ROBBINS, RUSSELL, ENGLERT, ORSECK & UNTEREINER LLP
1801 K STREET, N.W., SUITE 411
WASHINGTON, D.C. 20006
PHONE (202) 775-4500
FAX (202) 775-4510
www.robbinsrussell.com

Roy T. Englert, Jr.

(202) 775-4503
renglert@robbinsrussell.com

November 8, 2005

BY HAND DELIVERY

Clerk of the Court of Appeals
United States Court of Appeals for the
District of Columbia Circuit
Room 5423
333 Constitution Avenue, N.W.
Washington, D.C. 20001

Re: State of Utah's Petition for Review of the Nuclear Regulatory Commission's Licensing Proceeding, NRC Docket No. 72-22-ISFSI

To the Clerk's Office:

Enclosed is the State of Utah's petition for review of the Nuclear Regulatory Commission's Licensing Proceeding, NRC Docket No. 72-22-ISFSI. As required by the Court's rules, Utah is filing an original and four copies of the petition for review. As indicated on the certificate of service that follows the petition for review, copies will be sent today to all parties that participated in the administrative proceedings. As a courtesy, we have sent a copy of the petition for review to both the Secretary and the Staff of the Nuclear Regulatory Commission.

A number of the decisions from the licensing proceeding are attached to the petition. But, as noted in the petition for review, "Utah is invoking the Court's jurisdiction with respect to *all* of the decisions issued by the NRC and its adjudicative bodies in the PFS licensing process, whether or not copies of those decisions accompany this petition." Pet. Rev. at 3.

Sincerely,

Roy T. Englert, Jr

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF UTAH, Petitioner, v. NUCLEAR REGULATORY COMMISSION and THE UNITED STATES OF AMERICA Respondents.	)	No. _____

PETITION FOR REVIEW

The State of Utah ("Utah") hereby petitions the Court in accordance with Rule 15 of the Rules of Appellate Procedure to review the final decision and actions of the Nuclear Regulatory Commission ("NRC") in an adjudicatory licensing proceeding, NRC Docket No. 72-22-ISFSI. NRC's decisions and actions relate to the application by Private Fuel Storage, LLC ("PFS") to obtain a license to construct and operate an Independent Spent Fuel Storage Installation ("ISFSI") to store large quantities of nuclear waste on lands owned by the Skull Valley Band of Goshute Indians. These Indian-owned lands are located within the State of Utah; an accident, a malfunction, or negligence at the ISFSI could cause significant harm to Utah, its citizens, and its environment. Therefore, Utah intervened in the NRC licensing proceeding and raised a number of contentions (*i.e.*, reasoned objections to the license application) in accordance with the then-applicable NRC regulation, 10 C.F.R. § 2.714(b) (2004). Utah petitions the Court to review the NRC's adjudicatory rejection of all of Utah's contentions and the NRC's decision to issue a license to PFS. Under 42 U.S.C. § 2239(a)(1)(A) and (b), the Commission's adjudicatory decisions over the course of this

proceeding became judicially reviewable on September 9, 2005, when the Commission issued CLI-05-19, 62 N.R.C. __ (Exhibit A), which states (slip op. at 27), "Our decision today concludes this protracted adjudication – which has generated more than 40 published Board decisions and more than 30 published Commission decisions," and "[t]here are no remaining adjudicatory issues to resolve." This petition is filed within 60 days of that date. See 28 U.S.C. § 2344; 42 U.S.C. § 2239(b).

Each of the contentions that Utah raised focused on a particular defect in PFS's proposal. For a number of Utah's contentions, the NRC Licensing Board and the Commission acted arbitrarily and capriciously and contrary to law by failing to comply with their own prior decisions (without articulating a basis for doing so); by failing to follow the NRC's regulations or the federal statutes out of which those regulations arise; by failing to consider important evidence that would have changed the outcome of the various decisions; by violating Utah's due process rights; and by committing other reversible errors.

On September 9, 2005, the Commission in CLI-05-19, 62 N.R.C. __, not only concluded its adjudication of all issues (as discussed above), but also instructed the NRC's Staff to issue a license to PFS. This decision represented final agency decision and action, and made the other decisions from the PFS licensing process ripe for judicial review.

Utah intends by this petition to invoke the jurisdiction of this Court with respect to *all* of the decisions of the Commission and the Licensing Board leading up to and culminating with its final decision (*i.e.*, CLI-05-19, 62 N.R.C. __). Without in any way limiting the comprehensiveness of its invocation of this Court's jurisdiction, however, Utah states that its present intention is to address in merits briefing the following specific decisions:

1. All NRC decisions relating to Contention Utah K.

2. All NRC decisions relating to Contention Utah UU.

3. All NRC decisions relating to Contention Utah E.

4. All NRC decisions relating to Contentions Utah X, Y, Z, HH, II, KK, and RR, which are grouped together because each of these contentions alleged that the PFS application and the NRC's consideration of it failed in a material way to comply with the requirements of the National Environmental Policy Act, 42 U.S.C. § 4321, *et seq.*, and applicable NRC regulations.

For the contentions listed in Paragraphs 1 through 4 above, Utah is attaching to this petition (as Exhibits A through P) the most relevant decisions that the NRC Licensing Board and the Commission issued. (It would overburden the Court if Utah included at this time all of the decisions that the Commission's September 9 decision made subject to judicial review; these decisions consume thousands of pages. Utah is invoking the Court's jurisdiction with respect to *all* of the decisions issued by the NRC and its adjudicative bodies in the PFS licensing process, whether or not copies of those decisions accompany this petition.)

Contention Utah K addressed, among other things, the risk that a credible accident from a crashing aircraft or bomb would occur at the ISFSI. The ISFSI site is overflown annually by thousands of F-16s (some of which carry live ordnance) en route to the nearby military test and training range where pilots engage in war maneuvers and weapons testing. Utah is attaching a copy of CLI-05-19, 62 N.R.C. __, dated September 9, 2005, which is the Commission's final decision (see Exhibit A). That decision denied Utah's request that the Commission review the Licensing Board's various decisions on Contention Utah K. As noted above, the Commission's decision also authorized the NRC Staff to issue a license to PFS. Utah is also attaching a copy of the published version of the Licensing Board's February 24, 2005, final partial initial decision on this contention,

LBP-05-29, 62 N.R.C. __ (as redacted October 28, 2005) (see Exhibit B), which the Commission declined to review (see CLI-05-19, 62 N.R.C. __). An NRC commissioner and a member of the Licensing Board dissented from, respectively, the decisions attached as Exhibit A and Exhibit B. ("Safeguards" material that the Commission has protected from disclosure in accordance with 42 U.S.C. § 2167 and the NRC's applicable regulations, 10 C.F.R. § 73.21, has been redacted from the published version of the decision attached as Exhibit B. Utah anticipates that the parties will, by appropriate motion, provide the Court with the full versions of Exhibit B and other "Safeguards" materials under seal, but the public version should suffice to invoke the jurisdiction of this Court for present purposes.) Utah is also attaching a decision (CLI-01-22, 54 N.R.C. 255) in which the Commission determined the legal standard that must exist for an accident to be considered "credible" (see Exhibit C). One commissioner refused to join the majority opinion, indicating that she would have remanded the issue to the Licensing Board for additional fact-finding (Exhibit C, 54 N.R.C. at 265-66). In LBP-05-29, 62 N.R.C. __, the Licensing Board acted inconsistently with a previous decision, LBP-03-04, 57 N.R.C. 69, and committed other reversible errors. A copy of LBP-03-04, 57 N.R.C. 69, is attached as Exhibit D.

Contention Utah UU addressed, among other things, the risk that the Department of Energy will not collect and transport nuclear waste from PFS's facility for permanent storage at a geologic repository at Yucca Mountain unless it is first unsealed and repackaged elsewhere. Utah is attaching a copy of CLI-05-12, 61 N.R.C. 345, which is the Commission's decision denying review of the Licensing Board's decision on Contention Utah UU (*see* Exhibit E). Utah is also attaching a copy of the Licensing Board's decision on this contention, LBP-05-05, 61 N.R.C. 108 (*see* Exhibit F).

Contention Utah E addressed, among other things, PFS's failure to provide assurance that it had the financial means (or access to those means) to safely construct, operate, and decommission the ISFSI. Utah is attaching a copy of CLI-04-10 (public version), which is the Commission's decision denying review of Contention Utah E (*see* Exhibit G). Utah is also attaching a copy of the following three significant Licensing Board decisions, which the Commission declined to review: the Licensing Board's May 27, 2003, Partial Initial Decision on Contention Utah E, LBP-05-21 (public version) (see Exhibit H); the Licensing Board's May 27, 2003, Memorandum and Order (Rulings on Summary Disposition Motion and Other Filings Relating to Remand From CLI-00-13), LBP-05-20 (public version) (see Exhibit I); and the Licensing Board's January 5, 2004, Reconsideration Ruling, LBP-05-23 (public version) (see Exhibit J). (Some of the decisions arising in connection with Contention Utah E contain material that the Commission determined to be confidential proprietary information relating to PFS's financial qualifications. Utah anticipates that the parties will, by appropriate motion, provide the Court, under seal, with the full versions of Exhibits G, H, I and J and other proprietary materials.)

As noted above, Contentions Utah X, Y, Z, HH, II, KK, and RR all relate to the Commission's failure to consider adequately (as required by the National Environmental Policy Act, 42 U.S.C. § 4321, *et seq.*, and NRC regulations) the environmental costs, benefits, and/or consequences of building (or electing not to build, or of building in an alternative location) an open air facility to store nuclear waste (including the rail line that would lead to the facility). The Commission declined in CLI-04-04, 59 N.R.C. 31, to review the Licensing Board's treatment of Contentions Utah X, Y, Z, HH, II, and KK (see Exhibit K). In LBP-98-07, 47 N.R.C. 142, the Licensing Board declined to admit Contentions Utah X and Y (see Exhibit L, 47 N.R.C. at 202). In LBP-01-23, 54 N.R.C. 163,

the Licensing Board granted PFS's summary disposition motion on Contention Utah Z (see Exhibit M). In LBP-98-29, 48 N.R.C. 286, the Licensing Board declined to admit Contentions Utah HH and II (see Exhibit N). In LBP-00-27, 52 N.R.C. 216, the Licensing Board declined to admit Contention Utah KK (see Exhibit O). For Contention Utah RR, the Commission accepted for review the Licensing Board's decision, and held (in CLI-02-25, 56 N.R.C. 340) that PFS was not required to consider the environmental effects of a terrorist attack on the ISFSI (see Exhibit P).

Under the Hobbs Act, 28 U.S.C. § 2342, this Court has jurisdiction to review the NRC's decisions and actions pursuant to 42 U.S.C. § 2239(b).

Venue in this Court is proper under 28 U.S.C. § 2343.

Utah respectfully requests that the Court grant the following relief:

(1) Grant this petition for review;

(2) Declare that the NRC's decisions relating to the PFS license application are arbitrary and capricious and inconsistent with applicable law;

(3) Direct the NRC to revoke any license issued to PFS, to withdraw its approval of that license, and to refrain from issuing a license to PFS; and

(4) Grant such other relief as the Court deems just and proper.

Respectfully submitted,

Roy T. Englert, Jr.
Noah A. Messing
Robbins, Russell, Englert, Orseck
& Untereiner LLP
1801 K Street, N.W.
Suite 411
Washington, D.C. 20006
Telephone: (202) 775-4500
Fax: (202) 775-4510

Mark L. Shurtleff, Attorney General
Denise Chancellor, Assistant Attorney General
Fred G Nelson, Assistant Attorney General
James R. Soper, Assistant Attorney General
Connie Nakahara, Special Assistant Attorney General
Attorneys for State of Utah
Utah Attorney General's Office
160 East 300 South
5th Floor, P.O. Box 140873
Salt Lake City, UT 84114-0873
Telephone: (801) 366-0286
Fax: (801) 366-0292

November 8, 2005

CERTIFICATE OF SERVICE

I hereby certify that on November 8, 2005, true and correct copies of the State of Utah's Petition for Review (including all attachments) were served by first class mail, postage prepaid, upon:

John F. Cordes, Jr., Esq., Solicitor,
Sherwin E. Turk, Esq.
Office of General Counsel
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Office of the Secretary
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Jay E. Silberg, Esq.
Paul A. Gaukler, Esq.
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, N. W.
Washington, DC 20037-8007

Larry EchoHawk
Paul C. EchoHawk
Mark A. EchoHawk
EchoHawk Law Offices
151 North 4th Avenue, Suite A
P.O. Box 6119
Pocatello, ID 83205-6119

Joro Walker, Esq.
Western Resource Advocates
425 East 100 South
Salt Lake City, UT 84111

Paul Tsosie, Esq.
Calvin Hatch, Esq.
Tsosie & Hatch
2825 East Cottonwood Parkway, Suite 500,
Salt Lake City, UT 84121

Tim Vollmann
3301-R Coors Road N.W. # 302
Albuquerque, NM 87120

Steven J. Christiansen
Parr, Waddoups, Brown, Gee & Loveless
185 S. State Street, Suite 1300
P.O. Box 11019
Salt Lake City, UT 84147-0019

Noah A. Messing

STATE OF UTAH, Petitioner v. NUCLEAR REGULATORY COMMISSION and THE UNITED STATES OF AMERICA, Respondents

List of Exhibits Attached to State of Utah's Petition for Review

Exhibit	Citation	Date	Decision	Contention
A	CLI-05-19, 62 N.R.C. __	9/9/05	*Memorandum and Order* [denying Utah's petition for review & authorizing issuance of license to PFS]	Utah K
B	LBP-05-29, 62 N.R.C. __ [as redacted 10/28/05]	2/24/05	*Memorandum (Providing a Publicly-Available Version of Today's Board Decision on F-16 Aircraft Accident Consequences)*	Utah K
C	CLI-01-22, 54 N.R.C. 255	11/14/01	*Memorandum and Order* [affirming ruling on aircraft crash standard]	Utah K
D	LBP-03-04, 57 N.R.C. 69	3/10/03	*Partial Initial Decision (Regarding "Credible Accidents")*	Utah K
E	CLI-05-12, 61 N.R.C. 345	6/20/05	*Memorandum and Order* [denying Utah Petition for review]	Utah UU
F	LBP-05-05, 61 N.R.C. 108	2/24/05	*Memorandum and Order (Ruling on State of Utah's Recently-Filed Contention UU)*	Utah UU
G	CLI-04-10, __ N.R.C. __ [public version, 8/12/05]	3/24/04	*Memorandum and Order* [denying Utah's petition and accepting PFS's petition for review]	Utah E
H	LBP-05-21, __ N.R.C. __ [public version, 8/12/05]	5/27/03	*Partial Initial Decision (Contention Utah E/Confederated Tribes F, Financial Assurance)*	Utah E
I	LBP-05-20, __ N.R.C. __ [public version, 8/12/05]	5/27/03	*Memorandum and Order (Rulings on Summary Disposition Motion and Other Filings Relating to Remand from CLI-00-13)*	Utah E

Exhibit	Citation	Date	Decision	Contention
J	LBP-05-23, __ N.R.C. __ [public version, 8/12/05]	1/5/04	*Memorandum and Order (Granting in Part and Denying in Part Motion for Reconsideration and/or Clarification of Financial Qualifications Decisions)*	Utah E
K	CLI-04-04, 59 N.R.C. 31	2/5/04	*Memorandum and Order* [ruling on Utah's Petition for Review of residual issues]	Utah X, Y, Z, HH, II, KK
L	LBP-98-07, 47 N.R.C. 142	4/22/98	*Memorandum and Order (Rulings on Standing, Contentions, Rule Waiver Petition, and Procedural/ Administrative Matters)*	Utah X, Y
M	LBP-01-23, 54 N.R.C. 163	8/1/01	*Memorandum and Order (Granting Summary Disposition Motion Regarding Contention Utah Z)*	Utah Z
N	LBP-98-29, 48 N.R.C. 286	11/30/98	*Memorandum and Order (Ruling on Late-Filed Contentions Regarding August 1998 Low, Utah Rail Spur License Application Amendment)*	Utah HH, II
O	LBP-00-27, 52 N.R.C. 216	10/30/00	*Memorandum and Order (Denying Request to Admit Late-Filed Contention Utah KK)*	Utah KK
P	CLI-02-25, 56 N.R.C. 340	12/18/02	*Memorandum and Order* [denying Utah Petition for review]	Utah RR

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nils J. Diaz, Chairman
Jeffrey S. Merrifield
Gregory B. Jaczko
Peter B. Lyons

DOCKETED 09/09/05

SERVED 09/09/05

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

CLI-05-19

MEMORANDUM AND ORDER

The State of Utah has petitioned for review of a series of Licensing Board orders concerning the hazard from a potential aircraft crash into Private Fuel Storage, L.L.C.'s (PFS's) proposed Independent Spent Fuel Storage Installation (ISFSI). The Board found, ultimately, that the probability of a release of radiation from an aircraft crash into the facility was less than one in a million, and therefore the facility complied with applicable NRC safety standards.[1] For the reasons set forth below, we deny the petition for review and we also authorize the NRC staff to issue a license to construct and operate the PFS facility.[2]

---

[1] *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), Memorandum (Public (Non-Safeguards) Version (Regarding F-16 Aircraft Accident Consequences)), ADAMS ML050620391 (Feb. 24, 2005) and *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-05-12, 61 NRC 319 (2005) (Memorandum and Order (Ruling on Reconsideration)). *See also Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-03-04, 57 NRC 69, 122 (2002).

[2] *See* 10 C.F.R. § 2.764(c)(2004). Throughout today's decision we cite the NRC's former adjudicatory rules, which appear in the 2004 volume of the *Code of Federal Regulations.* In early 2004, the Commission issued new adjudicatory rules, but they do not apply to this case, which began before their promulgation. *See Final Rule: Changes to Adjudicatory Process*, 69 Fed. Reg. 2182 (Jan. 14, 2004).

I. BACKGROUND[3]

Because the proposed PFS facility would lie in Skull Valley, Utah – underneath the flight path of military aircraft – the possibility of an aircraft crash into the site raised concerns to which this agency has devoted much attention, including lengthy adjudicatory hearings before our Licensing Board. Air Force jets travel between Hill Air Force Base and the Utah Testing and Training Range over Skull Valley, including the proposed PFS site, at the rate of about 7000 flights per year.

NRC regulations require that ISFSIs be able to withstand "credible" accidents.[4] In this case, a significant question faced by the Board was how likely an aircraft crash had to be before it was considered "credible" – in other words, at what point does an accident become so unlikely that the Commission does not require that it be considered in the facility's design? The Board determined that any event having a less than one-in-a-million annual probability could be disregarded in the facility's design.[5] The Board referred its ruling to the Commission. A Commission decision agreeing with the Board was issued in November, 2001.[6]

After extensive hearings in 2002, the Board, applying its "credible" accident criteria, ruled that an F-16 crash into the facility was within the design basis for the facility. The Board drew this conclusion after finding that the probability of an aircraft crashing into the proposed

---

[3] The public version of the Board's partial initial decision explains the background of this complicated proceeding in detail, so we will summarize only briefly here. The Board also issued a non-public, "safeguards" version of its order. *See generally* 42 U.S.C. § 2167; 10 C.F.R. § 73.21. That version discusses evidence and findings that cannot be made public because of security concerns. Our decision today discusses only publicly available information, but our ruling also relies on discussions and findings in the Board's Safeguards order.

[4] *See, e.g.*, 10 C.F.R. § 72.24(d)(2).

[5] LBP-01-19, 53 NRC 416 (2001).

[6] CLI-01-22, 54 NRC 255, 265 (2001).

PFS site was more than one in a million – 4.29 in a million, to be precise.[7] The Board rejected PFS's theory that the likelihood of a crash into the facility would be measurably reduced by an "R" factor, representing the likelihood that the pilot of a crashing F-16 would deliberately steer the aircraft away from the PFS facility before ejecting. Consequently, the Board ruled, before the PFS facility could be licensed, PFS would have to show that such a crash would not release unacceptable levels of radiation. Accordingly, the Board called for a second hearing on the air crash issue, this one to consider the consequences of an F-16 crashing into the site.

PFS and the NRC staff sought Commission review of the Board's decision. Among other things, PFS claimed the Board erred in rejecting the "R" factor,[8] while the NRC staff argued that the Board's "4.29 in a million" finding came close enough to the NRC's "one in a million" standard to deem the aircraft crash threat acceptably low.[9] The Commission held those petitions in abeyance until after the Board-ordered "consequences" hearing on the basis that probability and consequences are "intimately linked" and the Board's initial "probability ruling may be rendered moot or unimportant by subsequent Board findings."[10]

The Board's effort to analyze radiological consequences of an aircraft crash into a facility has no adjudicatory precedent at the NRC.[11] Because the various possible crash scenarios are nearly limitless, the Board and the parties were plowing new ground in calculating the consequences of a "credible" aircraft accident. After much analysis, PFS proposed to carve out from all credible accidents a subset of accidents that it could prove, based on the speed and

---

[7] *See* LBP-03-04, 57 NRC 69, 122 (2003).

[8] See Applicant's Petition for Review of LBP-03-04 (Mar. 31, 2003), at 8-9.

[9] *See* NRC Staff's Petition for Commission Review of the Licensing Board's Partial Initial Decision in LBP-03-04 (Mar. 31, 2003), at 6-7.

[10] CLI-03-5, 57 NRC 279, 283 (2003).

[11] Public Partial Initial Decision (PID) at A-10.

angles of impact, would *not* rupture the interior multi-purpose canister, which is the last barrier to release of the fission products in stored spent nuclear fuel.[12] PFS argued that if the percentage of accidents that would *not* breach the canister was 80% or more, then the percentage of accidents that *could possibly* breach it must be 20% or less. In that case, PFS reasoned, the overall probability (20% of 4.29 in a million) that an accident could release radiation would be less than the one-in-a-million threshold.[13]

The parties performed complex computer simulations attempting to establish the dividing line between crashes the canister could survive without leaking and those it might not. Determining the breach probability had three basic steps. The first was to determine the maximum strain that the canister theoretically could survive without rupture. (The parties diverge at this point because Utah calculated that maximum strain before failure to be much lower than PFS and the NRC staff did.)

PFS then selected a hypothetical "bounding event" accident that it said would not exceed the maximum strain and therefore would not breach a canister. Of necessity, any accident at a *lower* speed or *greater* angle than the "bounding event" would have a lesser impact.[14] PFS did not fully analyze accidents exceeding the bounding event because the probability of those accidents was, by PFS's calculus, less than one in a million.[15] The probability of crashes exceeding the bounding event is referred to as the "unanalyzed event

---

[12] *Id.* at B-3.

[13] *Id.* at B-3.

[14] The particular speeds and angle discussed as the "bounding event" is considered safeguards material. The assumed angle of impact for the bounding event is near to the horizontal, because blunter angle impact at the same speed would have a less forceful impact on the cask.

[15] PFS submitted some analysis showing that some higher speed accidents would also not breach a cask. *See* Public PID at B-9.

probability."

The last step for PFS was to demonstrate, based on statistical analyses of historic crashes, that 80% or more of the expected crashes at the site would indeed be within the bounding event.

Utah countered PFS's approach by challenging PFS's premise that its canisters would withstand the force of the so-called "bounding event." Utah also maintained that a larger percentage of the predicted accidents would exceed the "bounding event" than PFS claimed.[16] The NRC staff supported PFS's approach.

The Board found 2-1 in PFS's (and the NRC staff's) favor, holding that the annual probability of a radiation-releasing air crash was less than one in a million.[17] The Board majority credited PFS's evidence on the performance of the multi-purpose canisters in an air crash scenario, on the strains imposed by the bounding event crash, and on the relative probability of crashes below or exceeding the bounding event. The majority also emphasized that PFS's crash analysis included "materially conservative assumptions ..., leading to the logical conclusion that the probability computed by the Applicant (and agreed [to] by the Staff) is likely to materially overestimate the probability (perhaps by an order of magnitude)."[18]

---

[16] Utah also analyzed accidents with a slightly different speed and angle than PFS's hypothetical "bounding event," but the force of impact of the "bounding event" accident is not in dispute in Utah's petition for review.

[17] *See* Public PID at B-8, C-1.

[18] The "conservatisms" include the following: (1) PFS's analyses assumed direct hits that would "maximize" damage, whereas in reality "a large fraction of such incidents would be expected to be other than direct hits;" (2) it was assumed that an aircraft hitting the "skid zone" around the facility would continue undamaged to hit a canister, even though the aircraft would be unlikely "to rebound off the desert without damage and without loss of part of its energy to the ground;" (3) because of the so-called "R" factor, there is some likelihood that a pilot would steer the aircraft away from the PFS site prior to ejection; and (4) PFS presented analyses indicating that the casks could withstand some higher speed impacts than the "bounding speed impact." *See* Public PID at B-8 to B-9. *See also* LBP-03-04, 57 NRC at 92-98 (explaining the "R factor").

In dissent, Judge Lam objected to the findings in favor of PFS for various reasons, some of which Utah reiterates in its petition for review. Judge Lam stated, for example, that there were insufficient data relating to historical crashes to reliably predict future crash probabilities. He also cited various uncertainties in the methods used to translate historical crash rates into a predicted rate.[19] In addition, Judge Lam stated that PFS should use a DOE-prescribed ductility ratio as the standard for predicting "failure," at least of the canister's overpack.[20] He concluded that PFS had not met its burden to satisfy the 10^{-6} safety standard.

II. Discussion

A. Motion for Reconsideration: 1 x 10^{-6} Probability Standard

As an initial matter, Utah asks the Commission to reconsider its 2001 decision setting a "one-in-a-million" (1 x 10^{-6}) threshold probability standard for a design basis air crash at the PFS facility.[21] Utah argues that the 2001 Commission ruling wrongly presupposed that the threshold standard had to be either one in a million or one in ten million, without considering the possibility of an intermediate number, for example (as Utah now suggests) one in five million.[22] Utah also disputes the Commission's finding that the consequences of an accident at an ISFSI would be more like an accident at a so-called geologic repository operations area ("GROA") than at a nuclear power reactor.

The Commission's ruling compared the one-in-a-million threshold standard established for a GROA – a temporary storage area to be used in conjunction with a permanent repository for disposing of spent nuclear fuel – to the one-in-ten-million threshold standard established for

---

[19]*See* Public PID, at D-2 to -3.

[20]*See id.* at D-4.

[21]CLI-01-22, 54 NRC 255.

[22]*See* State of Utah's Petition for Review of Contention Utah K (Aircraft Crashes), at 4.

a nuclear power reactor. The decision noted that in terms of both everyday operation and potential accident consequences, PFS's proposed ISFSI resembles a GROA more than a nuclear power reactor.[23] In addition, it pointed out that in previous rulemakings the NRC had announced its intent to "harmonize" regulations pertaining to ISFSIs and GROAs.[24]

Utah's new challenge to the one-in-a-million threshold probability standard amounts to an untimely motion for reconsideration.[25] Lateness alone is sufficient to reject Utah's reconsideration request.[26] Moreover, Utah's new argument fails to meet our reconsideration criteria. Reconsideration motions must be based on "elaboration or refinement of an argument already made, an overlooked decision or principle of law, or a factual clarification."[27] Utah's reconsideration request is none of these. Utah's argument for an intermediate accident probability standard, such as one in five million, was not raised in its 2001 appellate brief before the Commission.[28] Nor did the 2001 decision "overlook" legal principles or require "factual clarification." As the Commission held in 2001, in rulemakings prior to this adjudication it was made clear that GROAs and ISFSIs are similar facilities and should have the same design

---

[23] *See* CLI-01-22, 54 NRC at 264-65.

[24] *See id.* at 264, citing 61 Fed. Reg. 64,257, 64,262 (Dec. 4, 1996).

[25] *See* 10 C.F.R. §2.786(e) (2004) (setting forth a 10-day deadline for filing a petition for reconsideration of a Commission decision).

[26] *See, e.g, Private Fuel Storage , L.L.C.* (Independent Spent Fuel Storage Installation), LBP-00-14, 51 NRC 301, 310-11 (2000) (late-filed motion for reconsideration requires good cause, as well as new information or changed circumstances).

[27] *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-02-1, 55 NRC 1, 2 (2002).

[28] *See* "State of Utah's Brief on the Question Certified in LBP-01-19: The Regulatory Standard for Aircraft Crash Hazards at the PFS Site - Contention Utah K (Credible Accidents)," (July 13, 2001).

bases.[29] The Commission stated that there is "little basis" for using a reactor-like probability standard at an ISFSI (or a GROA); an accident at a reactor poses a greater risk than the accidental release of stored spent fuel because the contents of the reactor are under pressure that presents a "driving force behind dispersion" of radioactive materials.[30] For these reasons, Utah's request does not make the requisite showing.

In any event, the Board found that even a small breach of a single storage cask was not credible in the event of a direct hit by the single-engine F-16. A single F-16 crash could not significantly damage more than one cask, so the total number of casks on site – in other words, the total radioactive source term contained in the entire facility – is irrelevant. The number of casks increases the probability of a hit, but does not increase the potential consequences of a hit.[31] The Board's recent decision bolsters our 2001 ruling.

B. The Licensing Board's Rulings

The Commission will grant plenary appellate review of Licensing Board decisions – a discretionary step – in limited circumstances only. Among other things, we inquire whether there is reason to believe that (1) a Board "finding of fact is clearly erroneous," (2) a Board "legal conclusion is without governing precedent or is a departure from or is contrary to established law," or (3) the Board committed a "prejudicial procedural error."[32] Here, because of the complexity of this proceeding, we granted the parties an increase in page limits and extra time to file a petition for review and responses. After considering Utah's petition carefully we

---

[29] CLI-01-22, 54 NRC at 264.

[30] *Id.* at 264-65.

[31] Similarly, Utah's argument the proposed PFS facility is unlike the planned geologic repository in that PFS cannot control military overflight of the facility, goes to probability of a crash, not the similarity of the consequences.

[32] *See* 10 C.F.R. §2.786(b)(4)(2004).

see no factual, legal or procedural basis for disturbing the Licensing Board's carefully-rendered decision in this case. Below, we set forth the reasons why we find Utah's petition unpersuasive.

1. Standard of Review

Utah's petition for review focuses largely on the Licensing Board's fact-driven evaluation of the evidence on air crash risks at the PFS facility. As we have held previously in this proceeding, our "standard of 'clear error' for overturning a Board factual finding is quite high."[33] "A 'clearly erroneous' finding is one that is not even plausible in light of the record viewed in its entirety."[34] The short of the matter is that we expect our Licensing Boards to review testimony, exhibits, and other evidence carefully and to resolve factual disputes. That is the Boards' chief function in our adjudicatory system. Thus, unless there is strong reason to believe that in a particular case a Board has overlooked or misunderstood important evidence, we will defer to its findings of fact.

This very proceeding illustrates why it is sensible to defer to the Board acting in its factfinding capacity. At the hearing leading to the ruling before us today, the Board heard from 20 witnesses, who presented 225 exhibits, over the course of 16 days. The hearing transcript spans over 4,500 pages. In making its findings, the Board was required to sift through this evidence, to review studies and documents, and to make countless judgments on the credence to give each expert witness. We are not inclined to engage in any kind of *de novo* factual inquiry, particularly in a proceeding of this complexity, involving numerous experts and voluminous exhibits. As the United States Supreme Court has pointed out, the likelihood that a reviewing body will rely on the presumption of correctness of a trial court's factual

---

[33] CLI-03-8, 58 NRC 11, 25-26 (2003).

[34] *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Unit 1; Sequoyah Nuclear Plant, Units 1 and 2; Browns Ferry Nuclear Plant, Units 1, 2, and 3), CLI-04-24, 60 NRC 160, 189 (2004) (internal citations and quotations omitted).

determinations "tends to increase when trial judges have lived with the controversy for weeks or months instead of just a few hours."[35]

2. Cruise Missile Testing.

Utah challenges the Board's 2001 summary disposition ruling that impacts from errant cruise missiles need not be considered in the design basis of the facility.[36] In that decision, the Board granted a PFS motion for summary disposition and found that a cruise missile accident at PFS is not a credible event. Utah argues that its air crash contention – "Utah Contention K" – is whether the cumulative probability of a crash from military activities, including cruise missile testing, constitutes a credible event. It was error, Utah says, for the Board to look at the probability of a cruise missile impact separately to determine that the probability of that event is too small for consideration.

But the Board's ruling, as we read it, was not based on the probability of a cruise missile impact falling below the 1×10^{-6} threshold probability for a credible event. Rather, the Board cited PFS's undisputed evidence that the flight path for cruise missiles tested at the Utah Test and Training Range would not be within ten nautical miles of the facility.[37] The Board also relied on PFS's undisputed evidence that, according to Air Force officials, no cruise missile has crashed more than one mile off its flight path.[38] Given these two pieces of evidence, it was reasonable for the Board to conclude, as it did, that there was no material factual dispute suggesting that cruise missiles present any statistically significant threat to the facility. It is

---

[35] *Bose Corporation v. Consumers Union of the United States, Inc.*, 466 U.S. 485, 500 (1984).

[36] *See* LBP-01-19, 53 NRC 416, 424-29 (2001). As this ruling granted only a partial summary disposition, it was interlocutory and not appealable by the parties until the final disposition of this portion of the case.

[37] *Id.* at 427.

[38] *Id.*

therefore not necessary to determine whether a cruise missile crash is sufficiently like an F-16 crash to necessitate adding the probabilities together to reach a total probability for threats from the air.

3. Loss of Shielding

Utah claims the Board committed a prejudicial procedural error in ruling on reconsideration that "loss of shielding" was not preserved as a issue in the second hearing.[39] Utah argued in its motion for reconsideration that even if the multi-purpose canister was not penetrated in a crash, its concrete overpack could be stripped away, leading to excessive offsite radiation doses. Utah says the Board was wrong to end its analysis once it found that the canister would not rupture in a credible accident.

Utah argues that it never had the opportunity to present evidence on the loss of shielding claim because of the Board's ruling that the second hearing, rather than considering the "consequences" of a radiation release as originally envisioned, instead would focus on the probability of rupturing the canister. Excessive radiation doses due to damage to the overpack would go to the "consequences" of the crash, Utah says, an issue specifically precluded by the Board's pre-hearing ruling.[40]

In our view, the Board reasonably found that Utah had waived the right to argue about shielding loss by not bringing it up earlier. Our understanding of the procedural history of the air crash issue supports the Board's decision.

The first hearing on aircraft crash hazards examined the likelihood that an F-16 would crash anywhere on the site of the PFS facility.[41] After that hearing, the Board ruled against

---

[39] *See* LBP-05-12, 61 NRC 319 (2005).

[40] *See Memorandum Concerning Scheduling* (April 15, 2004), at 2.

[41] The Board limited the scope of the first aircraft crash hearing in response to a PFS motion *in limine*. *See* Tr. at 3008; LBP-03-4, 57 NRC at 136-41.

PFS, finding the likelihood of an F-16 crash onto the PFS site unacceptably high (an annual chance of 4.29 in a million). The Board found that the license could not be issued at that juncture unless PFS addressed the "consequences" issue, either by demonstrating that an F-16 would not penetrate a cask, or that, if it did, there would be no significant radiation doses to the public.[42]

Over the next year, the parties worked steadily to gather experts and statistics and perform the calculations necessary to determine what the "consequences" of an aircraft crash would be. It soon became clear that delineating between the "probability" of an aircraft crash and its "consequences" is not simple. To illustrate, if there is a 4.29 in one million chance that an F-16 would crash somewhere on the PFS site, a certain percentage of those crashes would not even hit a spent fuel storage cask, because portions of the facility site would be vacant or not used for spent fuel storage. A percentage of those crashes that did hit a spent fuel container would strike a only glancing blow. Some would be at high speed, and some would be at a speed too slow to inflict damage. Therefore, only a portion of the estimated 4.29 in one million crashes would actually result in damage to a cask.

After performing its calculations, PFS argued that even if the annual probability of a crash on the site was greater than one in a million, the probability of *significant damage* to a cask was below one in a million. It then asked the Board to limit the scope of the second hearing to the probability of a crash severe enough to penetrate the storage canister and to release contaminants. The Board agreed to limit the scope of the hearing to the probability of canister breach, which, as it pointed out, could be seen as either a part of the probability or the consequences factors of risk.[43]

---

[42] LBP-03-4, 57 NRC 69, 135 (2003).

[43] Memorandum Concerning Scheduling (April 15, 2004) (committing to writing the Board's April 8, 2004 oral decision), n.1.

Utah now argues that the Board's decision limiting the scope of the second hearing to the probability of a canister breach precluded it from making its argument that the "loss of shielding" from a damaged overpack would have unacceptable dose consequences even in the event that the canister was not penetrated. Utah argues that damage to the overpack should have been at issue in the second hearing because the parties repeatedly referred to "cask breach" and "cask damage" when discussing the results of an accident. Utah points out that the parties in this proceeding have regularly used the term "cask" when referring to the concrete overpack (which provides shielding), and "canister" when referring to the multi-purpose canister inside (which confines the radioactive byproducts).

We conclude that the Board acted reasonably in deciding that Utah had not timely raised the overpack-shielding issue. It is evident from the record that the entire phase two hearing was aimed at determining the likelihood that the multi-purpose canister would be breached, based on the assumption that only the release of radioactive materials from inside the spent fuel canister would raise concerns. Utah did not raise arguments or concerns about the shielding, either at the hearing itself or in the lengthy lead-up to the hearing. The NRC staff pointed out in its argument on Utah's reconsideration motion[44] – and the Board emphasized in its reconsideration decision[45] – that Utah never even mentioned the phrase "loss of shielding" in any of the 15 pre-hearing conferences leading up to the second hearing.

---

[44] *See* Tr. at 19,771 (Staff searched the transcripts for the phrase). The Board also searched the transcript for the word "shielding" and it never appeared. *See* Tr. at 19,717. Although Utah could not point to any time when it specifically made this argument, Utah now claims that its position was evident from the whole of its presentation. But the Board found otherwise. On this point, we do not find a basis to second guess the Board, which is much more familiar with the record and with the parties' statements and expectations than we are.

[45] LBP-05-12, 61 NRC at 327 ("*During the entire time the matter was under discussion the question of diminished shielding never arose.*" (emphasis in original)).

Utah, in short, never complained, until its reconsideration motion, that the Board hearing had focused on too narrow an issue – canister breach. It was Utah's burden to "structure its participation so that it is meaningful, so that it alerts the agency to [its] position and contentions"[46] As the Board indicated,[47] had Utah presented its loss of shielding argument sooner, the phase two hearing might have been restructured to include the probability of an accident stripping the overpack in addition to (or rather than) the probability of perforating the canister. It is too late to take that tack now. We see no obvious abuse of discretion, or procedural error, in the Board's refusal to restart its phase two hearing in response to Utah's untimely loss of shielding claim.

Indeed, accepting Utah's late claim would, in effect, return the complex probability-consequences inquiry to the starting line. The Board would first have to determine the probability that a crash would strip away a portion of the overpack before it went on to examine the offsite dose consequences of a partially or totally exposed canister.[48] In short, the parties would then be subject to another three-week hearing and the months of investigation preceding it. Such a result would be patently unfair to PFS, the NRC staff, and the Board, which have already focused extraordinary resources on the probability issues as originally framed.

Utah argues that potential violations of NRC dose limits cannot be waived by procedural default.[49] Utah's failure to raise its loss of shielding claim in timely fashion does not, however, waive NRC safety standards or excuse PFS from meeting them. It means only that Utah cannot

---

[46] *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 553 (1978)

[47] LBP-05-12, 61 NRC at 328.

[48] The Board might also have to determine the likelihood of other factors, for example, the probability that a crashing aircraft would strike a cask on the outside boundary of the formation (because radiation from a cask situated in the interior of the cask formation would be blocked from the boundary by the surrounding casks).

[49] *See* Utah's Petition at 12.

litigate the loss of shielding issue at an NRC hearing. Absent a statutory "mandatory hearing" requirement, NRC licensing boards sit to resolve discrete (and timely raised) *contested* issues only.[50] We depend on the NRC's expert technical staff to ensure that our licensees meet all other agency requirements.

4. Rejection of DOE Standard for Failure Strains of Steel Components.

Utah claims that the Board "arbitrarily rejected" a DOE standard for analyzing the performance of hazardous facilities in aircraft crashes.[51] At the phase two hearing, Utah urged the Board to use the DOE's Standard, *Accident Analysis for Aircraft Crash into Hazardous Facilities,*[52] to predict what strains PFS's multi-purpose canister could tolerate before failing in an aircraft crash. In particular, Utah argued that the Board should follow the DOE Standard's prescription of a "ductility ratio" of 20 as a criterion by which to gauge when the steels at issue would fail in tension. Rather than relying on the DOE approach, the Board relied on tests, placed in the record by PFS, showing the performance of stainless steel under tension.

The Board gave two reasons for not applying the portions of the DOE Standard Utah cites.[53] First, DOE's prescribed "ductility" ratios were apparently intended for a different type of structure, primarily buildings. Second, the type of failure the DOE Standard addressed was failure by collapse or deformation, not perforation. The Board's view was carefully considered and does not strike us as "clearly erroneous" or unreasonable. The parties argued the point during the phase two hearing and again at length at the oral argument on Utah's motion for reconsideration. The Board listened to a great deal of argument and testimony and considered

---

[50] *See generally Exelon Generation Co., LLC* (Early Site Permit for Clinton Site), *et al.*, CLI-05-17, 62 NRC __ (July 28, 2005).

[51] *See* Utah's Petition at 17.

[52] U.S. Department of Energy, DOE Standard DOE-STD-3014-96, October, 1996.

[53] *See* Public PID at B-3 to -4, B-10; LBP-05-12, 61 NRC at 332-33.

numerous exhibits in making its decision.

The DOE Standard provisions that Utah cites prescribe a permissible "ductility ratio" to determine when a structure will fail by "excessive structural deformation and collapse."[54] If the strain of the crash exceeds the prescribed ratios, then the DOE Standard says that the steel structure is assumed to fail.

> 6.3.3.3 Structural Evaluation Criteria. Deformation responses computed for various target structural components ... are then used to compute the ductility ratio (the ratio of computed displacement to elastic displacement) Computed ductility ratios are then compared to the permissible ductility ratios specified below to determine if the component would *deform excessively or collapse* under impact loads. ...
>
> b. for steel structural components, the permissible ductility ratios shall be as specified in Section Q1.5.8 of AISC Nuclear Specification, ANSI-N690 (Reference 11). For plate structures, the permissible ductility ratio is 10 is recommended.[55]

In calculating how much strain PFS's multi-purpose canister could withstand, both PFS and the NRC staff looked at experimental data that showed the canister's stainless steel make-up could tolerate 90 percent true strain in tension before it failed by rupture.[56] By comparison, the DOE Standard-prescribed ductility ratios would result in much more frequent assumed failures – 1/40th the strain of the experimentally determined failures.[57] PFS and the NRC staff advocated deriving an assumed canister failure rate by reducing – in accordance with customary engineering practice – the experimentally determined strain to allow a safety factor of two or three.[58] Their approach won the approval of the majority of the Board.

---

[54] *See* DOE Standard at 35, §4.3c. A ductility ratio is the ratio of computed displacement to elastic displacement or the yield strain. The yield strain is the point at which the material is changes from elastic to plastic, in other words, when it will be permanently deformed.

[55] *See* DOE Standard at 76, § 6.3.3.3. (Emphasis added.) *See also* n. 61 below.

[56] *See* Public PID at B-4.

[57] *See id.*

[58] *See id.*

a. The DOE Standard is Intended for a Different Type of Structure than the Multipurpose Canister

The Board observed that the DOE Standard addressed collapse of buildings, which are typically constructed of carbon steel, not stainless steel like a multi-purpose canister.[59] Stainless steel is considerably more ductile than carbon steel – that is, it will bend farther without breaking. Vessels such as the multi-purpose canister tend to be constructed of stainless steel.[60] The portions of the DOE Standard that Utah seeks to apply refer to an ANSI/AISC Standard that explicitly excludes pressure vessels.[61]

Utah now argues only that (1) the DOE Standard never explicitly says it does *not* apply to stainless steel pressure vessels and (2) an appendix to the DOE Standard describes how to evaluate potential exposure patterns in case a pressure vessel containing hazardous materials ruptures in an airplane crash. But neither argument persuades us that the Board's decision--to look at actual stainless steel performance instead of attempting to "fit" the problem to some pre-existing code–was wrong. Utah apparently does not dispute the proposition that stainless steel would perform differently from carbon steel in a crash. Utah does not offer any evidence that the two types of steel would perform similarly. Nor do we see any reason why the Board should have applied the DOE Standard to pressure vessels when that standard relies on an ANSI standard that explicitly excludes pressure vessels. Finally, the appendix that Utah cites is used to determine various exposure scenarios when a hazardous material container is breached; it is not used for determining whether a breach has occurred.

---

[59] *See id.* at B-10, (discussed in more detail in Safeguards PID at B-12 to -13); LBP-05-12, 61 NRC at 332-33.

[60] Soler/McMahon Reb., Post Tr. 15,228 at 15. Utah does not dispute this, but rather cites this testimony in its brief.

[61] ANSI/AISC Standard N690, *Specifications for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities* (1994), at 23.

b. The DOE Standard Addresses a Different Failure From That at Issue Below

It is apparent, as the Board found, that the portions of the DOE Standard that Utah advocates were not intended to address the type of failure that lies at the heart of the matter here. The majority of the Board determined that the ductility ratios in that standard were developed to determine the ability of structural components to carry loads: "[T]here was no justification for us to adopt a standard ductility ratio, developed for other situations, when that standard ratio was not shown to be relevant to, or derived from experiments about, the particular type of failures at issue here."[62] Judge Lam, in his dissent, thought the DOE Standard applicable to the concrete and carbon steel overpack, but his dissent takes no position on whether the "ductility ratios" should be used to determine perforation of the multi-purpose canister.[63]

The Board found that the DOE's ductility ratio did not answer the specific question at issue in the hearing – when the multi-purpose canister would rupture and allow its contents to escape. The portions of the DOE Standard invoked by Utah may help determine whether a steel component may fail by buckling or deformation. Other provisions of that standard address failure by penetration (the failure of concern here), but Utah does not advocate using those

---

[62] LBP-05-12, 61 NRC at 333.

[63] Judge Lam argued:

> A singularly important but unresolved dispute with respect to the Applicant's structural analysis is the Applicant's declination to adopt the DOE ductility ratio standard as the failure criterion for the spent fuel storage cask. The DOE ductility ratio standard was developed by a group of experts, assembled by the Department of Energy, to protect facilities containing radioactive or chemical materials from the hazards of an accidental aircraft crash.

Public PID, at D-4 (citations omitted).

provisions.[64] At the hearing below, the Board did not need to inquire whether the canister might be deformed or even weakened by the impact – rather, the Board considered the narrower question of whether the canister would *leak*. The Board held that Utah's preferred DOE Standard was not helpful in resolving that question.

The Board explained that other kinds of damage were not at issue in the proceeding because only a release of fission products would have offsite effects:

> [A]n incident which does not release radiation, but nonetheless causes the overpack and the [multipurpose canister] to be so damaged that the fuel contained within the [multipurpose canister] is no longer intact, may well be significantly more likely than one which is so damaging that radiation is released. *But such incidents are not at issue here*. Under the regulatory system, such incidents–because they are not radiation releasing–are to be dealt with by a licensee if and when they occur. Under that circumstance, the agency will become heavily involved (as it does in the aftermath of any accidents) to assure that possible effects of radiation arising out of the recovery operations are safely handled. Such incidents may present a serious problem in terms of what it takes of a licensee to clean up, but with no radiation "consequences," they do not have to be designed against.[65]

In sum, we find no clear error of fact in the Board's decision to use experimental data rather than the DOE Standard. The Board explained in detail its reasoning in rejecting the DOE Standard, both in its original ruling and on reconsideration, and its reasoning rested on the evidence before it.

We should also observe that all three parties, NRC staff, PFS and Utah performed extensive computer simulations, using sophisticated computer codes, and found as a common result that "*the maximum strain computed to occur in the [multipurpose canister] was well below (by at least a factor of eight or nine) the experimentally determined failure strain.*[66] Thus, there

---

[64] *See* DOE Standard at 35, §4.3b. "Local damage to steel targets: 1. penetration - to prevent perforation of a steel target, the minimum wall thickness required is at least 125 percent of the predicted penetration depth." *See also* DOE Standard, at 69-70, §6.3.2.2 Local Response Evaluation – Evaluation of Steel Targets.

[65] Public PID at B-2 (emphasis in original).

[66] *See id.* At B-3 (emphasis in original).

is a wide margin of safety.

There is no basis for further Commission review.

5. Claimed Errors in Calculating Probability[67]

Utah next argues that the Board used skewed accident data when estimating the probabilities of air crash accidents at various speeds.[68] Utah claims that the Board should have eliminated seven historical accidents that Utah says were dissimilar to possible Skull Valley accidents, and which had the effect of shifting the probability distribution toward slower speeds. In addition, Utah also argues that the Board arbitrarily eliminated from consideration certain hypothetical "top impact" crashes that should be considered "unanalyzed events."

As discussed above, the Board found acceptable PFS's "bounding aircraft impact" representing the top speed for the majority of accidents.[69] The "bounding speed" the Board used rested on PFS's structural analysis showing that its canister would not rupture at that or any lower speed. The bounding event is not necessarily a precise "cut-off" between crashes that would breach the canister and those that would not. The actual "cut-off" might well be at higher speeds than the bounding event. But because PFS's calculations showed that crashes

---

[67]As noted above, in countering Judge Lam's dissenting view that too many uncertainties infected PFS probability analysis, the Board majority pointed to "large conservatisms ... built into the analyses." *See* Public PID at B-12; *see also id.* at B-8 to B-9. Utah's petition for review says that the Board's "conservatism" finding rests on "subjective judgement, speculation and lack of evidentiary support." *See* Utah's Pet. at 26 *et seq.* But, as set out in detail in PFS's response to the petition for review, ample record evidence supports the Board's finding. *See* Applicant's Response to State of Utah's Petition for Review of Contention Utah K, at 25-29. In any case, the Board did not reduce the calculated probability at all to account for the conservatisms. Utah does not come close to suggesting there was "clear error."

[68]*See* Utah's Petition at 21-26.

[69] The Board accepted PFS's bounding speed and angle over Utah's (which involved a slower speed and slightly different angle) because it found that *neither* impact would have sufficient strain to breach a cask. Since either bounding speed was within the bounds of safety, it was appropriate to use the larger set (higher bounding speed) when calculating the relative probabilities of crashes within or outside the bounding speed. *See* Public PID at B-5 (explained more fully in safeguards version).

at higher speeds, while not impossible, were too improbable to be credible, the effects of those impacts were not analyzed. Thus, higher speed accidents are unanalyzed events and the probability of their occurrence is called the "unanalyzed event probability."

Utah argues that PFS (and the Board) set the unanalyzed event probability too low. In other words, according to Utah, certain higher speed crashes are more likely than the Board figured and therefore should have been considered credible. Utah claims that the Board "ignore[d] critical evidence" that the unanalyzed event probability exceeds one in a million.[70]

a. Seven Disputed Crashes

Utah would eliminate from consideration seven historical crashes that occurred at low speeds when the pilot delayed ejection in an attempt to land following engine failure. Including these accidents, which Utah says could not take place in Skull Valley, made the probability of a crash at lower speeds seem more likely.

Because there are limited available data of actual F-16 crashes, determining the probability of crashes at particular speeds and angles within Skull Valley proved a challenge for the parties and the Board. Of 121 accidents worldwide for which data were available, PFS identified 61 that it thought were of a type possible in Skull Valley. Further analysis eliminated four of those that were runway accidents, and therefore not possible in the air over Skull Valley, leaving 57 for the Board's analysis.

The Board considered the historical data issue at hearing and again in response to Utah's motion for reconsideration.[71] At the hearing, Utah sought to eliminate 13 additional crashes,[72] but on reconsideration focused its argument on the seven crashes on which it bases

---

[70] *See* Utah's Petition at 21.

[71] Public PID at B-7 to-8; LBP-05-12, 61 NRC at 334-36.

[72] Safeguards PID at B-20.

its petition for review. [73] As with the Board's other factual findings, the Board's decision on which historical air crashes to include and exclude from its probability calculation is not "clearly erroneous."

It is apparently undisputed that an F-16 could not take off or land in Skull Valley.[74] But the Board did not find this sufficient reason to eliminate the seven crashes now in dispute, even though they involve accidents where the pilots were looking to land, because the crashes were all initiated by the type of engine failure that *could* occur in Skull Valley. The Board found that these accidents were "fairly representative of one end of the range of crash scenarios."[75]

We find no clear error in the Board's ruling. Even assuming that Utah is correct in its view that eliminating these crashes from the data set would shift the probability distribution toward higher speeds, it is not clear that the result would be a more accurate prediction of future Skull Valley accidents. The Board found that the significant feature of the seven disputed crashes is that they resulted from engine failure. The Board explained that in case of engine failure, pilots are trained to trade forward speed for higher altitude, thus giving the pilot more time to attempt to restart the engine prior to ejecting.[76] Of the 57 accidents the Board agreed were relevant, 91% involved loss of engine power. In 63% of the loss of engine power loss accidents, it appeared that the pilot followed proper procedures.[77] And when the pilot follows procedures, the Board found, the aircraft crashes at a speed that "at any angle, is well below

---

[73] LBP-05-12, 61 NRC at 335

[74] *See* LBP-05-12, 61 NRC at 319.

[75] *See id.*

[76] *See* Public PID at A-6.

[77] *Id.* at B-6.

the speed of the Bounding Aircraft Impact."[78]

For these reasons, pilot experiencing engine failure over Skull Valley would probably not attempt to land; he would be expected to follow the above procedures to attempt to restart the engine. Utah has not given us reason to believe that most engine failure crashes would actually occur at higher speeds than in the seven disputed incidents.

It is also clear that there is more than one way to consider the data. For example, PFS suggested that if the Board were to eliminate the seven disputed incidents, then it should also "weight" the remaining crashes to reflect their likelihood of occurrence in Skull Valley. PFS argued that because the vast majority of flights in Skull Valley are at the 3000-4000 foot altitude range, the Board could "weight" historical accidents occurring at that initial altitude more than accidents that initiated at higher altitudes, which tend to result in higher speed impacts.[79] Weighting the probabilities would skew the data back toward slower speeds. The Board considered still other approaches to evaluating the available data, but concluded that using the entire set of 57 Skull Valley-type events would maximize the use of available data.[80]

The Board's inclusion of the seven disputed engine failure accidents does not appear to us "clearly erroneous" – that is, not even "plausible" on the record.[81] The Board, in any event, found no reason to believe that a re-analysis, leaving out the seven disputed accidents, would raise the unanalyzed event probability above acceptable bounds.[82]

---

[78] *Id.* Another 10 percent of relevant historical accidents were "deep stall" incidents where the aircraft falls vertically to the ground "like a leaf." A deep stall accident would not strike a cask with a force exceeding the bounding impact. *Id.*

[79] *See* LBP-05-12, 61 NRC at 335.

[80] *See* Safeguards PID at B-23.

[81] *See Tennessee Valley Authority,* CLI-04-24, 60 NRC at 189.

[82] *See* LBP-05-12, 61 NRC at 336.

b. Side Impacts Following Top Impacts.

Utah claims that the Board erroneously eliminated from consideration side impacts to a second cask after an F-16 first strikes the top of another cask. Utah argues that after a shallow impact to the top of a cask, an aircraft could continue without a significant loss of speed to crash into the side of another cask.

Again, we see no basis for declaring the Board's decision "clearly erroneous." The Board accepted PFS's expert's testimony that in the case of impacts to the top of the cask, the critical concern is the *vertical* speed at which the aircraft is traveling. An F-16 coming in at a shallow angle (close to the horizontal) would have a vertical speed much slower than the aircraft's overall speed. Therefore if the vertical speed were within the bounding event speed, then the crash would be within the bounding event.

Utah argues that any top impact with a *horizontal* speed greater than the bounding impact speed should be considered an unanalyzed side impact to neighboring casks. Therefore, Utah argues, the unanalyzed event probability is higher than the Board found.

The Board considered this argument on reconsideration, and rejected it. The Board explained why it would not expect such grazing, or "topping," incidents to contribute materially to the unanalyzed event probability.[83] Due to the arrangement of casks in the storage area, initial top impacts are more likely, because the sides of most casks are somewhat shielded by neighboring casks. Therefore, all potential crashes were divided into "top impact" or "side impact" for analysis, with the parties calculating the effective area for all tops or sides of casks that could be exposed to accident.

PFS introduced the testimony of Dr. Alan I. Soler[84] at the hearing. He testified that an F-

---

[83] *See* LBP-05-12, 61 NRC at 336-41.

[84] Ph.D. (Mechanical Engineering); Executive Vice President for Engineering, Holtec International (lead structural expert for design of the HI-STORM 100 cask system).

16 hitting the top of one cask at a high speed and shallow angle would not drop more than a few inches before hitting the next cask, and the tops of the casks have protuberances that would snag on the F-16's underside, preventing it from simply skipping to the next cask without loss of momentum.[85] The Board addressed this point in its reconsideration ruling. Where a major portion of the F-16 strikes the top of a cask, the Board said, it will "suffer material deformation" and "lose substantial momentum." [86]

Because of these factors, the Board found, the only way a craft hitting the top of a cask could continue unimpeded to strike the side of the next cask would be if it struck a glancing blow to the far side of the cask (that is, if only a small portion of the F-16's fuselage hit the cask top).[87] The Board reasoned that accounting for these side impacts would simply reallocate some impacts from "top" to "side" and "*effectively enlarge[], from a computational perspective, the cross-sectional area of the sides of the casks being impacted.*"[88]

Relying on an estimate provided by the NRC staff's expert, Dr. Dennis R. Damon,[89] the Board found that although this reallocation would increase the unanalyzed event probability, it would not be by enough to raise it to one in a million or more.[90] Reallocating some top impacts to side impacts would increase the unanalyzed event probability because the top impact was measured by vertical speed and the side impact would be measured by the greater horizontal speed.

---

[85] LBP-05-12, 61 NRC at 337; Testimony of Dr. Soler, Tr. 19,555-567.

[86] LBP-05-12, 61 NRC at 339.

[87] *Id.*

[88] *Id.* (emphasis in original).

[89] Ph.D, (Nuclear Engineering), Senior Level Advisor for Risk Assessment, Office of Nuclear Material Safety and Safeguards.

[90] LBP-05-12, 61 NRC at 341 (total unanalyzed event probability would be 7.8×10^{-7}).

Utah claims that simply reallocating a small fraction of "grazing" top impacts is not enough. It argues that every top impact with a horizontal speed exceeding the bounding speed should be considered to be an above-bounding impact to neighboring casks without regard to where on the cask lid the aircraft hits. It complains that the Board's analysis "allows countless high impact crashes to escape any contribution towards the probability of breach because the F-16 first strikes a cask top and the fact that it could continue on at speeds sufficient to breach is disregarded."[91]

Utah's petition has two problems: first, Utah does not specify the number of crashes with which it is concerned, and, second, its overarching theory of unimpeded secondary impacts seems to us unproven, if not far-fetched. The Board already has determined that the majority of crashes would not occur at speeds sufficient to breach a canister regardless of whether the impact was to the top or sides. Utah says the probability of a sufficiently high speed top impact is 1.94×10^{-7}, based on a calculation performed by PFS's expert Dr. Allin Cornell. According to PFS, however, that calculation was performed merely to determine the effect Utah's "unrealistic" scenario would have on the unanalyzed event probability.[92] The second difficulty we have with Utah's argument is understanding the mechanics of such a crash. An expert's opinion does not seem necessary to conclude that an F-16 cannot simply pass unimpeded through several feet of steel and concrete. Conceivably, we suppose, there could be a crash where an F-16 would hit the top of the cask at an angle and push it over, allowing the aircraft to continue on its trajectory. If so, however, Utah has given us no record evidence to support it or to perform probability calculations. The only relevant expert evidence called to our attention is that of Dr. Solar – who said that an F-16 hitting squarely on the top of a cask lid would itself bear the brunt

---

[91] Utah's Petition for Review, at 22.

[92] PFS Brief at 23, n. 53.

of the impact.

Therefore, Utah has not demonstrated that the Board committed any error, much less "clear error," in deciding this issue.

III. License Issuance

Our decision today concludes this protracted adjudication – which has generated more than 40 published Board decisions and more than 30 published Commission decisions. The adjudicatory effort, plus our staff's separate safety and environmental reviews, gives us reasonable assurance that PFS's proposed ISFSI can be constructed and operated safely. We express our appreciation for the diligent efforts of all involved in the adjudication – the intervenors (particularly the State of Utah), the NRC staff, and PFS itself.

There are no remaining adjudicatory issues to resolve. Accordingly, once it has made the requisite findings pursuant to 10 C.F.R. § 72.40, the Staff is authorized to issue PFS a license to construct and operate its proposed ISFSI.[93]

CONCLUSION

For the foregoing reasons, Utah's petition for review is *denied*, and the NRC staff is *authorized* to issue to PFS a license to construct and operate its proposed ISFSI.[94]

IT IS SO ORDERED.

---

[93] Under 10 C.F.R. § 2.764(c)(2004) the NRC staff cannot issue a license to construct and operate an away-from-reactor ISFSI without express Commission authorization. In this case we might have authorized license issuance earlier this year, once the Board issued its last partial initial decision, and notwithstanding Utah's subsequent reconsideration motion and petition for review. *See, e.g., Massachusetts v. NRC*, 924 F.2d 311, 322 (D.C. Cir. 1991), *cert. denied*, 502 U.S. 899 (1991). We decided, however, to hold off on license issuance until (in consultation with our technical and legal staff) we could complete our consideration of Utah's concerns.

[94] In view of today's decision, we need not consider the petitions for review still before us (held in abeyance) that challenge the Licensing Board's original probability ruling. *See* notes 8-10, *supra*, and accompanying text. Those petitions are, in effect, moot.

For the Commission

/RA/

Annette L. Vietti-Cook
Secretary of the Commission

Dated at Rockville, Maryland,
this 9th day of September, 2005

Commissioner Gregory B. Jaczko respectfully dissents, in part:

I appreciate the efforts of all parties involved in this long and detailed adjudication. I join in the Commission's decision to the extent the decision addresses the issues raised in the State of Utah's brief to the Commission seeking review of the final licensing board actions. I, too, am unconvinced by the arguments raised by the State of Utah in its brief and would defer to the Board's findings of fact regarding these issues.

I dissent in part because I believe the decision involves an important interpretation of the Commission's regulations and associated guidance related to aircraft hazard analyses that has not been adequately addressed – that of when an actual consequence analysis should be performed. Because I believe the final figures reached by the Board's calculation (which I do not disagree with) render an accident credible, I believe an additional analysis of the consequences of the F-16 aircraft hazard should be assessed prior to the issuance of the license.

As the NRC staff described in earlier briefs, the probability of a credible aircraft crash at the PFS site is calculated to be right at the established threshold at which additional analysis of the consequences of a crash is required. There is detailed analysis in the record of the exhaustive efforts to determine whether the actual probability is a fraction above that threshold or a fraction below. This analysis unfortunately missed the point and resulted in lengthy and unnecessary delays in this adjudication. An objective review of the inherent uncertainties

associated with a calculation of this magnitude makes it clear that the probability of an accident is "about" at the threshold which makes it credible. The precedent setting question then is, if the probability falls right at the established standard, what is the appropriate action for the Commission to take to ensure the adequate protection of the public?

I believe that in such situations fraught with uncertainty, it is the Commission's responsibility to approach these issues cautiously. The standard for establishing whether or not an accident is credible must be respected and if it is reached, the Commission should require the additional analysis necessary to determine any potentially harmful consequences. If those consequences could result in radiation exposures to the public that are above the exposure limits as defined by NRC regulations, then applicants are required to design against those possibilities.

These hearings were originally proceeding along this very path, but unfortunately never reached this logical conclusion. In an extensive opinion, the Licensing Board found that the Applicant, Private Fuel Storage, failed to show that the probability of an aircraft hazard was less than approximately 10^{-6}. The Board stated 'there is enough likelihood of an F-16 crash into the proposed facility that such an accident must be deemed "credible"', requiring an additional analysis of the design of the facility to show that such credible accidents would not result in a radiation exposure that exceeds the limits of 10 C.F.R part 100.[95] Specifically, the Board found that the probability of an accident was 4.29×10^{-6} per year, which exceeded the approximate 10^{-6} threshold for credibility.[96] The Board's finding on this issue was based on an understanding that the calculation for this probability was determined using the "classic four-factor NUREG-0800 formula".[97] Following a challenge of this decision to the Commission by the applicant, the

---

[95] *See* LBP-03-04, 57 NRC 69, 77 (2003).

[96] *Id.* at 88.

[97] The applicant argued that this formula should be modified to account for pilot actions in the event of a crash, but the Board rejected this argument in LBP-03-04, leaving the

Board's decision was upheld. [98] As a result, the applicant was forced to further evaluate the aircraft hazard.

The decision now before the Commission depends exclusively on a refinement of the calculation by the Board and I have concerns about the Board's application of this refined calculation. In arriving at the new probability for an aircraft hazard the Board adopted a new calculation that involved a consideration not only of the probability of an accident, but also the probability that an F-16 which crashed at the facility would breach one of the casks, leading to radiation exposure. After a contentious and complicated hearing, the Board found that the new probability was 0.74×10^{-6} and, more important, found that this number was below the threshold of 10^{-6}, eliminating aircraft hazard as a credible accident scenario.

As I indicated above, I do not dispute the Board's determination that this new probability calculation was 0.74×10^{-6}, but I do dispute the conclusion of the Board that this meets the established screening criteria to eliminate the aircraft hazard as a credible scenario. The staff's brief to the Commission appealing LBP-03-04, also supports this argument. There, the staff indicated that, "Dr. Campe testified that the criterion [for determining credibility of aircraft hazard] is expressed as an order of magnitude criterion – *i.e.*, an approximate value. He further testified that typically, order of magnitude thresholds are viewed as midpoints, such that 5×10^{-6} would be the dividing point between 10^{-6} and 10^{-5}.[99] Although the staff was arguing in that instance that, since the initial probability of an aircraft crash of 4.29×10^{-6} per year was consistent with 10^{-6} per year, the aircraft hazard should not be considered credible, I agree that the staff's description of the *interpretation* of the probability calculation is correct. In other words, the staff is correct that

---

traditional four-factor formula.

[98] *See* CLI-03-05, 57 NRC 279.
[99] Staff's Petition for Commission Review, March 31, 2003, at 6.

4.29×10^{-6} is *of the same order of magnitude* as 10^{-6}. Similarly 0.74×10^{-6} is *of the same order of magnitude as* 10^{-6}. The important content of the calculated number is just the order of magnitude.

I believe this is an important issue, because the Board has now effectively overturned Commission precedent in having flexibility to deal with the approximate probabilities in NUREG-0800. As NUREG-0800 clearly states, "This requirement is met if the probability of aircraft accidents resulting in radiological consequences greater than 10 CFR Part 100 exposure guidelines is less than *about* 10^{-7} per year (see SRP Section 2.2.3)."[100] Probability calculations of this kind are extremely difficult and fraught with uncertainty and can be rendered meaningless if the numerical results are given greater specificity than they actually inherently contain. For that reason, the staff correctly drafted and interpreted NUREG-0800 to reflect on order of magnitude estimate, not an absolute number. As the staff brief indicates, citing several cases, "[f]or events the estimated probability of which is of the order of 10^{-7} per year, there is virtually no hope that there will ever be sufficient data available to obtain a precise measured value."[101]

The Board majority and minority acknowledged the practical realities of this staff position in the difficulties of making its decision. Judge Farrar stated, "[i]n contrast, even those of us in the majority recognize that the F-16 accident crash challenge presents a close case, in which the demonstrated margins are, by our lights, narrow (and not persuasive to our dissenting colleague)."[102]

As a result, I believe the Board erred by establishing a new interpretation for the NUREG-0800 approximate probability, essentially replacing the credibility standard of "about 10^{-7}" with

---

[100] *See* NUREG-0800, §. 3.5.1.6., (emphasis added). Although NUREG-0800 references 10^{-7}, the Commission determined in CLI-01-22 that the appropriate numerical standard in this case is 10^{-6}.

[101] *Id.*

[102] See Board's Public Memorandum and Order, p. B-13 (Feb. 24, 2005).

"exactly 10^{-7}". Using the staff's reasoning, the Board should merely have looked at the *second* probability calculation as providing an order of magnitude estimate, which would be 10^{-6}. Thus, the *second* probability calculation failed to show conclusively that the aircraft accident was not credible, that is *less than* 10^{-6}.

Thus the Commission needs to consider alternative criterion to determine whether the aircraft hazard is high or low risk. The probability analysis simply failed to provide information useful in ruling out aircraft hazard as a credible threat. That leaves the applicant with only one option – complete a full consequence analysis of the design of the facility to show that the consequences of a credible aircraft crash will not lead to exposures above the 10 C.F.R. Part 100 limits. Such an approach would assure the adequate protection of public health and safety.

Although I have expressed my views in a slightly different manner, my concerns draw upon the dissent of Judge Lam. I agree fully with his conclusions that, "[more needs to be done. The Applicant should demonstrate that a breached spent fuel storage cask would not result in a site-boundary radioactive dose exceeding regulatory limits, or should implement other remedies such as the installation of physical barriers. Such a decisive demonstration, or the implementation of genuine remedies, would ensure the adequate protection of public health and safety."[103]

Therefore, I dissent in the decision of the Commission to authorize the staff to issue to Private Fuel Storage a license to construct and operate its proposed storage facility at this time. The misinterpretation of our regulations should be remedied by performing the necessary consequence analysis to ensure the adequate protection of the public health and safety from the issuance of this license.

---

[103] *Id.* at D-7.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

LBP-05-29

ATOMIC SAFETY AND LICENSING BOARD
Before Administrative Judges:

DOCKETED AND SERVED 10/28/05

Michael C. Farrar, Chairman
Dr. Peter S. Lam
Dr. Paul B. Abramson

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	October 28, 2005

ORDER ISSUING REDACTED VERSION
OF FINAL PARTIAL INITIAL DECISION

Our Final Partial Initial Decision in this proceeding, resolving the accidental aircraft crash "consequences" issue, was originally issued on February 24 of this year. Because our discussion therein involved Safeguards-protected matters, that decision was issued in two formats: one available to the public, and the other (the "official" one) available only to the litigating parties and to any reviewing tribunals. The publicly-available version differed from the non-public version in that the public Part II contained only a 13-page non-Safeguards summary or paraphrase of the Board majority's reasoning on the crucial issues, rather than the full technical analysis, including Safeguards information, detailed in the 43 pages of the non-public version of Part II. All other portions of the two versions, including the dissent, were identical.

We indicated at that time (see Feb. 24 cover Memorandum, p. 2; Decision, p. C-6) that we were retaining jurisdiction to attempt to issue later a redacted decision that would make as much of our reasoning, other than its Safeguards aspects, available to the public. Following issuance of the Commission's final decision on the matter (CLI-05-19, 62 NRC ___(Sept. 9,

2005)), the parties agreed on the Safeguards redactions (involving all or part of only some 34 lines) necessary to allow our earlier Decision to be released publicly. The Board's own NRC Safeguards expert, who had advised us as to those aspects of our earlier decisions, concurred.

Accordingly, the redacted Decision attached hereto, consisting of (1) the previously publicly-available portions – i.e., the opening "Overview and Summary;" the Part I "Procedural and Substantive Background;" the Part III "Conclusions of Law and Conclusion of the Proceeding;" the dissent; and the Appendix[1] – and (2) the newly-available Safeguards-redacted 43-page Part II "The Merits," [2] will be PUBLISHED physically, under this date and preceded by this Order, in the bound volumes of the periodic Nuclear Regulatory Commission Issuances.[3] The redacted Decision will also be PROVIDED electronically in the agency's ADAMS system for public viewing and reference.

The Decision may be cited as "LBP-05-29, 62 NRC ___ (February 24 [as redacted October 28], 2005)." The previously-issued unofficial, public version of our Decision, with its

---

[1] In re-issuing those portions, we have (1) made minor, non-substantive typographical or syntactical corrections thereto; and (2) conformed the description therein of the handling of the different versions of Part II to the present circumstances.

[2] The now-available redacted Part II is essentially identical to the original Safeguards-protected Part II, except for (1) some unavoidable minor, non-cumulative changes in page or line breaks; (2) the redactions themselves, as indicated by a series of XXXXX's occupying approximately the same typographical space as the text removed; (3) the change of several incorrect "Section A" references to refer instead to "Part I"; (4) the correction in footnote 125 of the "note 75" reference to refer instead to "note 124"; and (5) typographical corrections.

[3] In this regard, because it did not contain Safeguards information, our May 24 decision on reconsideration has already been published (see LBP-05-12, 61 NRC 319). As noted in the text (p. 1, above), the Commission's September 9 final decision on the matter is likewise being published.

13-page non-Safeguards paraphrase or summary of Part II, will remain available on ADAMS for reference purposes (accession # ML050620391). [4]

---

[4] Owing to the nature of a characterization contained therein, the Board finds it appropriate to comment upon an aspect of the NRC Staff's September 28, 2005 "Motion for Directed Certification and Stay of the Licensing Board's [September 15] 'Order Regarding Redaction of Final Partial Initial Decision.'" Therein, the Staff argued to the Commission, inter alia, that (1) the Board lacked authority to conduct redaction; (2) the Board had created a "balancing" test that could compromise the protection of Safeguards information, and the nation's common defense and security, in favor of the public's interest in viewing aspects of our decision; and (3) the redaction process would be so complex as to cause substantial further delay in the proceeding.

As to ground # 3 above, the redaction process proved simple and rapid, leading the Commission to dismiss the Staff's pleading as moot. CLI-05-22, 62 NRC ___ (Oct. 19, 2005). As is customary, the Commission went on therein to vacate our redaction order (to eliminate "any confusion or future effects stemming from unreviewed Board decisions"), while recognizing that our redacted decision was "now ready for publication." 62 NRC at ___ (slip op. at 3).

The matter could rest there but for the Staff characterization of the Board's action reflected in ground # 2, above, which could lead to a misunderstanding about the Board's intentions in terms of protecting Safeguards information. So that the record is clear as to what we actually did, we simply note that, in facing the possible need to determine what redactions should be made (as the Commission has now confirmed we should do with the assistance of our appointed adjudicatory employee (62 NRC at ___, slip op. at 4; compare p. 2, above)), we never considered that we should – and cannot fathom what in the record led the Staff to believe that we might – "balance" the protection of Safeguards information, and of national security interests, against the opportunity for the public to see more of our reasoning. See Sept. 28 Staff Motion at, e.g., 3. We neither used the word nor envisioned the concept. Indeed, we said essentially the opposite: see Sept. 15 Order, p. 4, urging "the parties" not to "over-reach" regarding their respective positions, for while "on the one hand, security interests will demand that certain material be protected, . . . excessive protection will deprive the citizens of Utah and the nation of the opportunity to understand more fully what underlies the agency's decision on this important issue" (emphasis added). The point is this: a desire to avoid excessive protection does not equate to, or include the suggestion of, a willingness to trade required protection for other values.

For litigants' future guidance on a related point, we remind them that, as far as we know, when disputes have arisen as to the extent of disclosure of material claimed to be protected, all previous Boards have done as we would have done here, that is, stayed, on the Board's own volition, the actual release of any contested document pending Commission review of any Board ruling that rejects a withholding claim. Requests for extraordinary remedies would not, then, be expected to be required in order for a party to protect its interest in non-disclosure.

It is so ORDERED.

THE ATOMIC SAFETY
AND LICENSING BOARD

/RA/

Michael C. Farrar, Chairman
ADMINISTRATIVE JUDGE

/RA/

Peter S. Lam
ADMINISTRATIVE JUDGE

Separate Opinion of Judge Abramson:

I concur in the issuance of the redacted Board decision and endorse the process adopted by the Board's Chairman in causing its preparation, but see no need for, or merit in, addressing in this Order the matters covered in footnote 4, and to that extent I dissent.

Rockville, Maryland
October 28, 2005

Copies of the foregoing documents were sent this date by Internet e-mail transmission to counsel for (1) Applicant PFS; (2) Intervenor State of Utah; and (3) the NRC Staff.

ATTACHMENT:

REDACTED VERSION FOR PUBLICATION

OF

LICENSING BOARD'S FEBRUARY 24, 2005

"FINAL PARTIAL INITIAL DECISION"

ON F-16 AIRCRAFT ACCIDENT CONSEQUENCES

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

LBP-05-29

ATOMIC SAFETY AND LICENSING BOARD
Before Administrative Judges:

Michael C. Farrar, Chairman
Dr. Peter S. Lam
Dr. Paul B. Abramson

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	February 24 (as redacted October 28), 2005

FINAL PARTIAL INITIAL DECISION --Redacted Version for Publication [1]
(Regarding F-16 Aircraft Accident Consequences)

Overview and Summary. Over the last several years, this Board has resolved a large number of wide-ranging issues regarding the application of a nuclear utility consortium known as Private Fuel Storage to construct and to operate -- on a Goshute Indian Reservation in Skull Valley, Utah, 50 miles southwest of Salt Lake City -- an aboveground facility for the temporary storage of spent fuel from the nation's nuclear reactors. If created as planned, that facility would consist of an array of 500 concrete pads, each 67 feet by 30 feet, on which would sit 4,000 cylindrical storage casks, each nearly 20 feet in height and 11 feet in diameter. Each carbon-steel-encased concrete cask would hold a stainless steel canister housing spent fuel rods.

The only question remaining before us was raised by the State of Utah and concerns the risk to those casks and their contents presented by an accidental crash of one of the some 7,000 flights of F-16 military jets that head down Skull Valley each year. By a 2-1 vote (Judge Lam dissenting), we resolve that question in favor of the Applicant (whose position the NRC Staff supported). Issuance of the requested license is now for the Commission to consider (see

[1] Initially, two versions of this decision were issued: (1) the official one, which contained "Safeguards" information and thus could not be released to the public; and (2) an unofficial one, containing no Safeguards information and thus available to the public. The differences between their respective contents are explained herein and in the Public Version's cover Memorandum.

p. 8, below, n.14 and accompanying text). In the rest of this introduction, we provide a brief summary of the facts and an overview of the reasoning underlying our decision.[2]

1. Spent Fuel Logistics. Each of the 4,000 casks described above would be comprised of an "overpack" -- consisting in part of over two feet of concrete sandwiched between carbon steel shells (a 3/4-inch-thick outer shell, and an inner shell with attached liner totaling 2 inches) -- housing and protecting a 1/2-inch-thick stainless steel "multi-purpose canister" (MPC) resting inside it. The MPCs would have been loaded with spent nuclear fuel at different reactors around the country, welded shut, and moved to the site by rail (see p. A-5, below) in a government-approved transportation cask, at an average rate of about four a week for 20 years.

The rail cars would be off-loaded at the facility's proposed Canister Transfer Building (CTB), with each MPC being shifted (unopened) from the transportation cask in which it arrived into one of the storage casks that will have been fabricated on site. After being loaded with an MPC, each cask would be straddled and lifted by a massive, heavy-haul dual-tracked transporter vehicle that would move the cask to a position on one of the concrete pads.

2. Previous Aircraft Crash Decision. Nearly two years ago, we issued a Partial Initial Decision[3] on an earlier phase of this major safety issue raised by the State, which had intervened in the proceeding as part of its opposition to the PFS application for an NRC

---

[2] Because this is the last decision we will issue in the proceeding, and it may lead to license issuance, we believe it appropriate -- for the benefit of reviewing tribunals as well as of those interested in how the agency conducts its business -- to devote considerable attention herein to the procedural and substantive history of the issue before us, given its significance to the people of Utah and the Nation (see the agency's Strategic Plan, NUREG-1614, Vol. 3, Part III ("Openness")(Aug. 2004), stressing the importance of effective outreach and communication as an adjunct to the agency's technical oversight of nuclear reactor and materials safety). In addition, all three Board members join in appending hereto information about the history of the proceeding which should be useful to various readers (see Appendix-1 to -15).

[3] LBP-03-04, 57 NRC 69 (Mar. 10, 2003).

license.[4] This safety issue, one of many presented to us by the State and now the last one pending, concerned the potential risk that accidental military jet crashes could damage the facility and thereby cause the release of radioactivity from the spent fuel rods held in the MPC.

The concern about such accidental crashes arose because pilots from Hill Air Force Base, northeast of Salt Lake City, annually make some 7,000 relatively routine flights down Skull Valley in F-16 single-engine fighter jets on their way to conducting intensive training maneuvers in the Utah Test and Training Range, located over the State's West Desert. Our earlier decision, following a lengthy evidentiary hearing, was that the probability of an accidental F-16 crash into the Applicant's proposed Skull Valley site was over four times too high to permit facility licensing (see Section 3, below) unless the potential consequences of such an accident were to be addressed in some fashion, such as by demonstrating their lack of significance or by guarding against them.[5]

3. "Credible Accident" Concept. The above-mentioned "probability" and "consequences" concepts come into play because nuclear facilities, such as power plants or spent fuel storage sites, must be designed to withstand all accidental events which are sufficiently likely to occur (while causing radiation releases in excess of specified limits) as to be deemed "credible" threats. Under the regulatory standard applicable here (see p. A-9, below), if the probability of such a radiation release from an accidental crash of one of the F-16s is less than one in a

---

[4] The State's broadscale and enduring opposition to the PFS proposal has been manifested here and in other forums. In that regard, the United States Court of Appeals for the Tenth Circuit recently affirmed a federal District Court's invalidation of certain State statutes designed to block the facility. See Skull Valley Band of Goshute Indians v. Nielson, 376 F.3d 1223 (Aug. 4, 2004), affirming Skull Valley Band of Goshute Indians v. Leavitt, 215 F. Supp. 2d 1232 (D. Utah 2002), petition for cert. filed (Oct. 28, 2004) sub nom. Nielson v. Private Fuel Storage, No. 04-575. See also Bullcreek v. NRC, 359 F.3d 536 (D.C. Cir. 2004) (rejecting the State's theory that the NRC lacks authority to license a privately-owned away-from-reactor spent fuel storage facility).

[5] See LBP-03-04, 57 NRC at 77-78, 135. That first phase of the aircraft crash issue became known colloquially as the "probability" phase, and the current, second phase as the "consequences" phase. As will be seen, those categorizations turned out to be not fully descriptive. See p. 5, below.

million per year, such crashes need not be considered in designing the facility (in NRC parlance, are not "credible accidents") and therefore do not pose a barrier to licensing the facility.

The first portion of our proceeding addressed only the preliminary question of the probability of an accidental crash of an F-16 into the site,[6] for if that probability had proven to be less than one in a million, the Applicant would have prevailed without having to present further analysis. With the evidence showing that probability to be over four in a million per year, however, this second portion has focused upon a more refined question: whether there is a probability greater than one in a million per year that an accidental crash of an F-16 would have the consequence of breaching a canister and thereby causing a release of radiation.[7] For if not, the facility would need not be designed to withstand such an accidental crash and would not on that ground be denied a license.

4. Recent Aircraft Crash Hearing. In the aftermath of our first F-16 crash decision, and of the Commission's declining to review it at that juncture (CLI-03-05, 57 NRC 279 (May 28, 2003)), the Applicant attempted to show, at a 16-day evidentiary hearing before us in late

---

[6] For purposes of determining that probability, a standard formula was employed (see p. A-12, below). See generally LBP-03-04, 57 NRC at 87-88, 114-22.

[7] As will be seen, the Applicant chose not to attempt to demonstrate that a radiation release, if it occurred, would not cause doses in excess of applicable limits (see pp. A-15 to A-16, below). Rather, it chose to hold itself to a more stringent test by attempting to establish that no radiation release whatsoever would result from any accidental crash deemed credible. See p. A-15, below.

summer, 2004,[8] that its storage casks were already designed robustly enough to alleviate the crash concern.[9] More specifically, the Applicant -- pointing to (1) the structure of the proposed storage casks and (2) the pattern of the actual F-16 crashes that have occurred worldwide -- urged that, even if an F-16 did crash into the site, such a crash was so unlikely to cause cask and canister damage resulting in radiological release that, under the "less than one-in-a-million" probability standard, the residual risk was an acceptable one to take.

Before the hearing began, the Applicant chose not to present evidence on possible radiological consequences from a breached canister, but to focus instead just on the probability that there would be no such breach. Accordingly, it could be said that this second phase of our hearing dealt not with classic accident "consequences" in a radiological release sense but with a consequences-oriented refinement, focusing on canister damage, of the initial site-related "probability" analysis. See p. A-15, below; LBP-03-04, 57 NRC at 78; and CLI-03-05, 57 NRC at 283-84. But see LBP-03-04, 57 NRC at 136 n.110, anticipating just such a segmentation of the issues.

---

[8] As adverted to in note 1, above, and in the cover memorandum to the Public Version of this decision, that hearing had to be closed to the public to protect from disclosure certain information -- referred to as "Safeguards" because it involves safeguarding nuclear materials -- relating to analyses of cask characteristics, and the impact of aircraft crashes thereon, that could be of interest to potential terrorists. For similar reasons, the public will be able to review only the conceptual framework, not the detailed analysis, which supports our decision (see p. 9, below). Our detailed fact-finding and reasoning -- related to the extent, or lack thereof, of structural damage caused by aircraft impacts at particular speeds -- must be withheld from the public.

We would, however, point out to residents of Utah, and to other interested persons, that counsel from the State Attorney General's office participated fully in opposing the facility during the hearing. Counsel had the opportunity to challenge all the evidence in favor of the project and to present evidence on behalf of those opposed to it. Those same State counsel will now be in position to scrutinize, and if desired to challenge, our full decision. In that regard, that full decision, including the non-public versions being served on the parties today, will be available to any reviewing tribunals (see n.15, below).

[9] At one point, the Applicant sought approval to begin building an interim, smaller facility. That plan involved storing a reduced number of casks (336 instead of 4,000), thus taking up less space and presenting a smaller "target" area (see p. A-7, below), and arguably reducing the probability of a military jet crash to acceptable levels. The Applicant did not pursue that interim step after we initially rejected it on procedural grounds. See May 29, 2003 Tr. at 13729-855 (oral argument), 13857-59 (Board ruling); see also Tr. at 13859-75 (anticipating possible further proceedings).

Just as vigorously as the Applicant presented its position that the probability of a consequential breach-causing crash was low enough to be ignored, the State urged the opposite, through witness testimony and documentary evidence of its own indicating that the probability was too high.[10] The NRC Staff -- having, as part of its regulatory function, put a lengthy, time-consuming series of questions to the Applicant before the hearing -- came to the hearing essentially supporting the Applicant's position.

5. Today's Split Board Decision.[11] Upon review of all the evidence, Judges Farrar and Abramson find themselves essentially in agreement with the Applicant and NRC Staff on the key issues before us. As that majority of the Board sees it, the evidence -- including analytical and experimental data, and computer simulations based thereon -- establishes, based on the properties and shape of the concrete and steel "overpack" cask and of the stainless steel internal canister, that an F-16 crashing at or below a particular rate of speed and angle of impact (the "bounding impact," which is non-public Safeguards Information) would not damage a canister. Further, the nature of F-16 flights down Skull Valley, and the data that can be gleaned from the reports of prior F-16 crashes worldwide in circumstances akin to Skull Valley

---

[10] With "risk" being made up of both probability and consequences factors, for simplicity it is often sufficient to focus on only one of those elements. Thus, if the consequences of an accident are shown to be not significant, no attention need be paid to the actual probability of that accident, for it does not matter if it occurs. Conversely, if the probability of an accident is sufficiently low, the consequences need not be examined, for even if they be assumed to be excessive, they need not be guarded against. (See the NRC Staff explanation preceding the opening of the Salt Lake City hearings (April 8, 2002 Tr. at 2997-99); our LBP-03-04 discussion (57 NRC at 138); and the Commission's explanation in an opinion herein, 57 NRC at 283-84.)

[11] In May 2003, the Commission expressed its belief that we should be able to issue today's decision by the end of that calendar year, i.e., nearly 14 months ago. See 57 NRC at 284-85. Much of the extra time, whose causes we reported to the Commission at each stage, was taken by the Staff's pursuit of additional questions in performing its pre-hearing regulatory review, and the Applicant's need for additional time to respond to those questions. In any event, all three Board members summarize in the Appendix our thoughts about the time consumed by this phase of the proceeding, both to complete the report the Commission expected, and to pass along our view that: (1) the extra time the parties took contributed much to the thoroughness and completeness of our evidentiary record; and (2) the course of this proceeding may be instructive in shaping expectations for future, similarly complex proceedings, especially in illustrating how large portions of time are outside Board control.

operations, reveal that there is over an 80% likelihood that the accidental crash of an F-16 into the site would be at a less severe speed and angle than the bounding impact and thus not damage a canister.

As a result, by virtue of the refined analysis presented by the Applicant and NRC Staff during the most recent hearings, the previously-determined over four in a million per year likelihood of a crash into the site (a relatively unsophisticated inquiry) has now been superseded by a more detailed inquiry. The latest analysis establishes that the likelihood of a crash causing a canister breach is somewhat less than one in a million per year.

Although the calculated probability seems to pass the applicable standard only marginally, the Board majority goes on to point out that there are at least four factors, not considered quantitatively in determining the probability, that can be seen qualitatively as serving to reduce that probability to an appreciable degree. These conservatisms involve: (1) the likelihood that, rather than being a "direct hit" causing the greatest damage, a crash could be off-center, a factor not considered in the evidentiary calculations; (2) the likely damage to an aircraft, and the reduction of its destructive force, that would occur if the plane hit short of the casks and skidded into them, a possibility that was analyzed at trial as though the crashing plane would continue unimpeded by its skid; (3) the possibility that before ejecting a pilot would attempt to direct the aircraft away from the site, a factor that -- although we declined to give the Applicant the "almost certain" credit for it being sought at the prior hearing -- has some support in the prior opinion testimony and anecdotal evidence and could thus justify some (albeit much smaller) credit; and (4) the possibility that the "bounding impact," below which canister breach was demonstrated not to occur, might upon further analysis be found to be slightly higher and thus move more crash scenarios into the "no-breach" category.

These additional conservatisms make the Board majority more comfortable with the degree to which the proposal meets the Commission's standards than it would be without them. On the other hand, Judge Lam's dissenting view is that there are too many areas -- including

the historic crash data, the expansive regression analysis, the curve-fitting methods, and the stainless steel behavior in the plastic range -- in which gaps in scientific and technical knowledge undercut the degree to which reliance can be placed on the evidence and the analyses. In his dissenting opinion, he explains why he is thus unwilling to credit the Applicant's and Staff's case sufficiently to approve the project.

6. PFS License Authorization Process. With our decision herein denying the State's assertions on the military aircraft accident issue, all the contentions raised by project opponents have now been considered by the Licensing Board[12] and resolved in the Applicant's favor in one fashion or another.[13] Thus, under agency rules governing facilities of this nature, it is now up to the Commission to determine whether to authorize the NRC Staff to issue the requested license.[14] Our decision is subject to review by the Commission and by higher tribunals.[15]

We build upon the foregoing Overview in Part I below (pp. A-1 to A-17) (Part I contains no Safeguards-related information and will thus be identical in each version of this decision). There we set out the procedural and substantive background that frames the parties' dispute.

In Part II, we provide our analysis of the evidence and explain how we arrived at the findings and reasoning outlined conceptually in this Overview. That discussion of the merits of

---

[12] As will be detailed, the changing membership of the Licensing Board over the course of the proceeding has not affected our continuity of function.

[13] See LBP-03-04, 57 NRC at 84. Only now, with our rulings at an end, would some of our earlier rulings have ordinarily become appealable. But the Commission anticipated the need to conserve time when we eventually reached this juncture and previously called upon the parties to file their petitions for review of earlier Board rulings some time ago, rather than await today's completion of Board involvement. CLI-03-16, 58 NRC 360 (2003). The Commission has since addressed, and rejected, those asserted claims of error in our prior interlocutory rulings. See CLI-04-04, 59 NRC 31 (2004); and CLI-04-22, 60 NRC 125 (2004). See also CLI-03-08, 58 NRC 11 (2003) (affirming our earlier partial initial decision on seismic issues); CLI-04-16, 59 NRC 355 (2004) (addressing an earlier decision on financial issues).

[14] See p. C-2, below, citing 10 C.F.R. § 2.764(c); compare id. § 2.764(a)-(b).

[15] Our "Initial Decisions" are, as that term implies, not this agency's last word -- our rulings are subject to review by the five Commissioners who head the NRC and make the final decisions on behalf of the agency. Commission decisions are in turn reviewable by a federal Court of Appeals and may thereafter be considered by the Supreme Court of the United States.

the issue focuses on the three major sub-issues in the case: evaluating the strength of the cask structures; characterizing the historic F-16 crashes; and determining the uppermost probability that a crash into the site would have radiological consequences. (Because Part II is where "Safeguards" information appears, the *Public Version* of this decision contains only a brief, general, non-Safeguards summary, with pages numbered from B-1 to B-13. The complete reasoning in the *Safeguards Version*, available only to the parties and to reviewing tribunals, has pages numbered from B-1 to B-43.[16])

Based on the Part II analysis, we are able in Part III (pp. C-1 to C-7) to bring matters to a conclusion (Part III, like Part I, contains no Safeguards-related information and is identical in both versions). We there recite briefly our formal Conclusions of Law and our Order and add our closing thoughts.

Judge Lam's dissent appears after our decision. It was framed to avoid inclusion of Safeguards-related information, and thus its pages are numbered D-1 to D-7 in each version.

After that dissent, we present in an Appendix some ancient and some recent history about the case. The former relates primarily to other issues that were raised, and to certain principles that govern our proceedings, and is offered for the benefit of those who may not be familiar with those matters. The latter, intended to complete the report expected by the Commission (see note 11, above), indicates what occurred, and what was accomplished, in the time consumed since our first aircraft crash decision.

---

[16] In our previous decisions herein, we included both a "Narrative" section addressing the crucial questions presented by way of an opinion, and another section that presented the more traditional and detailed "Findings of Fact." While this had the virtue of thoroughness, it did so at some cost in terms of both preparation time and overlapping rationales. Accordingly, we began discussing with the parties some time ago a different approach intended to shorten our decision-writing tasks at this juncture. See Tr. at 13912, referred to in our unpublished September 9, 2003, "Scheduling Order and Report," p. 7, n.10.

Although no specific resolution was agreed upon then, our decision herein is constructed differently from the earlier ones. We still employ a narrative format to explain the reasoning which leads us to the key determinations that drive our decision, but that narrative reflects only those findings that are relevant to the matters in issue, while omitting recitations of background or noncontroversial facts upon which all parties agree or which are not necessary for comprehension of the reasoning supporting our decision.

I. PROCEDURAL AND SUBSTANTIVE BACKGROUND

In this Part of our decision, for completeness but at the risk of repeating some of what appeared in the opening summary, we first review the procedural history of the litigation over the PFS application, with particular emphasis on the "credible accidents" contention now being decided on its merits. We next provide certain fundamental background information about the tangible aspects of the case: the Skull Valley geographic setting, the Air Force's training operations, and the Applicant's facility design. We then go on to recap the accidental aircraft crash decision-making process, including the manner in which our "probability" decision of two years ago, and the information-gathering since then, shaped the substance and timing of today's "consequences" decision.

A. Procedural History. The Applicant's proposal was noticed for hearing on July 31, 1997.[17] The State of Utah, along with a number of other parties, responded by requesting a hearing; eventually, those parties filed some 125 contentions challenging the proposed facility for various safety or environmental reasons.[18] On September 19, 1997, a Licensing Board was established to rule on petitions for hearing and for leave to intervene, and to preside over any adjudicatory proceedings that might be held in connection with the license application.[19]

The Board granted the State of Utah's request for a hearing, along with that of several other parties, and ruled that a number of contentions, in whole or in part, satisfied the Commission's requirements for admission as contested issues in this proceeding.[20] Other

---

[17] See 62 Fed. Reg. 41,099 (1997).

[18] See LBP-98-07, 47 NRC 142, reconsideration granted in part and denied in part on other grounds, LBP-98-10, 47 NRC 288, aff'd on other grounds, CLI-98-13, 48 NRC 26 (1998).

[19] 62 Fed. Reg. 49,263 (1997). The Licensing Board was reconstituted three times during the course of the proceeding. Early on, Judge Murphy was replaced by Judge Lam. Later, a second Board was created with Judge Farrar as Chairman, but with the original Board, chaired by Judge Bollwerk, retaining jurisdiction over certain pending matters. Last year, Judge Kline was replaced by Judge Abramson on the Farrar-chaired Board. See 62 Fed. Reg. 52,364 (1997), 66 Fed. Reg. 67,335 (2001), and 69 Fed. Reg. 5374 (2004).

[20] See LBP-99-07, 47 NRC at 247-49.

contentions were raised and ruled upon from time to time thereafter, to which we need not pause to provide references. The last State contention arose very recently, in mid-November of last year; our ruling explaining why it did not warrant further consideration was issued earlier today. See LBP-05-05, 61 NRC ___ (February 24, 2005).

All but one of the contentions originally or later admitted have since been resolved through legal rulings, evidentiary decisions, or settlement agreements, leaving before the Board only the State's "credible accidents" Contention Utah K (its derivation is recounted at pp. A-4 to A-5, below). Of the 45 days of evidentiary hearings in 2002, a good portion was spent on what turned out to be the first phase of Contention Utah K. Our decision on those matters, issued March 10, 2003, eventually led to the second phase of the hearing, which began on August 9, 2004 and finished on September 15, 2004.

Owing to the sensitive information involved, the second hearing had to be closed to the public. That factor, along with the relative ease and assurance of document safeguarding at our DC-area headquarters location (as opposed to space obtained elsewhere), dictated that the closed hearing be held in our courtroom in Rockville, Maryland.[21]

Speeded somewhat by some novel techniques we employed (see App. 10-11, nn.17-20, below), the hearing took 16 days, during which we heard testimony from 18 witness panels, composed of various combinations of 20 different expert witnesses, who among them sponsored some 225 exhibits. That all generated some 4500 transcript pages of live

---

[21] It should be noted that, although the hearings were "closed," they were not held in a "secretive" manner -- no information upon which our decision is based was unavailable to the parties, and no decision-makers met privately with any party. To the contrary, at all sessions, all three parties -- the Applicant PFS, the Intervenor State of Utah, and the NRC Staff -- were represented by counsel, and each had full opportunity to present its own witnesses, to cross-examine opposing witnesses, and to introduce (or to oppose the introduction) of documentary evidence.

A court reporter prepared a verbatim transcript of the entire closed proceeding. That Transcript, and all the other evidence in the case, has been available to counsel for all the parties, including the State, and will be available to the Commission and to any federal courts that may be called upon to review our decision.

exchanges, in addition to some 600 pages of pre-filed direct and rebuttal testimony that was, as is typical, bound into the record as if read.

The parties then submitted their two sets of post-trial briefs, in the form of opening and reply "Proposed Findings of Fact and Conclusions of Law" totaling over 900 pages. The last of those briefs was filed on November 19, 2004, and was thought to trigger the formal period for preparation of our decision.[22]

Upon examination of those briefs, however, we believed that an assertion by the State in its reply brief concerning an alleged serious deficiency in the NRC Staff position needed further exploration. Having heard nothing from the Staff, on December 1, 2004, we issued an "Order Directing Clarification of Record," calling upon the parties to provide us in rapid fashion additional position statements and record references that would clarify how the concerns we expressed were addressed in the record.

We duly received materials first from the State, then from the Staff and Applicant. The State then declined a chance to file a final response, expressing the view that it need not do so if no reliance was to be placed on what it viewed as additional materials the Staff had impermissibly provided without seeking to reopen the record.[23] At that point, we indicated in an email advisory to the parties that the State's filing, received December 22, would be deemed the final brief on the merits.[24]

---

[22] The Commission urges that a decision should typically be rendered within 60 days of the filing of the final briefs. See Statement of Policy on Conduct of Adjudicatory Proceedings, CLI-98-12, 48 NRC 18, 21 (1998).

[23] NRC Staff's Response to Licensing Board's Order Directing Clarification of Record (Dec. 16, 2004) at 9-11, where the Staff urged that the State had impermissibly sought to reopen a closed record while, seemingly inconsistently, presenting its own new materials.

[24] See n. 22, above, and accompanying text. During the briefing period, the State had also sought leave to file a new contention based on information that had only recently come to its attention. The briefing of that matter overlapped with the briefing of the clarification we had sought related to the structural evidence. Similarly, the preparation of our decision on that new contention, issued earlier today (see p. A-2, above), overlapped with preparing this decision.

B. Pending Contention. The issue that has thus occupied so much of our attention the past several years had its genesis in the portion of consolidated Contention Utah K that concerned alleged "credible accident" scenarios that could result in impermissible radiological releases from the proposed storage facility.[25] The Board combined the State's contention with similar contentions introduced by two other parties[26] that raised similar issues regarding consideration of credible accidents.[27]

After a series of rulings,[28] Contention Utah K was winnowed down to the following:

> The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the [independent spent fuel storage installation], including the cumulative effects of military testing facilities in the vicinity.[29]

In early follow-on rulings, however, the Board dealt with a number of aspects of those military operations.[30] Thus, as the time for trial approached, there were left, to be the subject of

---

[25] See LBP-98-07, 47 NRC 142, 190 (1998).

[26] The consolidated parties were (1) Confederated Tribes of the Goshute Reservation and (2) Castle Rock Land and Livestock and Skull Valley Company (collectively Castle Rock), and the combined contention was originally designated as Contention Utah K/Castle Rock 6/Confederated Tribes B. See LBP-98-07, 47 NRC at 157, 247 (1998).

[27] As first consolidated, the Contention read as follows (see LBP-99-07, 47 NRC at 253):

> The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the [independent spent fuel storage installation] and the intermodal transfer site, including the cumulative effects from the nearby hazardous waste and military testing facilities in the vicinity and the effects of wildfires.

[28] See LBP-99-34, 50 NRC 168 (1999); LBP-99-35, 50 NRC 180 (1999); LBP-99-39, 50 NRC 232, 237-38 (1999).

[29] LBP-99-39, 50 NRC 232, 240 (1999). On May 31, 2001, the Board granted in part, and denied in part, the Applicant's motion for partial summary disposition of various aspects of Contention Utah K. LBP-01-19, 53 NRC 416, 455-56 (2001).

[30] See LBP-03-04, 57 NRC at 86 (citing LBP-01-19, 53 NRC 416 (2001), which disposed of such matters as those related to general aviation, cruise missiles, and the use of military ordnance).

evidentiary presentations, only the matters eventually covered in our earlier "probability" opinion.[31]

C. Substantive Information. As seen above and in the Appendix, this litigation has a complex procedural background. In contrast, its substantive background may be described relatively simply.

1. Geographic Setting. Skull Valley is framed by the Stansbury Mountains to the east and the Cedar Mountains to the west. Its width varies, but for purposes of this general description the Valley can be regarded as some 10 miles wide. To the north of the Valley is the southern end of the Great Salt Lake. A bit south of the Lake, Interstate 80 runs in an essentially east-west direction (paralleled by the main line of the Union Pacific Railroad just to its north).

An exit from I-80 partway across the Valley provides access to Skull Valley Road, which runs north-south down the Valley all the way to the Dugway Proving Ground. Some 25 miles south of I-80, the road passes through the Reservation of the Skull Valley Band of Goshute Indians. The Band has leased some of its land west of the road to the Applicant for the proposed temporary facility for aboveground storage of spent nuclear fuel.

At one point, the Applicant planned to use Skull Valley Road as a truck route to bring the spent fuel on the last leg of the journey from various reactors around the country. But the Applicant later proposed to construct a rail spur, off the main line of the Union Pacific (which by then has cut south of I-80), down the west side of the Valley to the facility. After an evidentiary hearing on the environmental and wilderness issues involved, we rejected the Southern Utah Wilderness Alliance's challenge to that rail-line proposal. LBP-03-30, 58 NRC 454 (2003).[32]

---

[31] In addition to considering the F-16s headed down Skull Valley, the evidence at the first hearing, and our decision thereon, involved possible site impacts stemming from flights on the so-called "Moser Recovery Route," emergency landings at Michael Army Air Field (at the Dugway Proving Ground), dropped ordnance, and operations in the Utah Test and Training Range itself. See 57 NRC at 122-32.

[32] Although we held that wilderness values were neither apparent in the area in question nor affected by the rail spur, we noted (LBP-03-30, 58 NRC at 475-76) that the final word as to wilderness designations lay with the U.S. Congress.

2. Military Operations. The matter before us arose because military aircraft from Hill Air Force Base, northeast of Salt Lake City, are regularly flown down Skull Valley on their way to the Utah Test and Training Range (UTTR), the nation's largest overland training area, located to the west of the Cedar Mountains in the State's West Desert. Put simply, the flights down the Valley are relatively routine in nature, as the pilots get themselves and their craft prepared to participate in very intensive training maneuvers in the UTTR, which they enter by, in effect, making a U-turn at the southern reach of the Valley. See 57 NRC at 110 n.68.

As this litigation developed, the focus came to rest on the 7,000 or so flights a year pilots make in the Valley in the F-16, a single engine fighter aircraft. Not surprisingly, the historic crash rate of that aircraft, and the causes of those crashes, as well as the speed and angle of the planes at impact, became the subject of extensive evidentiary presentations in the two sets of hearings we held on this subject.

Although we cover that evidence in detail in Part II below, it is worth noting at this juncture that a good proportion of F-16 crashes stem from engine failure. When faced with that emergency, pilots are trained to "zoom" their aircraft, thereby trading their forward speed for a higher altitude and therefore gaining more time to deal with the emergency. The planes' trajectory and the pilots' activities after the conclusion of the zoom maneuver were the subject of extensive testimony in both sets of hearings, and we discuss in Part II the extent to which the zoom maneuver and its typical aftermath help us in predicting patterns of crash impacts and angles.

3. Facility Design. As noted above, the Multi-Purpose Canisters (MPC's) containing spent fuel from various nuclear reactors around the country are to arrive by rail at the facility's Canister Transfer Building. There, each MPC would be removed from the transportation cask in which it traveled from the reactor to the site and place in a concrete and steel storage cask, fabricated on site, which would then be moved to the concrete storage pads by a massive transporter.

The storage area would employ 500 such pads, each 30 feet wide by 67 feet long, sized to hold eight cylindrical storage casks upright in a 2 by 4 array. The pads would be arranged in two cohorts, each consisting of 25 columns of 10 pads laid end to end. The two cohorts of pads would be separated by 150 feet.

The distance between each of the end-to-end pads in a column would be five feet. In contrast, the side-to-side distance between pads in adjacent columns would be 35 feet, providing a passageway for crawler access to the four cask locations on the nearer side of each pad to its left and right.

This pad/cask geometry comes into play, of course, in calculating both (1) the spatial parameters of the "target" that would be presented to a crashing aircraft (the "A" factor, representing site Area, in the screening formula (see p. A-12, below) that was a focus of the first phase of the aircraft proceeding), and (2) the subsequent interaction among casks, and between plane and casks, after an initial crash impact. For example, because the severity of impacts to the side of a cask depends on the flight angle, the array of casks closest to the approaching plane provides some degree of shielding to the casks behind them.

D. Decision Process. Contention Utah K's long history before the Board was set out in Section B, above. Two key steps we took along the way were to limit the scope of that contention by granting in part the Applicant's motion for summary disposition (LBP-01-19, 53 NRC 416) and, after lengthy hearings, to decide the "probability" phase of the contention (LBP-03-04, 57 NRC 69). We focus below on that latter phase, and the manner in which it led to the current phase.

1. "Credible Accidents." Stated simply, of concern during the first "probability" set of hearings was the likelihood of an accidental aircraft crash into the proposed facility, for nuclear facilities have to be designed against only those radiation-releasing accidents that are sufficiently likely to be deemed "credible." In other words, if the possibility of such an accidental crash occurring proved too remote, then the Applicant did not have to protect against that

possibility. To that simple statement, however, need to be added two explanations -- one very short, the other not so.

In the first place, long-standing Commission precedent circumscribes Board hearings by explaining that they are not the place to consider deliberate terrorist-type attacks. That precedent was followed here.[33]

Secondly, the "credible accidents" test deserves more explanation in light of the complicated, two-part proceeding that has taken place here. To go back to the beginning, the admission of the State's "credible accidents" contention required us, in theory, to undertake a detailed examination of the probability of radiation release from aircraft crashes. In that respect, the Commission has, over the years, developed a standard for determining which events must be considered in the design of nuclear power reactors.

For consideration of aircraft accidents, the standard is that "if the probability of aircraft accidents resulting in radiological consequences greater than 10 CFR Part 100 exposure guidelines is less than about" one in ten million per year,[34] that potential accident need not be considered in the design of the facility [35] (according to these guidelines, an event which must be

---

[33] To be sure, one of the reasons behind closing our hearing to the public was to keep crash impact information and analyses out of the hands of those who might deliberately put them to nefarious use. But the scope of the hearing involved only the threat posed by accidental crashes, not deliberate ones. This limitation follows the agency's long-term practice, dating from the days of the Atomic Energy Commission (see Long Island Lighting and Power Co. (Shoreham Nuclear Power Station), ALAB-156, 6 AEC 831, 851 (Appeal Board, 1973)) and renewed after the events of September 11, 2001, that agency hearings are not the place to attempt to address concerns about terrorism. CLI-02-25, 56 NRC 340 (2002), discussed at 57 NRC at 78 n. 4.

Instead, protection of nuclear facilities against terrorism has been undertaken by the Commission itself -- outside the hearing process -- in conjunction with other federal agencies, civilian and military. In a word, then, the protection afforded the PFS site (or any site housing spent nuclear fuel) against deliberate aircraft crashes is viewed as coming not from a Board hearing attempting to evaluate that possibility, but from the federal initiatives attempting to prevent that possibility.

[34] See, e.g. CLI-01-22, 54 NRC 255, 260 (2001), referencing NUREG-0800 at 3.5.1.6, wherein the quoted material is set out.

[35] NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (Rev 2) (July 1981) at 3.5.1.6, Section I, and Section II, subsection 1, final paragraph (stating the converse).

considered is referred to as a "design basis event" or a "credible accident").[36] Because of the nature of the facility at issue here, however, the Commission established a different threshold probability for a design basis event -- at a PFS-like facility it is one in a million per year, rather than the one in ten million standard applicable to nuclear power reactors.[37]

A key to understanding this stage of the proceeding involves appreciating that, while prior rulings may have referred -- in shorthand fashion -- simply to the probability of an aircraft crash into the site, what is now (and always has been)[38] at issue is the probability of a radiation release caused by such an aircraft crash. In other words, the event that has to be guarded against is an accident causing a release. This is what the Commission addressed, and it is the event that was examined and described in the Standard Review Plan (NUREG-0800) to which the Commission referred in ruling that the appropriate threshold probability for a PFS-like facility is one in a million (the "designated threshold").[39]

To our knowledge, in every previous case before a Licensing Board (and/or the Commission), the determination as to whether or not a potential radiation release from an aircraft crash was a "credible accident" was resolved by simple examination of the probability of a crash into the site. For if that probability itself is lower than the threshold, the inquiry need go

---

[36] See, e.g., CLI-01-22, 54 NRC at 259.

[37] At the outset, based on pleadings the parties had filed with us, we sought the Commission's formal guidance on whether the standard determining the credibility of accidents that might affect nuclear power plants -- one in ten million per year -- should be relaxed for facilities like that proposed by the Applicant here. The Commission responded by setting the one in a million standard, meaning that this facility need be concerned only with events ten times more likely to occur than the even rarer ones that nuclear power plants need to guard against.

More specifically, we made an initial ruling on the design standard for accidental aircraft crashes at the proposed facility and found that the facility need not be designed to withstand aircraft crashes having less than a one-in-a-million (1×10^{-6}) chance of occurring. See LBP-01-19, 53 NRC at 430-31 (2001). But recognizing the novelty of that ruling, and the pivotal role that it would play in the eventual outcome, we sought formal advice by referring our interlocutory ruling to the Commission for its determination. The Commission accepted our referral and upheld our determination. CLI-01-22, 54 NRC at 257 (2001).

[38] See LBP 03-04, 57 NRC at 136.

[39] Ibid.

no further -- regardless of the potential radiation consequences, the sheer unlikelihood of the accident's occurring at all removes any need to look into how severe it might be. This led to the shorthand way of describing the issue.

On the other hand, if the probability of a crash itself were known in advance to exceed the designated threshold (i.e., the acceptable probability of a radiation-releasing event), an applicant might typically elect not to pursue the site further through the application process, much less the adjudicatory one. That election might be made even though an aircraft crash into a site does not make it certain that radiation will be released (the crash might not hit a radiation-confining structure or, if it did, the structure might not be breached). To our knowledge, no case has been heard before a Licensing Board or the Commission wherein the probability was close to the designated threshold -- because, we speculate, sites for which the probability was seen to be close were rejected by the applicants a priori and they chose, for any number of possible reasons, not to pursue inquiry about such sites any further.

Here, we previously found that the probability of a crash into the site did indeed exceed the designated threshold. Rather than abandon the effort, however, the Applicant (eventually supported by the Staff) took a legitimate but unusual approach -- taking a closer look at the crash sequence to determine the probability, not just of a crash, but of one that would release radiation. In doing so, the Applicant expected to be able to establish that the vast majority of aircraft crashes into the site would not rupture an MPC contained in a cask, and therefore would not release radiation, and therefore would not need to be designed against, notwithstanding the initial site-focused determination appearing to point the other way.

A site-focused probability determination begins with a classic "four-factor formula," which we describe elsewhere (and which the parties to this case accepted as the appropriate way to compute that probability). Use of that formula serves only to determine the probability of a crash into the site, which was all that was involved in our mid-2002 hearing. At that hearing, we were to determine whether the chance that an aircraft would crash into the proposed facility

was (1) greater than 1 x 10^{-6}, in which case the facility would have to be shown (or redesigned) to withstand the event without significant radiological release, or (2) less frequent than 1 x 10^{-6}, in which case the accident would be deemed not "credible," meaning its occurrence and its consequences could be safely disregarded.[40]

After our March 2003 decision on that issue went against the Applicant, the unusual -- but appropriate -- next step was that, at the Applicant's instance, we were asked to hear evidence on the details of such crashes, studying the spectrum and effects of such crashes and evaluating which crashes would (or would not) cause radiation releases. That examination involved considerations enormously more complex than has been the historical norm. We discuss both hearings in more detail below, devoting considerable attention to the previous hearing because of its relationship to the current one.

2. "Probability" Hearing and Decision. After the Commission set the design basis threshold probability at 1 x 10^{-6}, the factual issues were ripe for consideration by the Board. Although other military operations were also considered, the primary focus of the hearing was on the F-16 flights from nearby Hill Air Force Base that were passing over Skull Valley on their way to the UTTR.

At the heart of that hearing was the aforementioned four-factor screening formula that the NRC Staff has long used to calculate the risk of an aircraft crashing into an NRC licensed facility.[41] Although the parties disagreed mightily as to what the evidence showed as to the

---

[40] Ibid.

[41] The formula is contained in the "Aircraft Hazards" portion of the Staff's Standard Review Plan, NUREG-0800.

values to be assigned three of the factors, they accepted that the formula itself appropriately focused on those factors as the starting point for our evaluation.[42]

The formula's notation is $P = C \times N \times A/w$. Those designations represent that the probability (P, in accidents per year) is determined by multiplying the aircraft's historic accident rate (C, in accidents per mile) by the number of flights per year (N) and by the effective area of the facility (A, in square miles) divided by the width of the airway (*w*, in miles).

The parties presented extensive evidence and arguments about the value we should assign to three of the factors (A, the site area, was not contested). But it became clear early on that, even if the Applicant's values were accepted, it would be unable to prove via the formula that an accidental crash into the site had less than a 1×10^{-6} chance per year of occurring.[43]

This led to the Applicant's attempt to gain acceptance for adding a controversial fifth factor – the so-called "R" factor – to the standard screening formula. Intended to reduce the site impact probability, the R factor seeks to account for asserted "pilot avoidance" conduct, i.e., the claimed action pilots would take, if able to do so, to guide their planes away from vulnerable ground sites before ejecting in an emergency where a crash was likely.

The State made two arguments against the Applicant's R factor. In short, those arguments were that (1) the four-factor formula devised by the Staff was well-established and did not allow for a fifth factor and (2) the value that the Applicant wanted to assign to R – an 85 percent reduction in accident likelihood – was not supported by the evidence. LBP-03-04, 57 NRC at 90.

---

[42] At the outset of the "consequences" phase, Judge Abramson – who had been assigned to the case after the "probability" phase – asked the parties whether the formula, long-used as a rough "screening" device for determining the acceptability of a site, should also be used to determine more precise probability matters (Tr. at 17720). That question would be lingering here, but for the parties' unmistakable agreement that the case should be decided by application of the formula (Tr. at 17720 (Turk), Tr. at 17720-21 (Barnett), 17729 (Soper)).

[43] Of course, had the one in ten million standard applicable to nuclear power plants been retained as the guidepost, the Applicant would have been 10 times farther away from a showing of compliance. In this regard, see App-5, n.8, below.

The Board rejected the State's first argument that the formula could not be changed.[44] We did agree, however, with the State's second argument, that the evidence regarding the R factor did not justify the massive reduction in probability that the Applicant sought.

In doing so, the Board evaluated the R factor on the Applicant's terms, considering how often F-16 pilots are in control of their aircraft during an emergency (R1) and how often pilots in control will attempt to steer the plane away from something on the ground before ejecting (R2). The Board accepted the Applicant's R1 evidence that, taking into account only the F-16 crashes that are "Skull-Valley type events" (that is, crashes that occurred in circumstances that could also exist in Skull Valley flights), pilots are in control of their planes 90 percent of the time. Id. at 98-99.

In evaluating R2, however, the Board determined that the Applicant's assertion that pilots will attempt to steer away from objects on the ground in 95 percent of the cases was unfounded. Id. at 99-110. We found that the theory (based on expert opinion, not actual data) that a pilot will, with almost absolute certainty, avoid the facility when in an emergency situation and under considerable stress had not been established. Id. at 100, 107-09.[45]

In other words, the Board determined that the evidence setting a high value for R2 was too uncertain to be relied upon in making a safety decision for nuclear facility licensing. Thus, the Board did not accept the Applicant's and Staff's position on the R factor, and instead relied on the traditional four-factor formula in evaluating the probability of an crash into the proposed facility.

---

[44] We reasoned that, while the original formula does not explicitly contemplate the R factor, neither is consideration of such a factor legally prohibited, such as by way of agency regulations or Commission precedent. Therefore, we reasoned, as long as the addition of the R factor has a factual and technical justification, then it could be added to the standard probability formula. Id. at 91-93.

[45] Although we rejected it for the purpose and to the extent then offered, we did not indicate that the theory had no merit whatsoever. We return to it for another purpose later (see the portion of Part II setting out several conservatisms supporting our decision).

The Board applied the four-factor formula to all of the State's proposed accident scenarios, including F-16 crashes into the facility, other airplane crashes into the facility, and ordnance strikes into the facility. We determined that the evidence was insufficient to establish that the accidents had less than a one-in-one million chance of happening.

To the contrary, we found through use of the formula that the probability of an F-16 impacting the facility is 4.29×10^{-6}, that is, the probability of such an accident is more than four times greater than the standard for a "credible accident" set by the Commission. Id. at 122.[46] Thus, we determined, the Applicant had failed to establish that an aircraft crashing into the facility was not a "credible accident." The Applicant was therefore left to establish, in a subsequent "consequences" phase of the hearing, that the design of the facility is robust enough so that a crashing F-16 would not penetrate a cask or that, if it did, that there would be no significant radiation impact for the public. See p. 3, above.

3. The "Consequences" Hearing. After we decided in LBP-03-04 that the probability of a crash of an F-16 fighter jet from Hill Air Force Base into the Applicant's site was too high to permit facility licensing, the Applicant and Staff took an appeal to the Commission, as we had indicated might be appropriate at that juncture. Id. at 142-44, 231. In response, the Commission exercised its discretion to decline review of our "probability" decision until we heard the "consequences" part of the contention. CLI-03-05, 57 NRC 299, 282-84 (2003).[47]

---

[46] Of course, given the lack of absolute precision in the values found for the formulaic factors (see discussions in our previous decision regarding crash rate, width of airway, and number of flights), the "4.29" result may appear more precise than it is. Regardless of the number of significant digits, the point is the same – the Applicant's proof failed by a factor of over four.

[47] As we were preparing for that hearing, the Commission, which does not usually encourage wholesale interlocutory appeals, decided to do so at that stage of this case to "expedite the final stages of a licensing process that has dragged on for a number of years." CLI-03-16, 58 NRC 360 (2003). As a result, challenges to many prior Board rulings in this proceeding were considered and rejected by the Commission last year. See n. 13, above.

The Commission noted that it expected the consequences proceeding could be completed by the end of 2003. Id. at 284-85. We will return to that point, but need first to indicate what transpired at the beginning of that proceeding.

a. Scope of Hearing. At the outset of this "consequences" phase, the State sought to define its scope broadly enough to allow for the presentation of evidence on the radiological consequences that would result from the breach of a cask's MPC. The Applicant argued, however, that the scope of the consequences phase should be more narrow, limited to the Applicant's effort to demonstrate that the probability of such consequences left an MPC breach as a non-credible event. Under that view, it was said, radiological consequences would not need to be examined in detail.

We had foreseen, in our first decision, the possibility of this type of disagreement as we moved ahead. Colloquially, all had talked about a two-part proceeding, one involving "probability" and the other embracing "consequences," those being the two factors in a risk determination. But we had noted that the risk question could more precisely separated into three parts: probability of a crash into the site, leading to cask/canister breach, leading to radiological consequences. LBP-03-04, 57 NRC at 136 n. 110. As we observed, depending on how the second factor was defined, it could be viewed as either part of the probability (of a cask breach) calculation or as part of the consequences (of a site impact) analysis. Ibid.

In that light, we did not view it as necessarily an impermissible approach to separate consideration of the second factor from the third one. At that point, the State was ready to, and pressed to proceed on, the third factor. The Applicant and Staff indicated they were unprepared to do so. We made the pragmatic, time-saving decision to have the hearing focus on only the second factor.[48] But we took two additional actions as well.

---

[48] See unpublished Memorandum Concerning Scheduling (Apr. 15, 2004) at 3-4.

First, we indicated that the State would be permitted to make an offer of proof, pursuant to 10 CFR § 2.743(e), at the outset of the hearing. The State in fact did so. See Tr. at 19689-90.

Second, the Board Chairman advised the Applicant and Staff that, given the posture of the case, their unreadiness to proceed may have engendered lasting prejudice to their cases. Specifically, they may have forfeited any opportunity to address the radiological consequences issue later, if they were unsuccessful on the MPC-breach matters on which they were ready to proceed to trial. See Tr. at 19666-77; unpublished Memorandum Concerning Scheduling (Apr. 15, 2004) at 4.

Against that background, we need add only that the reason we did not entertain the evidence the State proffered is that -- even though the Applicant does not characterize it this way -- in essence the Applicant is, for purposes of this phase only, not challenging the notion that the radiological consequences of an MPC breach could be beyond acceptable norms.[49] But because in its view the probability of such a breach is below one-in-a-million, then even if the probability of excessive consequences of such a breach is taken as a certainty (expressed as unity), the overall risk of an accident that results in excessive radiological releases (being the product of the two factors) remains at less than one-in-a-million. For that reason, the evidence reflected in the State's offer of proof was, and remains, rejected as not material to the more narrow issue before us.

b. Result of Hearing. Put in layman's terms, the Applicant's approach at the hearing was a simple one. As noted above, we had held at the end of the first hearing that the

[49] Specifically, the Applicant does not concede, as a factual matter, that even its "unanalyzed events" (see Part II, below) would lead to any, much less excessive, radiological releases (although it does not argue that there is no speed at which a crashing F-16 would breach a canister). In contrast, our analysis in the text above is performed "as if a conservative assumption were made" that such a breach does occur for the accidents that are not "credible," simply to demonstrate how the "probability times consequences equals risk" formulation jibes with the regulatory standard. LBP-03-04, 57 NRC at 138, citing Staff explanation from April 8, 2002 oral argument.

probability of an accidental F-16 crash into the site was just under 4.3 in a million per year. In essence, by analyzing (1) the structural characteristics of the casks and (2) the impact speeds and angles of the applicable universe of historic F-16 crashes, the Applicant attempted to show at the second hearing that there is at least an 80 percent chance that a (hypothetical) future crash into the site would not breach an MPC holding the spent fuel.

If that showing were successful, it would of course point to the converse existence of at most a 20 percent chance that a crash into the site -- itself only a 4.3 in a million probability -- would breach an MPC. Taking the two factors together would yield no more than a .86 (less than one) in a million chance of anything that would cause a radiological release, and success for the Applicant.

In Part II, below, we explain why our decision today essentially holds that the Applicant's evidence established its point. Before turning to the merits, however, we think it important to explain why we are rendering this decision now, rather than much earlier.

c. Timing of Hearing. The Commission's "year-end 2003" goal for our decision was not able to be met, despite the best efforts of the Board and all counsel involved. This was in large part due to (legitimate) extra time consumed by the Staff's Requests for Additional Information from the Applicant, and the Applicant's revisions to its license application, all as reflected in the periodic orders we issued at different stages.

We might leave it at that. But the Commission has placed extensive emphasis in recent times on the need for expedition in the adjudicatory process, and this last phase has taken far longer than the Commission expected -- in a proceeding that it described a while ago (see n. 47, above) as having already "dragged on" for a long time. Thus, we think we owe it to the Commission, which asked us to report on this subject (CLI-03-05, 57 NRC at 285), to shine additional light on the matter. We do so in the Appendix to this opinion.

II. THE MERITS

SAFEGUARDS INFORMATION REDACTED [XXXXX]

Before this Board is the question of whether the release of radiation arising out of the crash of an F-16 aircraft (taken together with the impact of ordnance jettisoned from such a crashing aircraft) into the facility is a "credible event." For the purposes of evaluating this matter, the Commission has set as the standard[50] that if the probability of such an occurrence is less than 1.0×10^{-6}, it would not be a credible event.[51] If such an occurrence is not a credible event, it is not part of the "design basis,"[52] and therefore there is no need to engineer the facility to accommodate (withstand) such an event.

1. The Analytical Background. In prior hearings, the parties presented evidence on, and the Board considered, the probability that an F-16 (or the ordnance it carries) would crash into the PFS site. The Board found that there was a 4.29×10^{-6} probability of that occurrence.[53] Similarly, the Board found that there was a 2.11×10^{-7} probability of jettisoned ordnance hitting the site.[54] Since the Board had determined that this probability exceeded the threshold for treatment as a design basis event, the Applicant elected to look further at the probability evaluation, reasoning that an aircraft or a piece of ordnance which hits the site will not necessarily impact on and breach one of the spent fuel storage casks and thereby cause a release.[55] Thus the Applicant continues to attempt to demonstrate that the probability of

---

[50] CLI-01-22, 54 NRC 255, 257 (2001).

[51] For ease of reference, we will use the scientific notation throughout this decision.

[52] See 10 CFR Part 72, Subpart E and F.

[53] LBP-03-04, 57 NRC 69, 122 (2003).

[54] Id. at 131. We note, however, that the prior Board did not consider the fact that some of the aircraft involved in jettisoning their ordnance will carry more than one piece of ordnance, a fact which needs to be considered in the present evaluation.

[55] See Part I, above.

occurrence of the events in question is so low that these events need not be considered in developing the design of the facility.[56]

Therefore, in the present portion of this hearing, the parties have addressed whether an aircraft (or ordnance which is jettisoned from an aircraft) which crashes into the PFS site will impact and breach a cask. In doing so, the parties have made a number of assumptions (discussed in depth below).

The issue before us involves the limited safety question of whether the canister will, in a crash situation, maintain its integrity as a radiation boundary, and not whether it would, when subjected to a lesser crash impact which causes no radiation release, keep the spent fuel bundles from sustaining any damage. In that regard, an incident which does not release radiation, but nonetheless causes the overpack and the MPC to be so damaged that the fuel contained within the MPC is no longer intact, may well be significantly more likely than one which is so damaging that radiation is released. But such incidents are not at issue here. Under the regulatory system, such incidents -- because they are not radiation releasing -- are to be dealt with by a licensee if and when they occur. Under that circumstance, the agency will become heavily involved (as it does in the aftermath of any accidents) to assure that possible effects of radiation arising out of the recovery operations are safely handled. Such incidents may present a serious problem in terms of what it takes of a licensee to clean up, but with no radiation "consequences," they do not have to be designed against.

Rather than attempt to examine every possible event and then determine which events cause a breach and from that determine the probability of a breach, the Applicant elected to examine the inverse problem -- the Applicant has attempted to delineate a set of events which it alleges do not cause a breach. Since the universe of events can be divided into breach and

[56] See Part I, above.

non-breach, the probability of a breach would be no more than 1.0 minus the probability of the set of events which are determined not to breach.[57]

While the Applicant does not claim that it has thus defined all events which do not breach a cask, it takes the view (**with which we agree**) that so long as the probability of the remaining unanalyzed events (referred to as the Unanalyzed Event Probability or "**UEP**") is less than the 1.0×10^{-6} threshold, it need not examine any of those events – for it will have already established that the probability of a breach is less than the threshold and therefore that a breaching event is NOT a design basis event. This approach – if successful – would allow the Applicant to bypass the difficult task of assessing how, if there were a breach, the different radioactive nuclear materials in the MPC would be released, dispersed and find the pathways into the human population at site boundaries, an issue which the State wished to litigate.[58]

2. The Technical Approach. The technical problem has been divided into two basic pieces: first, examine the physical effect a crashing aircraft or falling ordnance has, at a particular speed and angle, on the steel lined cement "**overpack**" cask, to determine whether or not that impact damages the stainless steel Multi-Purpose Canister ("**MPC**") contained within the overpack – either through penetration of the overpack by the incoming aircraft or ordnance, or via a dynamic interaction between the overpack and the MPC, thereby (in either case) causing release of radioactive byproducts contained within the MPC (the foregoing being referred to as the "**structural analysis**");[59] and second, examine the probability of the incoming

---

[57] We say "no more than" because, by definition, we have no information on any of the events which have not been examined. Therefore, it is not known whether any particular event in that set would or would not cause a breach, but for purposed of the Applicant's theory it would not matter if they did.

[58] See Part I, above.

[59] The principal consideration for this category of events is whether or not radiation is released. Therefore, independent of the degree of damage sustained by the overpack, the sole consideration for this analysis becomes whether or not the MPC retains its integrity as a containment vessel. Thus the overpack could be viewed, for this particular analysis, as one of
(continued...)

aircraft or ordnance impacting on the overpack at a speed greater than the highest (as determined in the structural analysis) non-breaching speed and at an angle XXXXXXXXXXXX to the surface than the "critical" angle[60] (this latter analysis being referred to as the "**probability analysis**").[61] The structural analysis is then used to establish what amount to "set boundaries" for the probability analyses to enable computation of the probability of the set of non-breaching events, which are bounded by the "worst case" non-breaching event which has been analyzed (for the purposes of this discussion, the "**bounding event**"). Having so determined the probability of the non-breaching event set, which is bounded by the chosen "worst case bounding event," the probability of the breaching set (i.e., the UEP) is then bounded as 1.0 minus the former.

---

[59](...continued)
the "barriers" protecting the spent fuel and fission products from release from their confinement within the MPC, by interfering with the incoming airplane or ordnance before it impacts the MPC.

[60] The analyses indicated that, for impacts on the side of the overpack, aircraft impacting XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX, and therefore the parties have mutually assumed, for the purposes of this analysis, that if an aircraft impacts at an angle equal to or greater than, and at a speed equal to or less than, those for which analyses demonstrate non-failure, those impacts would also not cause failure. We find that approach to be scientifically sound, and hereby adopt that hypothesis.

[61] A thorough discussion of this approach is set forth in Applicant Exh. 265: C. Allin Cornell, Probability Assessment of the Aircraft Crash Impact Hazard for the Private Fuel Storage Facility Based on Engineering Evaluations of Storage Cask and Canister Transfer Building Structural Integrity (Rev. 1) (Jan. 2004) [hereinafter Cornell Report], including, among other things, the method for incorporating the effects of angle and azimuth of impact and the effective areas of storage cask tops and sides.

3. The Structural Analysis. The Applicant and the Staff have examined a series[62] of hypothetical radial impacts[63] by aircraft traveling at speeds of XXXXXXXXXXXXXXXXXXXX

---

[62] The Applicant provided 12 analyses (10 of which modeled radial impacts on the casks). The Staff reviewed the Applicant's analysis, and also contracted with Sandia National Laboratories to perform an independent analysis to confirm the Applicant's results. All of the "examinations" have been through the use of LS-DYNA, a sophisticated computer code intended for use in the analysis of complex dynamic structural loading scenarios (i.e., there is no direct experimental evidence on the entire scenario, although there is substantial experimental evidence supporting most of the models and modeling assumptions in the codes as used herein).

There is an old adage among the developers and users of computer codes for complex engineering problems that everyone believes the computed results obtained from such codes except the people who wrote them. In this instance, all parties were "users" of these codes, but none were developers of the codes in question, and each party challenged the results obtained by the other for a variety of reasons.

However, the Staff's consultants performed "confirmatory computations" using their computer codes to make a determination regarding the general accuracy of the computations performed by both the Applicant and the State. In most instances, the computer "models" (numerical representations of the "Problem" to be analyzed) developed by the Applicant differed in material ways from those developed by the State, and therefore direct comparison of computed results was impossible. Nonetheless, all parties attempted to model the scenarios at issue; the differences in their modeling essentially amounted to different assumptions about what and/or how particular components or phenomena needed to be modeled. The record is replete with testimony and documentation of the results of those computations and the differing views regarding sources of uncertainty or conservatisms in the computed results.

A common thread runs through these analyses: independent of the particular computer model and the particular computer code, they all result in prediction of a maximum strain in the MPC (defined in the text of this ruling) and those maximum strains all fall within a certain maximum. In the present case, the overriding (and underlying) issue is whether or not the MPC can withstand such a strain without failure to retain its containment capability. Thus we are able to focus on that particular issue, and are not forced to deal with the question of which analysis method is the most accurate.

[63] While it is obvious that not all impacts would be radial, this conservative assumption is deemed by the Applicant and the Staff XXXXXXXXXXXXXXXXXXX. The State has argued that the incoming aircraft or ordnance might ricochet off the first cask if it does not impact radially, and would also cause some torque to be applied to that cask, but has not presented any analyses to demonstrate that the results of a secondary impact could be as severe as the primary impact nor that the results of a non-radial primary impact would be expected to be more severe than those of a radial impact. We find that there is sound reason to believe that the effects of the primary impact upon the incoming aircraft or ordnance would deform and break up the impacting object such that a secondary impact could not be as severe as the primary impact. Therefore, we agree with the Applicant and the Staff that XXXXXXXXXXXXX by a non-radial impact would be bounded by that caused by a radial impact, and, therefore, that there is no need to delve into the issue of what damage would be caused by a secondary impact because the associated primary impact which has been analyzed indicates the maximum damage which could be expected to the MPC in such an event. Furthermore, we are

(continued...)

XXXXXXXXXXXXXXXX.[64] According to their most recent analyses, such crashes do not result in material penetration into the overpack, and result in maximum tensile strains in the MPC below 10 percent.[65] The Applicant and the Staff conclude from this that all the events impacting at a *lower speed or at a greater angle XXXXXXXXXXXXXX would not cause a breach of the MPC.*[66] Without, at this point, either accepting or rejecting the computed results for the "bounding event" as presented by the Applicant, we subscribe to this analytical approach.[67]

The State submitted numerous aircraft impact analyses (also assuming radial impact), but some of these were shown to have had modeling errors; accordingly the State's last analysis --

---

[63](...continued)
persuaded that there must exist, in the set of events, assumed to be purely radial impacts, a number of non-radial impacts which are essentially glancing blows which would have XXXXXXXXXXXXXXXX effect than a pure radial impact. Therefore, the assumption that all impacts are radially is markedly conservative XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX.

[64] See Testimony of Alan I. Soler on the Structural Effects of a Potential F-16 Impact on a Spent Fuel Cask Contention Utah K/Confederated Tribes B (July 12, 2004) at 18-19, 20 [hereinafter Applicant Direct Testimony on Structural]; NRC Staff's Testimony of Gordon Bjorkman, Robert Shewmaker, Robert Kalan, and Kenneth Gwinn Concerning the Consequences of an Accidental F-16 Aircraft Crash into a Hi-Storm 100 Cask at the Proposed PFS Facility (July 12, 2004, as revised August 6, 2004) at 13 [hereinafter Staff Direct Testimony on Structural (Bjorkman, et al.)].

[65] See Tr. at 19606 (Staff witness Bjorkman noting that all the parties found maximum tensile strain in the MPC to be below 10 percent). The Staff calculated a maximum actual true strain in the MPC of 8.5 percent. See NRC Staff Rebuttal Testimony of Gordon Bjorkman, Robert Shewmaker, Robert Kalan, and Kenneth Gwinn Concerning Cask Structural Issues (July 29, 2004, as revised August 9, 2004) at 7-8 [hereinafter Staff Rebuttal Testimony on Structural (Bjorkman, et al.)]; Tr. at 16941, 17128 (Kalan). The Staff at various points in its testimony presented an estimated plastic strain in the range of 10-20 percent (see Staff Direct Testimony on Structural (Bjorkman, et al.) at 15; Staff Exh. 67, Confirmatory Structural Analyses of an Accidental F-16 Crash Event Onto the Proposed Private Fuel Storage Facility (HI-STORM 100 Dry Cask Storage System) (May 11, 2004) at 54; Tr. at 16736 (Gwinn). The Staff's experts concluded in their rebuttal testimony that, while the there are higher strain values in the upper corner of the MPC where it strikes the rigid wall of the overpack, these strains are compressive and are not a threat to the integrity of the MPC; rather, the tensile strains, at 8.5 percent, in the MPC shell are the most important strains to consider when evaluating the structural integrity of the MPC post-impact. See Staff Rebuttal Testimony on Structural (Bjorkman, et al.) at 7-8.

[66] See note 60, above.

[67] For an explanation of tensile strains and other matters related to the ability of materials to withstand forces, see note 86, below.

of an aircraft impacting the overpack at a speed of XXXXXXXXXXXXXXXXXXXXXX from the horizontal,[68] presented during our September 2004 continuation of these hearings -- was the only one upon which we can place reliance.[69] None of the State's analyses (even those with modeling errors) indicate that an aircraft materially penetrates the overpack, and that latest analysis indicates a maximum tensile strain in the MPC of approximately 5.9 percent.[70] Thus, although the scenarios evaluated, and the modeling employed, by the parties are different, there is a common result for aircraft impact that the maximum tensile strains predicted to occur in the MPC are less than 10 percent.[71]

The results for ordnance impact are, however, not so easily compared. On the one hand, the State's analyses of ordnance, using the Applicant's suggested "corrections," assumed the impacting XXXXXXX bomb-class was completely rigid and that the steel in the overpack lid had weak material properties.[72] This resulted in a computation indicating that XXXXXX -class bomb impacting the cask at XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

---

[68] See Tr. at 19448 (Bjorkman).

[69] See Tr. at 17623-25 (Aramayo). All of the State's prior analyses indicate a form of numerical error which resulted in computation of unphysical gross very localized distortion of the fuel basket, thereby causing the code to compute large deformations of the MPC because of its computed interactions with the fuel basket. When the input assumptions causing those numerical errors were corrected by the State in this last "run", that phenomenon was no longer present in the computed results. See id. at 19269 (Aramayo).

[70] See Tr. at 19460 (Bjorkman), 19504 (Hoffman), 19506 (Sozen).

[71] See Tr. at 17128 (Kalan confirmed the Staff's maximum tensile strain in the MPC), 19460 (noting State's maximum tensile strain in the MPC), 19606 (Bjorkman stating all parties agree that the maximum tensile strain the MPC will be under 10 percent).

[72] See State of Utah Testimony of Mete A. Sozen, Christoph M. Hoffman, and Sami Kilic for Contention Utah K/Confederated Tribes B Cask Breach Probability Proceeding (Structural) (July 12, 2004) at 21 [hereinafter State Direct Testimony on Structural]; Tr. at 16535-36 (Kilic); see also State of Utah Rebuttal Testimony of Mete A. Sozen, Christoph M. Hoffman, and Sami Kilic for Contention Utah K/Confederated Tribes B Cask Breach Probability Proceeding (Structural) (July 29, 2004) at 6 [hereinafter State Rebuttal Testimony on Structural].

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX, and maximum strain in the MPC of 14 percent.[73]

On the other hand, the Staff's consultant's analysis modeled the bomb (after correcting certain input errors) as if it were made up of the actual materials at design thicknesses and strengths (i.e., a "deformable" bomb, not a rigid one), and used true stress strain properties for the overpack steel lid.[74] These results indicated that there would be very little penetration into the overpack lid as the bomb deformed and disassembled, dispersing its non-explosive content.[75]

In an effort to identify how much of the difference in the above results was due to rigidity of the bomb and how much was due to the assumed material properties for the overpack steel lid plates, the Staff and the State made computations in which they used the same computer code and input (including the "rigid" bomb model) but changed the State's original input for the properties of the steel which makes up the top of the overpack lid to utilize steel structural response functions closer to a "true stress strain" curve (which is required by the computer code).[76] These analyses used somewhat different steel properties, resulting in computation by the State of XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

---

[73] See State Rebuttal Testimony on Structural at 5. The State provided the initial velocity as XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX.

[74] See NRC Staff's Testimony of Gordon Bjorkman and Gustavo Aramayo Concerning the State of Utah's Analyses of the Consequences of an Accidental F-16 Aircraft Crash or Munitions Impact into a Hi-Storm 100 Storage Cask at the Proposed PFS Facility (July 12, 2004, as revised August 6, 2004) at 11 [hereinafter Staff Direct Testimony on Structural and Ordnance (Bjorkman and Aramayo)].

[75] See id. 11-12. The practice bombs carried by the aircraft in question here, contain concrete powder designed to have the same weight and density as the explosive which would be contained in live ordnance.

[76] See Tr. at 17668-17675 (Bjorkman). The computer code used for these analyses requires the user to put its input in the form of "true stress strain" rather than engineering stress strain as the State had done (following the data supplied by the Applicant, see Tr. at 16895, 17672 (Bjorkman) in its initial analysis).

XXXXXX [77] XXXXXXXXXXXXXXXXXXXXXXXX in the case of the use of the Staff's estimate of actual physical properties.[78]

But even in the analysis by the State with the "weaker" assumed steel properties, the ordnance was so slowed down by the energy loss XXXXXXXXXXXXXXXXXXXX [79] that the resulting computed maximum tensile strain in the MPC was approximately 4.3 percent.[80] Since it is clear that the XXXXXXXXXX actually carried by the aircraft in question are not rigid, and since it is clear that a "deformable" bomb XXXXXXXXXXX than a rigid bomb, we find that these computations indicate, with reasonable confidence, that the XXXXXXXXXXXXXXXXXX will, at the speeds used in these analyses, not penetrate the overpack and that damage, if any, to the MPC will result in maximum tensile strains well below the maximum of 10 percent indicated for full impact of an F-16 at the speeds and angles discussed above.[81]

With the evidence before us indicating that the maximum tensile strains in the MPC from the scenarios examined will not exceed 10 percent, we must then examine whether there is reasonable confidence that the MPC would, when subjected to such strains, retain its physical continuity and therefore its capacity to retain the fission products it contains.[82] The issue -- upon which this case turns -- devolves to identification of the appropriate method to determine the strain at which this particular stainless steel will fail in tension.

---

[77] See Tr. at 19134 (Bjorkman).

[78] See Tr. at 17673-74 (Bjorkman).

[79] See Tr. at 19119 (Bjorkman).

[80] See Tr. at 19134 (Bjorkman), 19418-19 (Sozen acknowledging that, in terms of strain on the MPC, the Staff and State run are no different).

[81] See Tr. at 19460 (Bjorkman), 19504 (Hoffman), 19506 (Sozen).

[82] See Tr. at 15674-79. During the first days of hearing, the Applicant made clear that the design goal of the cask is to prevent a radiological release. Therefore, as long as the MPC is not breached, the cask has not failed. The Applicant noted that while it will develop a removal process to deal with the accident, it does not matter, for purposes of this proceeding, how damaged the cask becomes as long as the MPC does not rupture.

In this regard, the parties' approaches are diametrically opposed. The Applicant[83] and the Staff[84] argue that this must be addressed by examining actual known (measured) physical properties of the material at issue, focusing on the experimental evidence shedding light on the maximum true strain at tensile failure. The State argues, on the other hand, that civil engineering standards (including certain ones adopted by the U.S. Department of Energy for examination of the ability of certain nuclear structures to withstand aircraft impact) prescribe a defined maximum strain above which a component must be assumed to fail.[85]

Put another way, we are faced with the choice of examining the issue from basic materials principles or viewing it from the perspective of a civil/structural engineering problem. Although one might not expect these approaches to be mutually exclusive, they have been formulated just that way in this proceeding.[86]

---

[83] See Applicant Direct Testimony on Structural at 2, 6-8; Rebuttal Testimony of Alan I. Soler and Charles J. McMahon, Jr. on the Structural Effects of a Potential F-16 Impact on a Spent Fuel Cask -- Contention Utah K/Confederated Tribes B (July 29, 2004) at 13 [hereinafter Applicant Rebuttal Testimony on Structural].

[84] See Staff Direct Testimony on Structural (Bjorkman, et al.) at 7-8; Staff Rebuttal Testimony on Structural (Bjorkman, et al.) at 4-5.

[85] See State Direct Testimony on Structural at 7-10.

[86] The following discussion relies heavily upon the ability of materials to withstand the application of tensile and compressive forces and the measures used to describe them among engineers. For the uninitiated, generally, when a force is applied to a material, its change in length (either stretching or compressing), which depends upon the force per unit area (defined as stress) is commonly discussed in terms of the engineering strain, which is computed by dividing the change in length (parallel to the applied force) by the original length. While strain is taking place, the cross sectional area actually changes (enlarging if the force is compressive and decreasing if the force is tensile).

Two common ways of describing the stress have evolved: "engineering stress," which is defined as the force divided by the unaltered cross sectional area; and "true stress," which is the force divided by the altered cross sectional area. However, while "engineering strain" is the change in length divided by the unaltered original length, "true strain" is defined as the natural log of the original cross sectional area divided by the altered cross sectional area. (NOTE that, since these are simply computations based upon measured force, length and area, the "engineering" stress and strain for a given condition can be mathematically converted to the

(continued...)

The Applicant and the Staff propose that, once the experimental data is used to determine the actual tensile rupture strain, one should then apply a certain "safety factor" [87] (i.e., determine that the analytical result is acceptable only if the computed strain falls short of the experimentally determined failure strain by a multiple selected to give sufficient comfort that failure would not occur),[88] a common approach in engineering analysis. Such a "safety factor" would account for the fact that those properties are measured in quasi-static laboratory conditions (experimentally-determined information regarding dynamic loading is discussed below) on samples which have not been subjected to the variations which might be expected to occur in the manufacturing, construction and assembly process.

On the other hand, the State argues in essence that when this Stainless Steel is strained beyond approximately 2.5 percent true strain, it must, in accordance with customary civil

---

[86](...continued)
"true" stress and strain for the same conditions by simply knowing the unaltered cross sectional area and length and the altered cross sectional area and length.)

Materials can be strained a small amount without undergoing permanent deformation -- such deformation being generally referred to as "elastic" strain, and the point at which the material begins to become permanently deformed being the "elastic limit." Once a material is strained beyond its elastic limit (that is, it will not return to its original dimensions once the stress ceases), it does not cease to offer resistance to further strain, and in fact, in some circumstances, its ability to resist further elongation actually increases. However, further strain becomes, at least in part, permanent, and is referred to as "plastic" strain. Some materials, like stainless steel, are able to undergo quite large plastic tensile strains before finally rupturing, and are sometimes referred to as being very "ductile."

[87] See Applicant Direct Testimony on Structural at 72-73; Applicant Exh. 293; Staff Direct Testimony on Structural and Ordnance (Bjorkman and Aramayo) at 27.

[88] See, e.g., Tr. at 15310-11 (Soler). In this regard, we note that the State's expert witness (Dr. Sozen) did not take issue with the principle that steels can be strained well beyond their elastic limit and well beyond the limit suggested by the civil engineering codes to which he refers for a failure criterion. He argued, instead, that there is increasing uncertainty in material behavior once the steel is strained beyond the threshold values he would suggest. Therefore, he suggests, one should, rather than beginning from the experimentally determined strain at failure and applying a safety factor, elect to assume that any strain beyond that determined using a ductility ratio specified for acceptable loads from a design perspective would cause failure in tension. Tr. at 16242-16244 (Sozen).

engineering principles, be assumed to fail.[89] The State's arguments rely heavily upon a standard developed by the Department of Energy[90] (hereinafter, the "**DOE Standard**") for application to assessment of structural integrity of nuclear facilities subjected to dynamic loading by aircraft impact – an approach which on its face appears meritorious.

Upon closer examination, however, three things are clear: (1) the standard set forth in Table Q1.5.8.1 of the ANSI/AISC Standard and referenced in the DOE Standard is inapplicable, by its own terms, to "pressure vessels"[91] (and the Applicant and the Staff assert that the MPC is a "pressure vessel" rather than a structural member for purposes of assessment in accordance with the methodology referenced in the DOE Standard);[92] (2) the DOE standard was developed with a clear focus upon "structural" members, which are made of carbon steel, not stainless steel;[93] and (3) the DOE Standard was intended to be used as a tool to assess whether or not a particular structural member would fail to be able to continue to perform its structural function when subjected to the load at issue, not for use to assess the point at which a steel component

---

[89] See Tr. at 16514-16 (Sozen).

[90] See State Exh. 254, United States Department of Energy Standard (DOE-STD-3014-96), Accident Analysis for Aircraft Crash into Hazardous Facilities (Oct. 1996); State Exh. 229, American National Standard Institute/American Institute of Steel Construction (ANSI/AISC) Standard N690, Specifications for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities (1994) at 23, Table Q1.5.8.1, Allowable Local Ductility Factor, μ, to be Used in Design of Steel Structural Elements for Impractive and Impulsive Loads (2002 Supplement) [hereinafter ANSI/AISC Standard]; see also State Direct Testimony on Structural at 8-9.

[91] See State Exh. 295, ANSI/AISC Standard at 23, Table Q1.5.8.1 (as referenced in State Exh. 254, DOE Standard at 76); see also Staff Exh. 103, AISC/ANSI Standard at Q1.01 (Scope); Staff Rebuttal Testimony on Structural (Bjorkman, et al.) at 5-6; Staff Rebuttal Testimony on Structural (Bjorkman/Aramayo) at 2.

[92] See Applicant Direct Testimony on Structural at 68-69; Applicant Rebuttal Testimony at 15-16; Tr. at 16810-11 (Bjorkman).

[93] See Applicant Rebuttal Testimony on Structural at 15-16; Staff Rebuttal Testimony on Structural (Bjorkman et al.) at 6; see also Applicant Rebuttal Testimony on Structural at 2,3,4,13-15 (noting differences between austenitic and ferritic steels).

would fail by stretching to the point that it ruptures (or that a hole was created in it as a result of the tensile loads).[94] The result is that, while the State's proposed standard (based upon use of a maximum "ductility ratio") is indisputedly applicable to determination of the failure point of the components of a structural steel member in a buckling mode,[95] it is unrelated to determination of the failure of a steel component by tensile rupture,[96] which is at issue here. We so find.

The experimental (laboratory) data presented to us indicates that this particular stainless steel can undergo approximately 90 percent true strain before it fails by rupture.[97] While the State did not dispute this data and information,[98] it argues that this laboratory data is inappropriate for use in these circumstances, and that "real life" stainless steel will have

---

[94] See Applicant Rebuttal Testimony on Structural at 13-14; Tr. at 16937-38, 17041-48, 17079-80 (Bjorkman).

[95] See Tr. at 16834-43, 16937-38, 17041-49, 17081-82, 17202-03, 17250, 17279 (Bjorkman testimony asserting that the ductility ratio is used to compute buckling failure).

[96] The State's witness has neither presented nor pointed to a single piece of experimental evidence which would support the hypothesis that the steels at issue here would fail to retain their continuity (and therefore their confinement capability) or fail in tension by rupture at any strain nearly as low as the State proposes as a standard for judgement here. See also Tr. at 16839-42 (where Dr. Bjorkman further describes the technical article cited in reference 69 in the Staff Exh. 111, ANSI/AISC Standard at C-18, CQ.1.5.8). In that article, Dr. Bjorkman explains, the authors use the ductility ratio to assess structural failure by examining buckling, not rupture. Thus, Dr. Bjorkman continues, failure was determined by analyzing the point at which a structure ceases to be able to carry a load, buckles, and becomes unstable. Failure is not determined by analyzing the point at which a structure is ruptured. Id. at 16842.

[97] See Tr. at 16004-06 (Bjorkman); Staff Exh. 92, Structural Alloys Handbook (John M. Holt et al. eds., 1996 edition, v.2) at 45. According to Dr. Bjorkman, the Staff's search for material properties in common sourcebooks indicated that the 304 stainless steel's lowest data point value of true strain at rupture they found was approximately 92 percent. Tr. at 16006. See also Staff Exh. 93, The American Society for Metals International, Atlas of Stress-Strain Curves (2nd edition.) at 184 (graphing true-stress strain curve of 304 stainless steel and showing that at both elevated and room temperature, the true failure strains was greater than 90 percent); Staff Rebuttal Testimony on Structural and Ordnance (Bjorkman and Aramayo) at 9.

[98] See e.g, Tr. at 16495-99, 16505-16517 (where Dr. Sozen offered no support for a contrary view despite being afforded extensive opportunity); see also Tr. at 16257.

impurities and irregularities which would make it fail in tension at a materially lower true strain.[99] In support of this proposition, the State points to the fact that this material cannot be expected to be manufactured free of impurities and irregularities, and is welded in numerous locations, all of which (the State argues) would weaken the material.[100]

Although those propositions seem reasonable, the State neither submitted nor pointed to a single piece of experimental evidence supporting them.[101] And the Applicant (supported by the Staff) responded by pointing to the facts that: (a) the steel plates used to make up the MPC are manufactured, and examined during and after manufacture, to assure compliance with the ASME Code requirements for this material and this application, and that any plate failing to conform to those standards would be rejected from use;[102] and (b) the welds are performed in accordance with ASME prescribed and approved processes and procedures, and, since the ASME code requires that the weld material have identical strength to the base material, there is no basis for an argument that the weldment would represent a "weakness."[103]

To emphasize this point, the Applicant presented to the Board strained strips of actual weldment material taken from the stainless steel to be used in these MPCs.[104] These strips had been bent to nearly 180 degrees with no visible indication of rupture on the outer elements (which are the elements exposed to tensile strains in such a bend).[105] The Applicant's experts

---

[99] See Tr. at 16243-44, 16514-16 (Sozen).

[100] See note 99, above.

[101] See e.g., 16516-17 (Sozen).

[102] See Applicant Direct Testimony on Structural at 69-73; Applicant Rebuttal Testimony on Structural at 5-6.

[103] See Applicant Direct Testimony on Structural at 7-8, 71-73; Applicant Rebuttal Testimony on Structural at 2-3; Tr. at 15242-44 (Soler), 15724-25 (McMahon).

[104] See Applicant Exh. 307 (physical specimen of ½ inch weldment bend test).

[105] See Tr. at 15239-40 (Soler).

indicated that the tensile strains in the outer elements of that strip would be in the order of 20 percent.[106] Similarly, the Staff's experts presented samples of deformed stainless steel exposed to very high loads in an experimental environment, and also demonstrated that this particular stainless steel withstood true strains of the order of 90 percent without tensile rupture.[107]

In addition, the State argued, without submittal of supporting experimental data, that the maximum strain at rupture in tension would be reduced when loads are applied rapidly.[108] The Staff's evidence, however, demonstrates that there is minimal effect on tensile rupture strain at the strain rates computed to occur in these crash events.[109]

Finally, the State argued -- for the first time -- in its rebuttal brief filed on November 22, 2004, that application of the ASME Code Appendix F criteria would indicate that maximum permissible strains under that code are less than 10 percent.[110] However, it is clear from both the State's analysis and the responses of the Staff[111] and the Applicant to the Board's

---

[106] See Applicant Exh. 301, Bend Test of 304 SS; Tr. at 15240 (Soler).

[107] See Tr. at 15974-16002 (Kalan), 16010-11 (Bjorkman); see also Staff Exh. 107, (pulled steel).

[108] Tr. at 16243, 16524-25 (Sozen).

[109] See Tr. at 16004-10 (Bjorkman); Applicant Exh. 305, W. Lee et al., The Effects of Strain Rate and Welding Current Mode on the Dynamic Impact Behavior of Plasma-Arc-Welded 304L Stainless Steel Weldments, Metallurgical and Material Transactions A, vol.35A (May 2004) 1505; Staff Exh. 92, Structural Alloys Handbook at 45 (providing a table of strain rate effects and ductility); see also Tr. at 16000 (staff witness Dr. Kalan noting that stainless steel is not particularly strain rate sensitive).

[110] See State of Utah's Reply Findings of Fact and Conclusions of Law on the Phase II Hearing of Contention Utah K/Confederated Tribes B (Cask Breach Probability) (Nov. 19, 2004) at 15-25 [hereinafter State Reply Findings of November 19, 2004].

[111] In this opinion we do not rely on any material supplied by the Staff in the affidavit of Dr. Bjorkman attached to the "NRC Staff's Response to the Licensing Board's Order Directing Clarification of Record" (Dec. 16, 2004) [hereinafter Staff's Response of December 16, 2004]. Thus the Board, consistent with the State's position in the "State of Utah's Answer to the Board's Directive Re Clarification of the Record" (Dec. 21, 2004), did not ask for any further briefs from the State on this matter.

December 1 Order requesting clarification of the record,[112] that the State misapprehended the relevant ASME Code provisions, having applied a criterion established for examination of general primary membrane stress (or strain) which is applicable in circumstances where a member is globally (i.e., essentially uniformly) strained -- such as loading on a balloon by internal pressure.[113]

To explain further, the ASME Code expressly provides criteria for three types of loadings: general primary membrane stress (as discussed above); primary stress -- in which the stress is averaged through the wall thickness of a locally loaded (stressed/strained) region;[114] and local stresses.[115] Since the loadings which are created by the accidents at issue here are clearly not global, but are very localized, we find that application of general primary membrane stress/strain criteria would be incorrect. Furthermore, we find that Appendix F of the ASME Code would guide a user toward use of a localized stress and strain criterion such as has been developed by the Staff's expert, Dr. Bjorkman.[116]

Finally, although we do not endorse, as more fully discussed below, the concept of application of any Code-delineated prescriptive formula for determination of failure in this sort of examination, we note that even if the ASME Code's Appendix F criteria for primary stress/strain

---

[112] See Staff Response of December 16, 2004; Applicant's Response to Board Order Directing Clarification of the Record (Dec. 16, 2004) [hereinafter Applicant's Response of December 16, 2004]; see also Order Directing Clarification of Record (Dec. 1, 2004).

[113] See State Reply Findings of November 19, 2004 at 15-16, 19; Applicant's Response of December 16, 2004 (Dec. 16, 2004) at 17-18.

[114] See Applicant's Response of December 16, 2004 at 21-22; Staff Response of December 16, 2004 at 4.

[115] See Staff Exh. 90, American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code: ASME an International Code, Rules for Construction of Nuclear Facility Components (2001) at Appendix F ¶ F-1341.2 (Plastic Analysis); see also Staff Response of December 16, 2004 at 4; Applicant's Response of December 16, 2004 at 21-22.

[116] See Staff Response of December 16, 2004 at 4-5; Staff Rebuttal Testimony on Structural and Ordnance (Bjorkman and Aramayo) at 7-8.

were applied (which, although the ASME Code would guide an analyst toward use of a purely local evaluation such as has been performed by the Staff, is clearly more applicable than the criterion for general primary membrane stress/strain), the maximum permissible tensile strain would be on the order of 25 percent,[117] well above the maximum of 10 percent computed by any of the three analyses at issue here, that the parties predict to result from a "bounding event" F-16 crash.

As we mentioned above, the fundamental issue underlying this portion of the argument is whether the "failure criterion" for the MPC should be based upon actual expected materials properties or upon the use of a formulaic standard used in civil or mechanical engineering.

We, therefore, do not find persuasive the arguments presented by the State that one should assume failure at a specific ductility ratio (which amounts to the prescriptive establishment of a defined maximum strain not based upon material properties and relatively invariant with choice of materials) or that one should apply a particular criterion suggested in the ASME Code. In this regard, the State's expert is a civil engineer experienced in structural design,[118] but has essentially no experience in (and is not an expert in) materials properties, the behavior of any steel under large strain conditions, or the behavior of stainless steels under the circumstances at issue.[119]

Nonetheless, while we are persuaded that the MPC's stainless steel can withstand, without tensile rupture failure, much more than the approximately 2.5 percent maximum strain which would be suggested by use of a ductility ratio as proposed by the State, and materially

---

[117] See Applicant's Response of December 16, 2004 at 21.

[118] See State Direct Testimony on Structural at 1-3, Biographical Data: Mete A. Sozen; see also Tr. at 16289-92, 16523-24, 16528-29, 19531-32 (Sozen).

[119] See Tr. at 16289-93, 16300-01 (Sozen acknowledges that he is neither a mechanical engineer or a metallurgist, that he has seldom worked with stainless steel, and in fact, this hearing was the first time he has looked at stainless steel "intensely").

greater tensile strains than the approximately 10 percent indicated by all of the parties' computations, we also believe it would not be prudent to assume that the MPC could handle 90 percent true strain in tension before losing its integrity as might be suggested by the laboratory data. On this point, the Staff experts testified that application of an uncertainty factor of two or three to the laboratory data would both: (a) adequately accommodate the unknowns regarding the effects of manufacturing and assembly of the MPC; and (b) provide reasonable confidence that a conservative failure criterion was being used.[120] Therefore, given that the maximum computed true tensile strain in the MPC in all of these analyses is less than 10 percent, which is more than a factor of nine below the laboratory data, we find that there is reasonable confidence that the MPC would not fail under the conditions predicted by these analyses.

Based upon the foregoing, this Board accepts the principle put forth by the Applicant and supported by the Staff that the MPC will not fail when the overpack is impacted by an F-16 traveling at a speed equal to or less than XXXXXXXXXXXXXXXXXXXXXX or more from the horizontal. We so find. Similarly, this Board finds that the MPC will not fail when the overpack is impacted by a XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX. The foregoing events, therefore, become the bounding events for use, after determination of the distribution of the probabilities of impact of an F-16 (or the XXXX ordnance) at various speeds and angles, in determining the UEP.

---

[120] See Tr. at 15986-88 (Staff witness Dr. Gwinn commenting that 50 percent of the ultimate strain would be a reasonable "upper limit" to the strain to which a material should be subjected and that at 30 percent one would have "a comfort factor that is good"), 15995 (Gwinn again noting that going to half of the ultimate strain will account for any flaws, welds, or any other weaknesses in the material); see also Staff Rebuttal Testimony on Structural (Bjorkman/Aramoyo) at 4-5 (noting that the ASME Code allowable strain limit is 46 percent), 9 (noting 92 percent true rupture strain for 304 stainless steel). Such a "safety factor" would result in use of a "failure criterion" of approximately 45 percent true strain, a number completely consistent with the 46 percent criterion proposed by Staff expert Bjorkman. Id. at 4-5.

4. The Probability Analysis. The Applicant's structural analysis resulted in a bounding incoming F-16 flight at XXXXXXXXXXXXXXXXXXXXXXX,[121] while the State's computation assumed an impact speed of XXXXXXXXXXXXXXXXXXXXXXX.[122] Since neither computation reached the threshold strain in the MPC, we find that it is appropriate to use the larger set (bounded by the Applicant's bounding case which we have just approved) to determine the UEP. Thus we turn now to determination of the probability that a certain crash speed is below the bounding case, which will enable the determination of an upper bound on the UEP. To make this determination, we must look to the parties' analyses regarding what crash data should be included in making the computation.

There is limited data available regarding crashes of F-16 aircraft under conditions which are reasonably similar to those of Skull Valley. From crash data available from 121 accidents worldwide, the Applicant has identified 61 crashes which it believes are applicable and which were considered as "Skull Valley type incidents" by the prior Board.[123] Among those 61

---

[121] See Applicant Exh. 265, Cornell Report at 23 (Dr. Cornell evaluated the impact on the cask at 40 inches below the lid); see also Testimony of C. Allin Cornell on the Unanalyzed Event Probability of Aircraft Crash or Jettisoned Ordnance Impacts at the PFSF -- Contention Utah K/Confederated Tribes B (July 12, 2004) at 16 [hereinafter Applicant Direct Testimony on Probability].

[122] See State of Utah Supplemental Testimony of Michael C. Thorne Ph.D for Contention Utah K/Confederated Tribes B Cask Breach Probability Proceeding (Sept. 9, 2004) at 2; see also State Exh. 238, M.C. Thorne, Ordnance Impacts and Aircraft Crashes at a Proposed Private Fuel Storage Facility for Spent Nuclear Fuel in Utah: Summary of Probability Estimates (May 2004) at 13 (setting forth four case scenarios for side and top cask impacts at varying speed and angles) [hereinafter Thorne report]. It was not until the Dr. Thorne's supplemental testimony, prepared at the request of the Licensing Board to address the issue of an appropriate flight data set, that the State set forth the boundary speed of XXXXXX cask side impacts.

[123] See Testimony of C. Allin Cornell, Wayne O. Jefferson, Jr. and Ronald E. Fly on the Appropriateness of Using Skull Valley Type Events for Evaluating the Speed and Angles of Potential F-16 Crashes in Skull Valley, Utah -- Contention Utah K/Confederated Tribes B (July 12, 2004) at 3 [hereinafter Applicant Direct Testimony on Speed and Angles].

incidents are four crashes which essentially occurred on runways.[124] In this proceeding, the Applicant eliminated from consideration the four incidents which were essentially runway incidents.[125] The Staff concurred with the Applicant that these remaining 57 incidents are those properly considered in development of the probability distributions.[126]

The State, on the other hand, argues that in addition to the four runway related accidents, 13 more incidents should be excluded, including nine loss of engine power incidents which occurred during take off and landing,[127] and four accidents that involved other situations

---

[124] See id. at 5-6; see also Applicant Exh. 266, Maj. Gen. Wayne O. Jefferson, Jr. et al., Evaluation of F-16 Aircraft Crash Impact Speed and Angle for Skull Valley-Type Events (Rev. 1) (Jan. 2004) at 2, Tab A (Chronological Listing of Data from F-16 Mishap Reports FY89-FY98) [hereinafter Burdeshaw Report]. These are the incidents occurring on April 24, 1992; May 5, 1992; August 27, 1993; and March 30, 1994.

[125] See note 124, above [***discussing four excluded flights***].

[126] See NRC Staff's Testimony of Kazimieras M. Campe and Amitava Ghosh Concerning F-16 Crash Impact Speeds and Angles for Skull Valley Type Events (July 12, 2004, as revised Aug. 6, 2004) at 11-12 [hereinafter Staff Direct Testimony on Speed and Angles]; NRC Staff's Rebuttal Testimony of Kazimieras M. Campe and Amitava Ghosh Concerning F-16 Crash Impact Speeds and Angles (July 29, 2004 as revised August 20, 2004) at 2-3 [hereinafter Staff Rebuttal Testimony on Speed and Angles].

[127] See State of Utah's Testimony of Lt. Col. Hugh L. Horstman and Lt. Col. Luis N. McDonald III for Contention Utah K/Confederated Tribes B Cask Breach Probability Proceeding (Speeds and Angles Ordnance) (July 12, 2004) at 15 [hereinafter State Direct Testimony on Speed and Angles] at 15 (noting that while all nine accidents were caused by engine failure, they should be excluded because the flight characteristics, namely altitude and speed, could not occur over the PFS site because there are no runways for pilots to attempt to land or take-off). The nine excluded events include accidents on: August 7, 1990 (engine failure during pilot's landing approach); February 20, 1991 (engine failure as pilot attempted to reach a landing field); May 7, 1991 (engine failed 52 seconds after takeoff); June 8, 1991 (pilot attempted to land following engine failure); January 13, 1992 (pilot attempted to land following engine failure); September 18, 1992 (engine failed after pilot took off and raised landing gear); April 21, 1993 (pilot attempted to land following engine failure); July 11, 1996 (pilot attempted to land following engine failure); January 29, 1997 (pilot attempted to land following engine failure). Id. In proposing elimination of these accidents, the State argues that in an accident in Skull Valley over the PFS Facility, a pilot would not attempt to land in the event of an engine failure and would not delay an ejection (thus affecting the crash angle and speed) in an attempt to reach a runway. Similarly, the State argues, a pilot would not experience engine failure in Skull Valley at the low speed and altitude experienced immediately following take-off. Id.

that could not happen in Skull Valley.[128] Much of the testimony centered on which of those thirteen should be included,[129] and there was very little disagreement on the methodology which should be used to generate the probabilities once the proper data set was selected.

This question of whether or not the proper set of events is the 57 events proposed by the Applicant and the Staff or the 44 events proposed by the State has a relatively important effect upon the final probability distributions. In addition, it is clear that inclusion of irrelevant or unrepresentative data, or conversely, exclusion of relevant data, will corrupt the dataset and lead to misleading results, particularly where, as here, the size of the dataset is small. These issues are addressed below.

---

[128] See State of Utah's Pre-filed Rebuttal Testimony of Lt. Col. Hugh L. Horstman (U.S.A.F. Retired) for Contention Utah K/Confederated Tribes B Cask Breach Probability Proceeding (Speed and Angles) (July 29, 2004) at 2-3 [hereinafter State Rebuttal Testimony on Speed and Angles]. These four accidents occurred on: October 22, 1992 (altitude decreased when pilot delayed ejection in an attempt to make emergency landing at an air force base); October 25, 1994 (pilot ejected below minimum ejection altitude after attempting to land on runway); August 11, 1993 (pilot delayed ejection to crash on an island instead of over open ocean); July 1, 1994 (initiating event was caused by a bird and the Board ruled in LBP-03-04, 57 NRC at 168, that a bird strike in unlikely in Skull Valley).

[129] The Applicant's witness, Dr. Cornell, argued that the four runway events should obviously be excluded because they include no impact information, speeds, or angles. The remaining flights, however, all provide useful information and data should not be weighted or excluded based on altitude because the probability of a crash exceeding XXXXXX is insensitive to such adjustments. See Tr. at 17738-42. While the State witness, Lt. Col. Horstman, agrees that the four runway events should be excluded, he also argues that an additional 13 events (discussed above) should be excluded because the accident crashes could not occur at the PFS site and including them in the data set lowers the impact speed estimation at the PFS site. See State Direct Testimony on Speed and Angles at 14-15; State Rebuttal Testimony on Speed and Angles at 2. Furthermore, Lt. Col. Horstman argues, the Applicant's rationale to exclude the four runway related accidents, but not the nine accidents that occurred while a pilot was attempting to land on, or take-off from a runway, is inconsistent. Id.

For its part, the Staff, in analyzing the 13 additional events, concluded that while 3 of the 13 (the accidents of April 21, 1993; January 13, 1992; and September 18, 1992) accidents occurred in such close proximity to the runway that they might not be representative of Skull Valley flight conditions, the specific flights parameters are possible in Skull Valley and thus they should not be excluded. See Staff Rebuttal Testimony on Speed and Angle at 5. The remaining accidents, the Staff concluded, occurred under flight conditions comparable to those that could occur in Skull Valley regardless of whether the accident occurred during landing or take off. See id. at 2-7.

Before examining the particulars of each incident to identify those incidents which are properly included in this analysis, we focus upon determining which incidents provide useful information. The technical approach taken by the parties was to examine the incidents for which there is crash impact data to determine if any reasonable correlation could be made between the flight conditions at onset of the incident and the crash speed and angle which must be determined for use in the analyses at hand.

There are only fourteen accidents for which the ejection speed and altitude and the crash impact speed are all reasonably known.[130] The Applicant's and Staff's analysts used regression analysis to develop from those few incidents a correlation between ejection speed and altitude and the measured speed of impact.[131] Then, from applying that regression analysis, the Applicant and Staff each developed a methodology to expand the data set, using the correlation to estimate the "missing" information for the accidents where only partial information was available.

In an effort to determine whether accurate results could be obtained using only accidents containing complete data, the Board asked the Applicant to examine the probability distribution based only on incidents with known data and to weight those according to the relative frequency of flights in the two flight ranges, known as Sevier B (3000 ft to 4000 ft above ground level ("AGL")) and Sevier D (approximately 5000 ft AGL to 14,000 ft AGL).[132] In response, the Applicant examined accidents with documented impact speeds and found a dataset of 15

---

[130] See Applicant Exh. 266, Burdeshaw Report at 10, Tab G.

[131] See Applicant Exh. 266, Burdeshaw Report at 4, 10-11; Tr. at 17753 (Cornell), 17758 (Fly); Staff Exh. 100, Dr. Kazimieras M. Campe and Dr. Amitava Ghosh, NRC Staff's "Evaluation of Aircraft Crash Impact Speeds and Angles considered by Private Fuels Storage, L.L.C. in its Analyses of Skull Valley Type Events (May 24, 2004) at 14 [hereinafter Staff Evaluation of Speed and Angles]; Tr. at 18051-52 (Campe).

[132] See Tr. at 17924 (Farrar).

accidents.[133] Of those 15 incidents,[134] nine originated within Sevier B and six within Sevier D.[135] Because Sevier B is weighted[136] so heavily, however, the nine events originating in Sevier B become the most relevant in considering the estimated probability that a future Skull Valley event would exceed XXXXXX.[137] Thus, the effective sample size is diminished from 15 to nine data points. Attempts to develop probability distributions of impact speed from those nine data points resulted in a projection with a standard error of estimation that is effectively 50 percent of the estimate and whose one-sigma error was the entire width of the projected impact speeds.[138]

Therefore, since a correlation based upon the nine incidents would be so unreliable, the Applicant and the Staff took a different approach to maximize use of all available data, ultimately resulting in use of the entire set of 57 Skull Valley-Type accidents to perform the analyses that

---

[133] See Tr. at 17922-46 (Board and parties discussing assignment).

[134] See State Exh. 278 (Cornell "homework assignment" performed at the request of the Board, Tr. at 17922-26) at 2 [hereinafter Cornell Assignment].

[135] See Tr. at 18074-75 (Cornell); State Exh. 278, Cornell Assignment at 2. In the "homework assignment" given to Dr. Cornell, the Board asked him to exclude accidents that occurred above Sevier D and below Sevier B, thus excluding the two high ejection points referred to above and the four take/off and landing incidents because they are not representative of what might happen in Skull Valley. Though the Board asked the Applicant to include only those accidents with documented speed and angles within Seviers B and D, the Applicant examined only the accidents with documented speeds. As the State points out during cross examination, however, four of the accidents included in the dataset had speeds that were estimated by the Applicant. Tr. at 18075-76.

[136] See Tr. at 17737- 41 (Dr. Cornell explaining the methodology that went into weighing the data to account for the majority of Skull Valley flights occurring in Sevier B). Dr. Cornell has weighted Sevier B at 96 percent and Sevier D at 4 percent based upon the relative frequency of flights in those height sectors.

[137] Tr. at 18081-82 (Cornell)

[138] Tr. at 18082 (Cornell). It is well known that the standard error of an estimate is dependent upon sample size alone, and that as data sets become larger, the standard error becomes smaller.

lead to the probabilities of crash impacts at various speeds.[139] The Staff's experts concurred in the validity of use of all 57 incidents and confirmed the accuracy of the Applicant's correlation,[140] which led to being able to "fit" each actually measured impact speed to within 20 knots.[141] Experts representing the Applicant, the Staff, and the State all testified that the correlations of impact speed to ejection altitude and speed is robust (i.e., a good correlation with small error) for these larger data sets.[142] The Applicant and the Staff agree that in 18 cases, there is reasonably reliable data regarding the altitude and speed at which the pilot ejected from the aircraft, and the Applicant and the Staff argue that this entire set should be used, together with the 14 incidents where impact speed was known along with the ejection altitude and speed, to develop the probability of impact at various speeds.[143]

In addition to the information added to the dataset by inclusion of these events through statistical analysis, there is some logic to their inclusion because, for the incidents in question that are initiated by a loss of engine power, the flight path after engine failure can be predicted with some reliability. This is, because, as all parties' experts testified, the pilot would be

---

[139] See Tr. at 18085 (Cornell explaining that limiting the data to documented speeds discarded about two-thirds of relevant accident data), 18698 (Cornell explaining that he used the entire data set in his regression analysis to establish impact speed).

[140] See Tr. at 18795 (Ghosh), 17969-71 (Campe, Ghosh); see also Staff Exh. 119, NRC Staff's Response to the Atomic Safety and Licensing Board's Questions Concerning the Probability of an Accidental F-16 Crash into the PFS Facility at 4-5.

[141] See Tr. at 17902-03, 18088-18091 (Cornell discussing the 20 knot standard deviation), 17872-73, 17893 (Applicant witnesses Fly and Jefferson discussing use of all 57 data points to establish correlation). While this did not lead to a perfect "fit", it led to a correlation coefficient very close to 1.0. See Tr. at 17853 (Cornell stating that the confidence bounds in the regression analyses was in the order of 95 percent); Applicant Exh. 266, Burdeshaw Report at 10-11, Tab G.

[142] See Tr. at 17753 (Cornell),17758 (Fly), 17969-71 (Campe, Ghosh), 18911 (Thorne).

[143] See Applicant Exh. 266, Burdeshaw Report at 10-11, Tab H; Staff Exh.100, Staff Evaluation of Speeds and Angles at 4 (18 incidents where ejection altitude and ejection speed were known).

generally expected, in the case of engine failure, to attempt to gain the maximum possible altitude (to provide the maximum amount of time to attempt to restart the engine) while not letting airspeed go below 250 knots.[144] With the loss of engine propulsion, the aircraft would then reach a peak in its trajectory and begin descent at approximately 220 knots.[145] Thus, it is reasonable to expect, in cases of engine failure (absent other malfunctions), that the aircraft will begin its descent at 220 knots. The testimony is uncontroverted that the aircraft's control systems will thereafter attempt to maintain that speed and maintain the descent at approximately 6 degrees below the horizon (through manipulation of the aircraft's flight control surfaces).[146] Pilots are advised to eject from the aircraft at no less than 2000 ft AGL, although there was considerable evidence in prior hearings that pilots in fact often stay with their craft below that altitude in their efforts to restart the engine and save the craft.[147] In fact, 52 of the 57 incidents being considered by the parties in these analyses were loss-of-engine accidents,[148] and 32 of those 52 had crash speeds of less than 250 mph.[149] This indicates that the majority of the loss-of-engine accidents indeed crashed at speeds not much faster than would be expected if all procedures were followed and aircraft controls operated as described. Of course, conversely, a large portion of such accidents did not exhibit that predictability. Nonetheless, it is clear to us that, in addition to the mathematical and statistical arguments for expansion of the dataset by

---

[144] See LBP-03-4, 57 NRC at 171-72; State Direct Testimony on Speed and Angles at 7-8, 18; Applicant Direct Testimony on Speed and Angles at 4-5; Tr. at 17745-47 (Fly), 17997-98 (Campe).

[145] See LBP-03-04, 57 NRC at 172.

[146] See State Direct Testimony on Speed and Angles at 8, 18; Tr. at 17746 (Fly)

[147] See LBP-03-04, 57 NRC at 172; Tr. at 17805-06 (Fly).

[148] See Applicant Exh. 265, Cornell Report, App. A. Analysis of F-16 Crash Impact Speed and Angle Distributions (Rev. 1) at 4,5.

[149] See State Exh. 238, Thorne Report at Attach. 1.

inclusion of these additional incidents, there is a phenomenological basis for incorporating them as well, albeit with some caution as to actual speeds.

Two accidents involving initiating events other than engine failure resulted in pilot ejection above the top of Sevier D, and the State would have us rule that because no aircraft flying through Skull Valley would be traveling at those altitudes, these incidents should be excluded.[150] We see no reason, however, to exclude such incidents from the dataset simply because they originated at a particularly high altitude, since they do represent accident initiators which could take place at Skull Valley and thus should not be ignored.

The foregoing analyses raise the question, addressed below, regarding whether, and if so how, this Board should incorporate into its analysis the fact that approximately 90 percent of the 57 incidents being considered were initiated by loss of engine power.[151]

A similar issue is raised by a second set of incidents – those which involve events that result in aircraft descending in a "deep stall." There were six incidents (i.e., approximately 10 percent of all incidents being considered) for which observers described the aircraft as "falling like a leaf;" in airframe vernacular, this is more accurately described as in a "deep stall," which means the descent is essentially vertical while the aircraft wings and fuselage remain essentially level with the horizon.[152] In those incidents, the aircraft manufacturer has advised the Staff that

---

[150] See Tr. at 18389-90 (State witness Horstman explaining exclusion of the two flights); State Exh. 238, Thorne Report at Attach. 1 (excluding flight number 8, January 13, 1991, and number 33, September 11, 1993).

[151] Applicant Direct Testimony on Speed and Angles at 6; Applicant Exh. 265, Cornell Report , Analysis of F-16 Crash Impact Speed and Angle Distributions at 4-5.

[152] See Applicant Exh. 266, Burdeshaw Report at 4, 11, Tab I. The six deep stall accidents were as follows: January 13, 1991 (hydraulic failure and subsequent flat spin); March 19, 1991 (hydraulic failure, uncommanded barrel rolls); February 19, 1993 (uncommanded climb, aircraft rolling); September 11, 1993 (explosion, fire); June 25, 1995 (stall, fire, and explosion on impact); September 16, 1997 (mid-air collision followed by loss of control); Tr. 17811 (Fly).

the descent speed will be no more than 150 knots[153] and the Air Force believes that the descent speed will be between 99 and 148 knots.[154]

Accordingly, although the impact speed of those crashes is not known by any physical measurements, there is good confidence that impact speed for those incidents has an upper bound of 150 mph. We note that the Applicant used an impact speed of 123 knots for its probability computations,[155] which is the average of the range given by the Air Force, while the Staff, in its confirmatory analysis, used the upper bound speed of 150 knots.[156] For these incidents, the trajectory and impact speed are reasonably computable based solely upon the initiating cause of the accident.

Thus, there emerge two fundamental questions regarding how to approach this data: (1) should the data be limited in some fashion; and (2) in determining what circumstances are relevant for the instant case, should the crash data be examined and utilized from the perspective of how the incidents are initiated, independent of their originating altitude (i.e., if 90 percent of the relevant incidents are already determined to be initiated from engine failure and 10 percent initiated from causes which resulted in the aircraft descending in a deep stall, should the probability of a crash initiating from those conditions be 90 percent and 10 percent respectively and, based upon that, should crash angles and speeds for that 90 percent and 10 percent be determined expressly from those two specific types of incidents?

Our examination of the crash data makes it clear that those incidents which originated from engine failure cannot ALL be presumed to crash at the speeds and angles which would be predicted assuming aircraft controls actually managed the flight until crash. There is every

---

[153] See Staff Direct Testimony on Speed and Angles at 7, 10.

[154] Applicant Testimony on Speed and Angles at 17.

[155] See Tr. at 17922 (Fly); Applicant Exh. 266, Burdeshaw Report at Tab I.

[156] See Staff Direct Testimony on Speed and Angles at 7.

indication, however, that all deep stall crashes had essentially the same crash flight path (wings level with a vertical descent) and crashed at speeds below 150 mph. Upon inquiry by the Board of the Applicant, Staff and State experts,[157] it was clear that none had analyzed the data from the perspective of initiating event, although all had examined the data from the perspective of flight conditions at incident initiation and at pilot ejection.

The Applicant[158] and the Staff[159] experts testified that, because the correlation of measured impact speed to ejection parameters was so good (robust), the proper approach to development of a formula which would predict impact speed from ejection parameters would be to use a correlation developed from the fourteen accidents to analyze the entire set of data points for which ejection parameters are known (consisting of 26 data points)[160] and use a regression analysis to develop (using the correlation based upon the 14 incidents discussed above) predicted impact speeds for all events in that set of 40 accidents.[161] Based upon that analysis, probabilities of impact speed were developed for the entire data set of 57 accidents.[162]

---

[157] State expert Thorne confirmed that this would be a useful approach (Tr. at 18946-48), while PFS expert Cornell declined to comment (Tr. at 19035-36, 19044), although neither had examined it.

[158] See Tr. at 17743-44 (Fly, Cornell), 17753 (Cornell), 17758 (Fly).

[159] See Tr. at 18911 (Thorne).

[160] See Staff Exh. 100, Staff Evaluation of Speed and Angles at 4,5. The Staff details 18 accidents with known ejection altitudes and speeds, but unknown impact speeds; 7 accidents that document only ejection altitude, and one accident that documents only ejection speed, therefore totaling 26 incidents where ejection parameters are known. See also Applicant Exh. 266, Burdeshaw Report at 8-11.

[161] See Applicant Exh. 266, Burdeshaw Report at 10-11, Tab D, F, G, H.

[162] The parties excluded predicting impact speeds for the four runway related accidents. See Applicant Exh. 266, Burdeshaw Report at 14 n. 19. The primary reason for developing impact speeds for the entire data set is that expansion of the impact speed data set materially increases the breadth of data and a larger data set significantly improves the usefulness of the Cumulative Distribution Function (CDF) and the Complimentary Cumulative Distribution Function (CCDF), which are both needed in assessment of the UEP. See, e.g., Tr. at 18086 (Cornell notes that smaller data sets produce highly uncertain results), 17926-28, 18085-86 (Cornell noting the importance of using all the useful data), 18901 (Thorne).

When examined on the technical validity of that approach, experts for both the Applicant[163] and the Staff[164] took the position that, because these 26 additional incidents represent the available real data on crashes for F-16s, to ignore the information content of any particular incident without sound reason would create an inaccurate subset of the data. Therefore, they argued, since the ejection parameters are known and since there is such a good correlation between ejection parameters and crash impact speed, it is proper statistical methodology to compute impact speeds for the incidents wherein it was not measured. Thus they used the correlation for impact speed from ejection parameters based upon the fourteen incidents to develop (using a regression analysis technique which is itself unchallenged)[165] a set of formulae to compute impact speeds for the balance of the 26 incidents for which the impact speed was not known but ejection parameters were known.

The foregoing approach has merit: given that the correlation developed by the Applicant and confirmed by the Staff was so good for those data points where crash impact speed was measured,[166] and since the ejection parameters are known for a number of other data points, it

---

[163] See Tr. at 17926-28, 18085-86 (Cornell explaining why it is important to use all the data).

[164] See Tr. at 18015-17 (Campe and Ghosh noting that a small sample size introduces error).

[165] Although a State witness, Lt. Horstman, had some criticism that estimating impact speed and angles was too speculative (See State Exh. 242, Lt. Col. Hugh L. Horstman, Evaluation of Impact Velocity and Impact Angle for F-16 Crashes at the Proposed PFS Site (Sept. 2003), at 6-7), the State nonetheless relied on regression analysis during the hearing (see, e.g., State Exh. 279, M.C. Thorne, Ordnance Impacts and Aircraft Crashes at a Proposed Private Fuel Storage Facility for Spent Nuclear Fuel in Utah: Supplementary Analysis of Probability Estimates (Sept. 2004) at 10-11; Tr. at 18889 (Thorne); Applicant Exh. 284, Excerpts from Lt. Horstman's Deposition of May 24, 2004 at 159-60 (stating the Applicant's estimates appear to be relatively accurate).

[166] As is mentioned above, our confidence in that approach is in part improved by the fact that one would expect, from the standard post-engine-failure procedures that are followed, such a correlation to exist (and the data bears out this perception) for those incidents where the cause was solely loss of engine power (which represented a larger portion of the incidents under consideration).

is reasonable to utilize the correlation to develop projected crash speeds for those other data points. This enables the utilization of all the relevant information from ALL data for which ejection parameters are known to develop a probability distribution function for crash speed based upon all the available relevant data. We adopt that approach.

Unfortunately, no success was achieved in attempting to correlate the ejection parameters to the impact angle.[167] Thus, the data could not be expanded as to this parameter.

Turning now to those incidents whose applicability to the situation in hand is in question, we examine first those incidents where the pilot was attempting to find an airfield to land. Testimony provides the following relevant information:

(a) since these incidents resulted in crashes short of the landing area, the pilot may have been attempting to "stretch" the glide path. The State's expert testified that, although trained to use the fact that the maximum range would be achieved by a descent at approximately 6 degrees at airspeed of about 220 knots,[168] a pilot's instinct is to pull the nose up in a misplaced effort to "stretch" the glide path, but in fact such action results in reduction of airspeed and reduction of glide range.[169] The Applicant's experts testified that a pilot would not contradict that guidance,[170] but there appears to be no evidence to support a conclusion either way regarding pilot actions in any of such incidents included in this data set;[171] and

---

[167] See Applicant Exh. 266, Burdeshaw Report at 3; Tr. at 17758 (Fly).

[168] There was no disagreement on this basic principle, just disagreement regarding how the pilot would react to the circumstances.

[169] See Tr. at 18419-22 (Horstman).

[170] See Tr. at 18511-13 (Fly explaining that the F-16 flight manual instructs that in attempting a flame out (i.e., loss of engine) landing, maximum glide range is achieved at seven degree angle of attack). Col. Fly further explains that if the pilot attempted to change his angle of attack, he would make his glide shorter, and that he would expect a pilot to follow the flight manual instructions. Tr. at 18517.

[171] See Tr. at 18511-13, 18529 (Fly further explaining how changing the angle of attack from the maximum glide path will shorten the glide range), 18418-22 (Horstman describing how

(continued...)

(b) since reconfiguring the plane for landing (lowering landing gear, flaps etc.) substantially reduces airspeed and range, a pilot attempting to "stretch" his range would not reconfigure for landing until becoming certain of being able to land.[172] We were advised that landing gear can be lowered in approximately two seconds,[173] and therefore there is a reasonable probability, in incidents where the plane crashes materially short of a landing strip, that the plane would not have been "reconfigured" and would, instead, have been continuing its glide at approximately 6 degrees and would have crashed in the same mode as if the pilot had not been attempting to reach an airfield.[174] In incidents where the plane crashed near a runway, there is some likelihood that the pilot may have slowed the craft by instinctively raising the nose.

Thus inclusion of these data points in development of a correlation or in development of crash data must be selectively done. We find that inclusion of crashes occurring well short of a runway which have been categorized as "landing" incidents and which were initiated by loss of engine power are properly included because the crash characteristics would be expected to be substantially the same as a crash where the pilot was not attempting to land, even where the crash impact speed must be computed from the correlation described above. Crashes

---

[171](...continued)
a pilot attempting to land may nonetheless think that pulling up the nose as he approaches the runway will extend the glide). The Applicant's and the State's witness also had some disagreement as to how to characterize several flights in the record, thus increasing the uncertainty in predicting how pilots will react in such circumstances. See Tr. at 17779-82 (Fly disagreeing with State's characterization of several accidents as "landing accidents" where the pilot lifted the nose of the plane because he believes that the pilots never intended to land the plane, but were instead lifting the nose of the plane to gain some altitude before ejection, something he describes as a perfectly acceptable flying procedure), 17791, 17794 (Fly noting a pilot may lift the nose of the plane up to increase the safety margin during an ejection).

[172] See Tr. at 18399-400 (Horstman), 18525-26, 18527-18529 (Fly).

[173] See Tr. at 18529 (Fly)

[174] See Tr. at 18404-05, 18451-52 (noting computer's involvement in impact angle).

occurring near a runway are, however, not properly included for two reasons: (a) there is no runway on or very near the PFS site, and therefore no F-16 could be expected to be attempting to land near the PFS site,[175] and (b) there is a reasonable probability that the pilot interfered with the electro-mechanically controlled glide path in an attempt to "stretch" his glide, thereby making the correlation inapplicable to determination of crash speed for such an incident. Similarly, take-off incidents in which the aircraft lost power before it reached the 250 knots target for the initiating conditions for a glide should be excluded. This reasoning calls for elimination of four of the 61 incidents (the four eliminated by all parties) reducing the applicable set to 57.

Considering now those six impacts which arose out of a descent in a deep stall, we note that the State would have us exclude the two deep stall incidents which were initiated above the highest customary flight path (i.e., above the upper extremity of Sevier D).[176] Their rationale is that since flights at such height will not occur in Skull Valley, those incidents are irrelevant.

This forces this Board to consider whether the data should have been partitioned by initiating event and analyzed on that basis – a step not employed by any party, but nonetheless agreed by them to be a sensible one. As we noted earlier, of the 61 incidents considered by the prior Board to be relevant, six (approximately 10 percent) were incidents in which the aircraft fell in a deep stall.[177] This information is no less valuable than the distribution of incidents by ejection altitude and/or speed. Furthermore, as with the crashes where the parties predict

---

[175] As discussed in note 196 below, pilots will not attempt to land F-16's on unprepared surfaces because the planes are too fragile.

[176] See Tr. at 18389-390 (noting State seeks to exclude the flights of January 13, 1991 and September 11, 1993); see also State Exh. 238, Thorne Report at Attach. 1 (excluding accident number 8 and 33 from the relevant data set). The State argues that because the initiating event and the ejection altitude in these two instances occurred above Sevier D they should be excluded from the data set because the crash could not reasonably occur in Skull Valley.

[177] See note 152, above.

impact speed from the ejection parameters, for these deep stall incidents one can predict impact speed within a very narrow range.

Thus, where the relevant crash data indicates that 10 percent are crashes in a deep stall and 90 percent originate from engine failure, it appears to us that it might be manifest error to assume that the same percentages should not apply to crashes originating from flights through Skull Valley.[178] Therefore, although we do not advocate reanalyzing all this data to develop such an approach, the fact that relevant crash data includes incidents initiating at altitudes outside the ranges expected to be flown by the F-16s flying through Skull Valley does not imply that one should not expect approximately 10 percent of the crashes in Skull Valley to also be deep stall type crashes.[179] In fact, we find that it implies quite the opposite. Therefore, we see no basis to eliminate the two deep stall events from use in developing the probabilities simply because they originated at altitudes not flown in Skull Valley. We are, therefore, not persuaded by the State's arguments that the two deep stall incidents which initiated above Sevier D should be excluded and we find, instead, that those two events are properly included in the computations.

Having thus determined which of the 61 accidents should properly be included in the computation of probability, we can now turn to examination of the probability that the aircraft will

---

[178] Even the State's expert concurred that this was useful information which should be considered. See Tr. at 18947-48,18951-52 (Thorne).

[179] One could, following this logic, take the view that the relevant crash data informs us that 10 percent (6 of 57) of crashes are deep stall crashes which impact at 150 mph or less and 56 percent (32 of 57) are loss-of-engine power crashes which impact at less than 250 mph because they follow the expected glide path (because the procedures were followed and automatic controls functioned as expected and no other factors intervened). Based on this approach, one would conclude that the data advises that approximately two-thirds of crashes occur at less than 250 mph. This number is consistent with the complex statistical analyses performed by the parties which indicated that the probability of a crash at more than 250 mph is approximately 0.35 (see Applicant Exh. 265, Cornell Report at Fig A-1) and that the probability of a crash at more than XXXXX must therefore be materially smaller. In fact, it appears to us to be quite consistent with the Applicant's computed probability of approximately 0.20 for a crash at greater than XXXXXX. Ibid. Thus this simpler view of the information provided in the accident data (based upon more fundamental principles) gives us confidence that the Applicant's (and the Staff's) computations are reasonable estimates.

impact at angles and speeds above the bounding event (the UEP). The way the hearing developed, this particular computation has been performed for the event which this Board has determined to be the bounding event by the Applicant (and confirmed by the Staff), and has not been performed by the State.

The State's expert has, however, raised a challenge to the methodology which the Applicant and the Staff used to derive their probabilities, arguing that a correlation (which is essentially a "curve fit" to the data) has no particular basis and proposing, instead, to use a "step function" to describe the probability distribution.[180] The State's expert proposes a step function which results in zero probability for any accident whose impact speed is below the first data point,[181] holds constant at the computed probability of the first data point until the speed of impact reaches the second data point, holding constant at the probability of the second data point until the speed reaches that of the third crash data point, and on through the data.[182]

This particular choice of step function has the effect of shifting the probabilities toward higher crash impact speeds when compared to any other option one could chose (such as the "curve fit," or a linear interpolation, or a step function which assumes the probability is equal to the probability of first data point until the crash speed of the lowest impact speed is reached and then jumps to the second step until the speed of the second data point is reached).[183] Because there is so little data at higher crash speeds, such an approach has a material (but not dominating) effect on the Cumulative Distribution Function (CDF) and the Complementary

---

[180] See Tr. at 18876 -81 (Thorne).

[181] See Tr. at 18881 (Thorne's model has zero probability for any event less than 179 KTAS).

[182] See Tr. at 18870-71 (Thorne).

[183] See Tr. at 18879 (Thorne).

Cumulative Distribution Function (CCDF) and therefore upon the UEP. The State's expert has clearly demonstrated this effect for higher impact speeds.[184]

Upon examination, the State's expert offered no particular technical or scientific justification for why the step function could not have been such that the probability holds constant at the first value from zero speed up to the crash speed of the first data point then jumps to the second value rather than the steps which he employed.[185] In any event, we find it illogical to assume that probabilities would stay constant between data points as they do in either version of the step function. In that regard, we were presented with (and see) no particular reason why, for example, a linear interpolation between data points would not be a better correlation than the step function approach, and that there is no sound rationale for the election to use any particular type of step function.

In the final analysis, we recognize that we have before us sparse data that may be of questionable utility in predicting any particular incident. But, we see no reason to believe that the universe of possible incidents is properly represented by a discontinuous rather than a continuous function.[186] This does, however, raise a particularly important point for this Board. If, as the testimony indicates, the computed probability of the UEP is materially sensitive to the methodology used to "fit" these sparse data, we must exercise caution in interpreting the results.

---

[184] See Tr. at 18868-70 (Thorne); State Exh. 285, Additional Probability Analysis at 5. State Exh. 285 indicates that using the step function Thorne proposed, when coupled with his proposal to reduce the dataset to 44 incidents, would increase the probability of breach from side impact from 3.75×10^{-7} to 5.06×10^{-7}. However, Dr Thorne indicated that the dominant cause for this increase was the elimination of 13 "take-off and landing" incidents from consideration. See Tr. at 18868-69, 18907.

[185] See Tr. at 18879-82 (Thorne).

[186] While this Board takes judicial notice of quantum mechanical principles, the discretization of energy and other properties characteristic of those principles do not manifest themselves on such a macroscopic level as those at issue here. Therefore, for the resultant probabilities to be quantized as the State's expert suggests would, we expect, imply a first-of-its kind phenomenon and form the basis for an entirely new field of study.

In this instance, the Applicant's computation (confirmed by the Staff) – using the regression analysis to "fit" the data with a continuous "best fit" function (which is an accepted approach to interpretation of data) – yields a total of 7.37×10^{-7} UEP.[187] While there is no dispute by the State's expert regarding the regression analysis methodology used by the Applicant and the Staff, the State's expert obtained a larger overall UEP as a result of selecting the worst case methodology for "fitting" the data by using a (discontinuous) step function and reducing the dataset by elimination of the 13 "take-off and landing" accidents and consideration of only 36 crash events.[188] Although not directly addressing the overall UEP, the State's expert pointed out that this approach leads to a probability of breaching the cask due to a top or side impact of 5.08×10^{-7} (as compared with 3.75×10^{-7} computed by the Applicant using the entire 57 accident dataset and a smooth curve fit to the data).[189] Although we find that there is no particular justification for use of the State's "worst case" analytical methodology, the State's computation emphasizes the fact that use of sparse data, and questions regarding determination of which events to include in performing analysis, can lead to results which one may question.

5. The Ultimate Question. The resultant UEP which would be computed from the Applicant's analysis leads to a 7.37×10^{-7} overall probability of an F-16 breaching a cask.[190] In contrast, the State has proposed between 2.0×10^{-6} and 4.08×10^{-6} as the probability range.[191]

---

[187] See Applicant Direct Testimony on Probability at 9-10, 21-22; Applicant Exh. 265, Cornell Report at 51; NRC Staff Direct Testimony of Dr. Dennis R. Damon Concerning Aircraft Crash Probability Assessment (July 12, 2004, as revised Sept. 10, 2004) at 4 [hereinafter Staff Direct Testimony on Probability]; Staff Exh. 102, Dennis R. Damon, NRC Staff's Evaluation of Private Fuel Storage, L.L.C. Aircraft Crash Probability Assessment (May 11, 2004, as revised Sept. 10, 2004) at 16.

[188] See Tr. at 18868-73 (Thorne).

[189] See Applicant Exh. 265, Cornell Report at 48.

[190] See Applicant Direct Testimony on Probability at 21-22; Applicant Exh. 265, Cornell Report at 51.

[191] See State Exh. 238, Thorne Report at 21.

In considering the State's proposal, we note that since approximately two-thirds of all historic crashes occur at 250 mph or less (see note 179, above), no more than approximately one-third of the crashes being examined can be expected to be at speeds greater than 250 mph. Even if we were to assume that all impacts at 250 mph or above breached a cask (a hypothesis which is exceedingly conservative given the analyses of crash impacts discussed earlier), the overall UEP would thus be $0.333 \times (4.29 \times 10^{-6})$; in other words, the UEP cannot reasonably be expected to exceed 1.5×10^{-6}. Thus, we cannot give credence to the State's proposed range of UEPs: since one would expect a not-immaterial percentage of crashes to occur between 250 mph and the bounding case of XXXXXX for which non-breach has been demonstrated, even a very simplistic view of these events advises clearly that the UEP must be materially less than 1.5×10^{-6}.

On the other hand, the State's conservative analysis of breach probabilities would increase the Applicant's number by approximately 0.13×10^{-6} (based upon the increase from 3.75×10^{-6} to 5.08×10^{-6} discussed above), resulting in a UEP of approximately 8.7×10^{-7}. Therefore we see no credible argument for the position that the UEP exceeds 1.0×10^{-6}.

As is obvious, these numbers fall near the Commission-determined 1.0×10^{-6} threshold for determination of whether this accident is a "credible accident." If our analysis ended here, we would have considerable discomfort finding that this is indeed not a credible event. This discomfort is exacerbated by the fact that the data is limited and may have material uncertainties, and by questions regarding how it should be specifically interpreted for use in the analysis at issue here. However, we gain substantial comfort from the fact that there four aspects to this analysis wherein large conservatisms are built in.

First, all aircraft impacts are assumed to be completely radial. While no evidence or computations were presented to this Board regarding either the relative probability of a non-radial impact versus a radial impact or the consequences of a non-radial impact (a glancing blow), we find that there is reason to believe that a non-radial impact will impart less momentum to the cask, cause less damage to the cask impacted, and therefore cause less damage to the MPC. Furthermore, there is no reason whatsoever to believe that all impacts would be radial,[192] and in fact, we find, based upon simple geometric considerations, that the probability of a purely radial impact is significantly less than the probability of a non-radial impact. In fact this view is borne out by the testimony of witnesses Cornell and Thorne when asked.[193] Therefore, while we are unable to precisely quantify this effect, we find that a material conservatism (which could amount to as much as a factor of five) is introduced by this assumption.[194]

Second, the parties have assumed that any incoming aircraft which hits a "skid area" in front of the cask storage area will bounce off that area without deformation or damage to the aircraft, and without slowing down at all, and impact the cask as if it had done so directly. This assumption has the effect of increasing the effective area for the cask storage area (and therefore the probability of the accident) by approximately 15 percent.[195] There is uncontroverted evidence in the record that an F-16 is so fragile that attempts to land it on the desert would cause the craft to break up,[196] and therefore we find that there is no reason to

---

[192] See Tr. at 19049-50 (Cornell), 18967-69 (Thorne).

[193] See Tr. at 19049-50 (Cornell), 18967-69 (Thorne).

[194] A simplistic and therefore obviously crude estimate by Dr Cornell would lead to a conservatism of a factor of five. See Tr. at 19050-51 (Cornell).

[195] See Tr. at 19019-21 (Thorne).

[196] See Tr. at 17787 (Fly noting that the F-16 flight manual instructs a pilot to land only on prepared surfaces), 18550-52 (Horstman describing how F-16's can only land on prepared surfaces because they are "fragile").

believe that an F-16 impacting this "skid area" would behave as assumed. In fact, we find it much more likely that: (a) such an impact on the skid area would do significant damage to the incoming F-16, causing it to impact the cask in a very different configuration than that assumed in the purely radial impacts assumed in the computations, probably with material portions broken off; (b) such an impact on the skid area would cause material amounts of the incoming aircraft's momentum and energy to be transferred to the ground, making the resulting impact on the cask less damaging than a direct hit; and (c) it is unlikely that after such an impact on the ground the aircraft would rise off the skid area and impact the cask near the top at an angle of XXXXXXXXXXXXXXXXX or less (just given the geometry). Therefore, we find that the impact area (and therefore the probability of an accident of this type) has been unrealistically and conservatively overestimated. While we are unable to quantify this conservatism, it is clearly a material amount, in the range of 15 percent conservatism (based upon the approximately 15 percent increase in impact area which was assumed).

Third, while in our prior hearings we refused to credit the Applicant's claim that there was a near certainty that a pilot would make the effort to avoid a crash into the facility, there was some evidence that pilots do make such efforts.[197] Thus, while we previously determined we could not assign a factor of 95 percent (i.e., a reduction in impact probability of 0.95) to the efforts of a pilot in redirecting the crashing plane away from the facility, we find that some

[197] During the last hearing, the Applicant sought to introduce the Pilot Avoidance, or "R," factor to reflect the Applicant's belief that, when possible, Air Force pilots would almost always attempt to avoid striking the facility during an impeding crash. See LBP-03-04, 57 NRC at 90. To support its claim, the Applicant cited the F-16 flight manual which instructs pilots to avoid "populated areas" before ejecting if time permits. Id. at 96 n. 34. While the Board agreed that pilots would make a good faith effort to follow the F-16 manual, and noted that there were heroic instances where pilots sacrificed their own lives to save the lives of people on the ground, the Board ultimately concluded that the Applicant simply did not have enough evidence to establish that, with near certainty it claims, in an emergency situation pilots would send their crashing planes away from the Private Fuel Storage Facility. See id. at 99.

material reduction could be assigned to such efforts. Therefore, the earlier decision -- which gave no credit for such effort -- introduces another material conservatism in the computations.

Fourth, we note that the computations which have been performed and presented to us all represent events which have been analyzed and which do not cause radiation release. Many other scenarios exist which are above the bounding case -- and these have not been analyzed, and therefore may or may not cause such a release. For example, the Applicant has submitted some computations indicating that a purely radial impact at XXXXXX (which is above the bounding case) does not cause the MPC to fail. Therefore, we find that there is also some conservatism contained in the selection of the particular bounding case which has been considered.

Furthermore, in light of the foregoing analyses and the evidence presented by the Applicant and the Staff, we find that the aircraft crash risk presented by the Canister Transfer Building is *de minimus*.

The end result is that we adopt the Applicant's prediction for probability of release -- a result which was supported by the Staff's analysis -- and find that the probability of a radiation release from an F-16 accident is below the one-in-a-million per year threshold. In reaching that result -- which our dissenting colleague is unwilling to reach because of his concern that the result is too fraught with uncertain judgments, and too close to the pass/fail mark -- we think, as we discuss more specifically below, that our colleague has given inappropriate consideration to the underlying technical merits. We also believe he has not adequately weighed the fact that the foregoing materially conservative assumptions were incorporated into the analyses, each of which caused the computed probability of radiation release from a crash to be higher than would have been computed by a realistic estimate, and leading to the logical conclusion that the probability computed by the Applicant (and agreed by the Staff) is likely to materially overestimate the probability (perhaps by an order of magnitude).

Thus, even though we find the computed probability of an MPC breach to be only slightly less than one in a million (the closeness to that threshold being a principal reason for our dissenting colleague's discomfort), a number of qualitative factors exist that assure us that the probability found by the Applicant and supported by the Staff is indeed an upper bound, and that efforts to more closely model reality would make it lower. We therefore believe that a more refined analysis would result in a lower (and perhaps materially lower) probability of release, and on that basis do not share our dissenting colleague's view that the closeness of the computed probability to the threshold is disqualifying to the Applicant's proposal.

In resolving this phase of the case in the Applicant's favor, we have given careful consideration to the discomfort we understand that our colleague Judge Lam has with several aspects of the technical information before us. We believe that, although the concerns he expresses might be theoretically valid in other contexts, the facts and opinions in the record make it clear that, properly considered, the matters he has raised have no application here.

First, we find that the theory advanced by a key State witness and emphasized in the dissent -- that one should apply a tool (the ductility ratio), which is regularly used to assure that structures are designed conservatively, to determine when a non-structural element will actually fail -- was entirely discredited by the physical facts and expert testimony before us (as was the State's belated (and incorrect) suggestion that the ASME Code advises something similar). A structural design criterion, good as it may be for that purpose, does not answer the different question being asked here, and the State simply misapprehended the portion of the ASME Code to which it made reference.

It may be that underlying our colleague's concerns regarding the integrity of the Overpack is the possibility, about which he asked several questions during the hearing, that a crashing aircraft might penetrate a cask and push overpack materials into the canister inside. As we view the record, all the expert testimony and the computer simulations confirmed that -- because the cask's ring of concrete is confined by inner and outer steel shells -- if an aircraft

were to hit the outer shell, the pressure and loads would be transmitted circumferentially (at the speed of sound) around the overpack concrete, spreading and reducing the localized loads on the inner liner and avoiding the result our colleague inquired about.

Furthermore, whereas the dissent focuses upon the structural characteristics of the overpack and argues that a ductility ratio should be used to assess its integrity and ability to resist the impact, the record clearly indicates two things: first, the carbon steel rings confining the concrete can withstand a great deal more strain before failure than the approximately 2 percent which the State's expert (and the dissent) would have us use (the evidence indicates that failure strain is on the order of 50 percent or more for such carbon steels); and secondly, although of materially lesser import, the overpack is not serving as a structural member and therefore would, in any event, not be the type of component to which a ductility ratio type test should be applied.

Second, the dissent is concerned about the uncertainty associated with the fact that the Air Force accident reports do not supply all the data about speed and angle of impact that we would like to have had. The dissent is correct that the set of crashes for which complete data is available is relatively small. But all the experts agree that, through standard, commonly-used statistical techniques, extrapolations can be made (applying correlations appropriately derived from the crashes with complete data) from the valid data that are available for the other crashes, so as to allow expansion of the data set; this is recognized as an accurate way to take advantage of the additional information available from those other crashes. Indeed, the State's own expert did not dispute that principle, and this use of additional information was validated by the fact that the regression analysis achieved a correlation coefficient in excess of 90 percent (an unusually strong correlation, which the dissent dismisses as "good but not perfect").

Third, the dissent points to the expert disagreement about how to fit a curve to, and thus learn more from, the very few high speed crashes reflected in the data set, especially because

the State's statistical expert demonstrated that using a particular form of step function to fit that data would lead to a much higher probability of crash at high speed. But there are two ways to apply a step function, and if the State's expert had used the alternative method to fit the data (i.e., if he had the steps start, rather than end, at a data point, a fit which we believe is a better representation of the data), the result would have been a significantly lower (rather than higher) probability of breaching impact than that obtained by the Applicant and the Staff. Even more importantly, because phenomena at the macroscopic level are not "quantized," we do not agree that a step function was appropriate at all -- the proper way to "fit" data on real world events is to draw a curve through them, which is how the Applicant's and the Staff's experts proceeded.

In sum, we think no concern expressed by our dissenting colleague has the technical support in the record that would transform his theories into a finding of a higher radiation release probability for the situation at issue here. In addition, the dissent does not appear to give any weight to the large conservatisms which are built into the analyses -- conservatisms which indicate to us that these computations overestimate the probability of an MPC rupture by a factor of five or even more. In this regard, in setting the standard for this case, the Commission made clear the legitimacy of evaluating and weighing conservatisms whose impact can be reasonably estimated, and in fact indicated that in such circumstances the threshold probability for a credible accident might be even further increased. See CLI-01-22, 54 NRC at 260 (citing the steps a Licensing Board took in that regard in Consumers Power Co. (Big Rock Point Plant), LBP-84-32, 20 NRC 601, 639-52 (1984)).

For the foregoing reasons, we remain unpersuaded by our colleague's concerns.

In light of all of these conservatisms in the computations and methodology, and based upon the foregoing review, we find that the accidents at issue are not credible and therefore need not be included in the design basis for this facility.

III. CONCLUSIONS OF LAW AND CONCLUSION OF THE PROCEEDING

This Licensing Board has considered all of the material presented by the parties on Contention Utah K ("credible accidents") . Based upon our review of the evidentiary record relative to this contention and of the two sets (initial and reply) of proposed findings of fact and conclusions of law submitted by the parties, the Board has decided the matters in controversy concerning this contention in the fashion delineated in the views set forth above – which we believe are supported by a preponderance of the reliable, material and probative evidence in the record, and are in accord with applicable laws and regulations.

This Initial Decision does not attempt to address explicitly all aspects of the parties' proposed findings. To the extent a particular proposal was not so addressed, it is either because we have determined that to do so was unnecessary to our decision, or because our reasoning addresses it implicitly.

In accordance with the views previously expressed herein, the Board reaches the following ultimate legal conclusions in favor of the Applicant Private Fuel Storage, LLC (and the NRC Staff):

1. The evidence establishes that the probability is less than one-in-a-million per year that there will be an accidental crash into the PFS site by an F-16 from Hill Air Force Base that has the consequence of breaching a multi-purpose-canister containing spent nuclear fuel and thereby causing a radiological release.

2. Because of that low probability, an accidentally crashing F-16 impacting a cask while traveling beyond the structurally-related "bounding speed and angle" utilized to determine that probability is not a "credible accident" as defined in agency regulations.

3. The proposed PFS facility need not, therefore, be designed to withstand such an accident and no inquiry need be made into the radiological consequences of such an accident.

Accordingly, for the reasons set forth herein, we determine that the Applicant has met its burden with respect to Contention Utah K and we rule in its favor thereon: Contention Utah K is RESOLVED on the merits in favor of the Applicant Private Fuel Storage, LLC (and the NRC Staff) and against the intervenor State of Utah.

All the Intervenors' Contentions admitted into the proceeding have now been resolved, whether by voluntary withdrawal, summary disposition, negotiated settlement, Board decision following an evidentiary hearing, or other means. There has been no ultimate resolution of an admitted Contention of a nature that would preclude issuance of the license requested by the Applicant and, with the conclusion of substantive Licensing Board proceedings, the question of whether to issue a license is now properly before the Commission for determination pursuant to 10 C.F.R. § 2.764(c). See also LBP-05-05, 61 NRC at ___ (slip opinion at 23-25) (February 24, 2005).

We close with three additional thoughts (in which Judge Lam joins):

A. Scope of Decision. In its recent decision on the length of the required Yucca Mountain isolation standard, the United States Court of Appeals for the D.C. Circuit spoke eloquently about the magnitude and importance of the national debate about how to address the presence at reactor sites of spent nuclear fuel. See Nuclear Energy Institute v. EPA, 373 F.3d 1251, 1257, 1258 (2004):

> Having the capacity to outlast human civilization as we know it and the potential to devastate public health and the environment, nuclear waste has vexed scientists, Congress, and regulatory agencies for the last half-century. After rejecting disposal options ranging from burying nuclear waste in polar ice caps to rocketing it to the sun, the scientific consensus has settled on deep geologic burial as the safest way to isolate this toxic material in perpetuity. Following years of legislative wrangling and agency deliberation, the political consensus has now selected Yucca Mountain, Nevada as the nation's nuclear waste disposal site.
>
> * * * * * *
>
> Radioactive waste and its harmful consequences persist for time spans seemingly beyond human comprehension. . . . As of 2003, nuclear reactors in the United States had generated approximately 49,000 metric tons of spent nuclear fuel. Most of this waste is currently stored at reactor sites across the country. (Citations omitted).

In issuing today's decision, we must stress that our rulings do not purport to address the questions raised by the debate to which the D.C. Circuit referred. Put another way, we do not sit, and it is not our role, to determine the optimum method by which the Nation should manage spent nuclear fuel.

Rather, what is before us is a specific proposal by the Applicant for making an away-from-reactor temporary spent fuel storage facility available for use by the nuclear utility industry. Our role has been only to pass judgment on the series of safety and environmental challenges to that proposal – not to determine the wisest course of action for the country in terms of what should be done with spent nuclear fuel in either the short or the long term. On that score, the Commission has already indicated herein (CLI-04-04, 59 NRC at 40) that a matter like that borders on being a "political" question (in the sense, not of partisan party politics, but of policy choices, about competing societal values, that are for our elected and appointed representatives to make) – and, as such, is a question that the Commission "do[es] not believe that NEPA charges . . . the Board, in its hearing process, with answering . . . ."

The resolution of that political question must also factor in how spent fuel can be best protected from deliberate (e.g., terrorist) attacks. Especially to the extent that such anti-terrorism factors are concerned, that debate is even more expressly outside our jurisdiction, being reserved to the Commission for consideration outside the adjudicatory process (*see* p. A-8, n.33, above).

In short, all determinations on overarching matters like those are for others to make. Debates on such matters will have to take place in forums other than ours.

B. Fairness to Parties. In its decision a few months ago upholding a district court's rejection, on preemption grounds, of a series of laws enacted by the Utah legislature and intended to block this project, the United States Court of Appeals for the Tenth Circuit expressed the hope that the State would receive fair treatment in the federal nuclear regulatory process that the Court recognized as paramount:

> [w]e also note that many of the concerns that Utah has attempted to address through the challenged statutes have been considered in the extensive regulatory proceedings before the NRC . . . . We are hopeful that Utah's concerns -- and those of any state facing this issue in the future -- will receive fair and full consideration there.

Skull Valley Band of Goshute Indians v. Nielson, 376 F.3d 1223, 1254 (2004).

We suppose that, after Commission review of our decision today, the losing party will appeal, and the 10th Circuit (or its counterpart, the D.C. Circuit) will have the opportunity to determine whether the hope expressed above was realized. The Court will be able to measure our decision against the underlying record that the parties compiled and that our rulings and our questions shaped.

Whether the agency's decision, and the manner in which the record was shaped, is ultimately upheld or not, we would expect the reviewing Court to come to the conclusion that the State, and the other parties, were, to the best of our ability, treated fairly, as the 10th Circuit had hoped. According them that fundamental right has been a paramount concern of ours. See Tr. at 15208-10, 19701-02; see also United States v. Steel Tank Barge H 1651, 272 F. Supp. 658, 659 n. 1 (E.D. La. 1967), referring to John M. Kelley, Audi Alteram Partem, 9 Natural Law Forum 103 (1964), authorities which we also cited three years ago. See LBP-02-08, 55 NRC 171, 201 n.60 (2002).

C. Consideration of Settlement. This proceeding has been hard and long fought, by parties fully committed to the justice of their cause. The Applicant and the State have along the way, however, settled several varied matters (e.g., those relating to (1) bird habitat [before the first aircraft trial, see Joint Motion to Dismiss Contention Utah DD -- Ecology and Species (Mar. 15, 2002); Prehearing Memorandum: Summary and Order (Mar. 22, 2002), at 5]; (2) sewage disposal [during the first aircraft trial, see App-4, below, and Joint Motion to Dismiss Contention O - Hydrology (June 18, 2002)]; and (3) cask design [after the first aircraft trial, see App-7, n.12, below]). Those settlements were built essentially on the principle that, if the license application were to be approved, a more safe or a more benign facility was in the interest of all concerned.

While the evidence on the major safety issues remained to be considered, however, there appeared to be no possibility of settling the overall proceeding. Now that all the evidence has been taken and all our decisions have been rendered, the likely outcomes are easier to see. The Applicant is in position to obtain its license (see p. C-2, above) and to hold on to it unless the State is successful, at the Commission level or in the federal courts, in overturning -- on either procedural or substantive grounds -- determinations resulting from the past seven-plus years' work.

Put another way, with aircraft crash impact probabilities now ascertained, each party can more readily assess the likelihood that it will achieve its long-term objectives. The Applicant seems to have qualified to receive its license in the short-term, but could lose it in the long-term. The State will have to count on demonstrating to the Commission or the federal courts error in some important part of the proceeding to block the license permanently.

Commission policy strongly favors settlements, and settlements sometimes are possible in unlikely circumstances. See generally CFC Logistics (Materials License), LBP-05-01, 61 NRC ___ (Jan. 11, 2005) (in which both members of today's majority were involved in the achievement of a difficult settlement, albeit one that involved a much less consequential matter). The accidental aircraft crash issue was the most difficult and most closely contested one in this entire proceeding. The outcome is a close one, as evidenced by our rationale and by our split vote. Close cases are prime candidates for settlement.

The parties may thus want to consider whether an overall resolution might be obtained through, for example, (1) the Applicant agreeing to further enhance the safety of the facility against potential aircraft crashes, such as by the construction of a berm (see Tr. at 15580-81) or of a pole-and-cable system (or a combination thereof) that would protect the casks from aircraft approaching the site in horizontal flight on the predominant azimuthal flight path; in return for (2) the State's dropping all appeals and accepting the existence of the facility as so modified. Such a settlement would truly have come about as a direct result of the State's

efforts to protect the safety of its citizens through the hearing process, and would in fact be in furtherance of that end, as well as of the Applicant's interest in further protecting its facility from accidental -- or appellate -- harm.

Absent a further Commission directive, the Board's substantive role in the case is complete (the Farrar-chaired Board does intend later to work with the parties administratively to prepare a *Redacted Version* of this decision, and the Bollwerk-chaired Board is carrying out a similar task related to the proprietary aspects of the financial qualifications issue). For the final time, then, we thank the parties for their professional, high quality presentations and participation, while also commending to their attention our thoughts about possible settlement.

Pursuant to 10 C.F.R. § 2.760(a), this Final Partial Initial Decision will constitute the FINAL ACTION of the Commission within forty (40) days of this date unless a Petition for Review is filed in accordance with 10 C.F.R. § 2.786(b), or the Commission directs otherwise.

Within fifteen (15) days after service of this Final Partial Initial Decision (which shall be considered to have been served by regular mail for the purpose of calculating that date), any party may file a PETITION FOR REVIEW with the Commission on the grounds specified in 10 C.F.R. § 2.786(b)(4). Any such Petition for Review should also cover any interlocutory rulings of ours that were not previously appealable either by NRC Rule or by Commission Order. The filing of a Petition for Review is mandatory in order for a party to have exhausted its administrative remedies before seeking judicial review. 10 C.F.R. § 2.786(b)(1).

Within ten (10) days after service of a petition for review, any party to the proceeding may file an ANSWER supporting or opposing Commission review. 10 C.F.R. § 2.786(b)(3).

The petition for review and any answers shall conform to the requirements of 10 C.F.R. § 2.786(b)(2)-(3).

It is so ORDERED.

THE ATOMIC SAFETY
AND LICENSING BOARD

[original signed by]
Michael C. Farrar, Chairman
ADMINISTRATIVE JUDGE

Peter S. Lam *
ADMINISTRATIVE JUDGE

[original signed by]
Paul B. Abramson
ADMINISTRATIVE JUDGE

* As indicated at the outset, Judge Lam dissents from the result reached in the foregoing Initial Decision, and is therefore not signing it. His signed dissent follows, on pages D-1 to D-7.

Rockville, Maryland
February 24, 2005

Copies of the *Public Version* of this Initial Decision were sent this date by Internet e-mail transmission to counsel for: (1) Applicant PFS; (2) Intervenors Southern Utah Wilderness Alliance, Skull Valley Band of Goshute Indians, OGD, Confederated Tribes of the Goshute Reservation, and the State of Utah; and (3) the NRC Staff.

So that all parties receive it at approximately the same time, hard copies of the full *Safeguards Version* are being sent by overnight delivery to the State of Utah and to the Applicant PFS, and will be hand delivered tomorrow morning at 10:00 AM EST to the NRC Staff.

Opinion of Judge Lam, Dissenting

I. Introduction

I dissent from the majority opinion for the basic reason that the proposed PFS facility has not been demonstrated to meet an established safety standard for accidental aircraft crash hazards. This safety standard, which was established in an earlier Board decision[1] and subsequently affirmed by the Commission,[2] requires that the PFS facility be designed to withstand aircraft crashes if the annual probability of such crashes exceeds one in one million (1×10^{-6} per year). The Board previously ruled in a partial initial decision[3] that the proposed PFS facility did not meet the 10^{-6} per year safety standard, and accordingly the Board did not approve the PFS license application at that time.

In this current proceeding, the Applicant has performed an extensive probability analysis and a structural analysis to rehabilitate its license application. As explained below, the Applicant's probability and structural analyses both suffer from major uncertainties. These uncertainties fundamentally undermine the validity of the analyses. Accordingly, I would hold that the Applicant has not met its burden of demonstrating that it has satisfied the 10^{-6} per year safety standard.

II. Discussion

A. Uncertainties in the Applicant's Probability Analysis

Three inter-related issues contribute significantly to the uncertainties in the Applicant's probability analysis: (1) the scarcity of F-16 crash data; (2) the quality of the F-16 crash data, as expanded by regression analysis; and (3) the sensitivity of the complementary cumulative

---

[1] LBP-01-19, 53 NRC 416 (2001).

[2] CLI-01-22, 54 NRC 255 (2001).

[3] LBP-03-04, 57 NRC 69 (2003).

distribution function (CCDF) to different fitting methods, and its large impact on the final calculated crash probability.

Issue 1: Scarcity of Documented F-16 Crash Data

First, there is no dispute by the parties that the data on F-16 crashes in general, and on crash impact speed and angle in particular, are sparse. Only 57 F-16 accident reports were deemed suitable for analysis by the Applicant, and only 15 reports have documented impact speed. Even if Utah's challenges to the suitability of some of these reports were entirely disregarded, these reports collectively represent a small sample.

The uncertainties inherent in using a small data set were explored by the Board in this proceeding. The Board requested that the Applicant perform its analysis using only documented crash data from the 15 reports that contain documented impact speed to assess how sensitive the results might be to such a small data set. The Applicant's results[4] indicate that using such a small set of data would imply a crash probability exceeding the 10^{-6} per year safety standard, but that the standard errors of the estimate would be unreliably large. This of course is no surprise, as it only confirms the obvious: the use of a small data set leads to large uncertainties.

Issue 2: Quality of Expanded F-16 Crash Data

The scarcity of data, the Applicant asserts, necessitates the expansion of the small data set of documented impact speeds to a larger set of estimated impact speeds by using regression analysis. The uncertainties inherent in using a small data set are now compounded by the uncertainties introduced by the regression analysis. Note that the correlation coefficients in the Applicant's regression analysis are above 0.9, but not quite 1.0, indicating there is a good, but not perfect, fit of data. This implies that additional uncertainties are now being introduced by the regression analysis. The Applicant advocates the theory that the expanded

[4] See State Exh. 278, Summary Table for Board's Requested Calculation, by PFS expert Dr. Cornell, August 20, 2004. See also Tr. 18078-102 (Cornell explaining exhibit).

set is as good as the original set, while Utah argues that the expanded set may not adequately represent the actual F-16 crash parameters. The truth probably lies somewhere between these two opposing positions.

The uncertainties inherent in the use of a small set of F-16 crash data, compounded by additional uncertainties introduced by regression analysis, must not be ignored for two important reasons. First, the Applicant's calculated crash probability (0.74×10^{-6} per year), even if assumed to be accurate and reliable (an assumption Utah vigorously challenges), leaves scant margin for error in meeting the 10^{-6} per year safety standard. Second, the Applicant's calculated crash probability is sensitive to small uncertainties introduced by how crash data is manipulated (see discussion of the CCDF curve below).

Issue 3: Sensitivity of CCDF Curve to Fitting

The uncertainty raised by the third issue, namely how different methods of fitting the CCDF curve in the region of high impact speeds affect the final calculated crash probability, is also critical. Utah's expert Dr. Thorne, in State Exhibit 285,[5] indicates that by using actual discrete values of the CCDF for three particular impact speeds higher than the Applicant's threshold value, the annual probability of an F-16 crash breaching a spent fuel storage cask is 0.506×10^{-6} per year. This represents a significant increase from the Applicant's value of 0.375×10^{-6} per year, which is obtained by fitting the CCDF curve into a smooth curve between the aforementioned impact speeds.[6] This increase alone would bring the accidental F-16 crash probability to slightly above 1×10^{-6} per year, hence failing the 10^{-6} per year safety standard. This observation of CCDF sensitivity is important because it demonstrates quantitatively that the annual probability outcome is sensitive to a seemingly small uncertainty introduced by how crash data is manipulated.

---

[5] State Exh. 285, Additional Probability Analyses, September 13, 2004.

[6] See Tr. at 18869-83 (Thorne explaining exhibit).

B. Uncertainties in the Applicant's Structural Analysis

A singularly important but unresolved dispute with respect to the Applicant's structural analysis is the Applicant's declination to adopt the DOE ductility ratio standard[7] as the failure criterion for the spent fuel storage cask. The DOE ductility ratio standard was developed by a group of experts, assembled by the Department of Energy, to protect facilities containing radioactive or chemical materials from the hazards of an accidental aircraft crash. Experts from the Defense Nuclear Agency, Federal Aviation Administration, and Environmental Protection Agency participated in that development process, with an NRC expert having observer status.

The evidence provided by Utah persuasively shows that the concrete overpack of the spent fuel storage cask is exactly the type of structure (concrete structure with carbon steel shells) to which the DOE ductility ratio should be applied as a governing failure criterion. When, as a result of an F-16 crash, the strain in the carbon steel shells of the concrete overpack reaches the failure strain set by the DOE ductility ratio standard, the overpack should be considered to have failed in performing its intended function. All parties' analyses in the evidentiary record show that the strain in the overpack's carbon steel shells significantly exceeds the DOE ductility ratio failure strain. Therefore the overpack is expected to fail in an F-16 crash scenario.

How this overpack failure would occur under the DOE ductility ratio standard, and how it would subsequently impact the stainless steel multi-purpose canister, has not been identified in this proceeding, despite numerous inquiries by Board members. This lack of clarity about how the overpack fails under the DOE ductility ratio standard is not a valid basis for asserting that the overpack would not fail. Nor is it a valid basis for asserting that the DOE ductility ratio standard does not apply to the overpack.

---

[7] See State Exh. 254, United States Department of Energy Standard (DOE-STD-3014-96) Accident Analysis For Aircraft Crash into Hazardous Facilities (Oct.1996).

The caution urged by Utah's expert Dr. Sozen in advocating the adoption of the DOE ductility ratio standard for both the carbon steel shells of the overpack and the stainless steel canister should be heeded. As Dr. Sozen testified in this proceeding,[8] there are numerous uncertainties associated with how a structure would fail under aircraft crash impact. These uncertainties include: uncertain loading; the actual shape of the stress/strain curve; presence of residual stress; large strain gradients; presence of welds; potential fabrication and installation errors; and high strain rates. To appropriately deal with these uncertainties, the failure strain should be set as close as reasonable to the yield strain, namely to stay close to the elastic range. This rationale is the underlying premise of the DOE ductility ratio standard. Its adoption in this proceeding as the governing failure criterion for the concrete overpack, perhaps even for the stainless steel multi-purpose canister as urged by Utah, would have been prudent.[9]

The use of the DOE ductility ratio standard is also bolstered by the latest theory advanced by Utah regarding how Appendix F to section III of the ASME code should be applied to determine the failure strain of the multi-purpose canister.[10] Here, Utah argues persuasively that using material properties for stainless steel provided by the ASME code, taking into account neither strain hardening nor transformation of engineering strain to true strain, would predict a failure strain of less than 10 percent. This 10 percent value is significantly less (by a

---

[8] See Tr. at 16243-44 (Sozen).

[9] I do not join in the majority's belief that the DOE ductility ratio standard is merely a design tool, and that a significant violation of that standard will pose no threat to the concrete overpack or the stainless steel canister. However, even if the DOE ductility ratio failure strain were merely a design failure strain, prudent safety practice (and the position advocated by Utah) would still require preventing the strain in the overpack and the canister from greatly exceeding the ductility ratio failure strain. To greatly exceed a design failure strain is to erode whatever conservatism is incorporated in the design.

[10] See State of Utah's Reply Findings of Fact (Nov. 19, 2004) at 15-25; State of Utah's Response to Board Order Directing Clarification of Record (Dec. 8, 2004).

factor of about 4) than the value the Applicant used in its analysis for failure strain in the stainless steel multi-purpose canister.

III. Conclusion

Simply put, in contrast to the demonstrated robust safety margin against design seismic events found in our earlier decision LBP-03-08,[11] the proposed PFS facility does not currently have a demonstrated adequate safety margin against accidental aircraft crashes. Even if the Applicant were to overcome all of the aforementioned uncertainties in its analyses, the proffered probability of 0.74×10^{-6} per year of aircraft crashes leading to unacceptable consequences has a margin of only 26 percent when measured against the safety standard of 1×10^{-6} per year. This 26 percent margin rapidly disappears when one or more of the aforementioned uncertainties are considered. For example, if either the documented impact speeds alone were used, or the DOE ductility ratio standard were adopted as the concrete overpack and multi-purpose canister failure criterion, the proposed PFS facility would immediately fail the 10^{-6} per year safety standard.

This lack of adequate safety margin is a direct manifestation of the fundamentally difficult situation of the proposed PFS site: 4,000 spent fuel storage casks sitting in the flight corridor of some 7,000 F-16 flights a year. The venerable four-factor aircraft crash formula in NUREG-0800,[12] which has been used for years to steer reactor license applicants away from difficult sites facing significant aircraft hazards, has already indicated once[13] that the proposed PFS site fails to meet the safety standard of 10^{-6} per year.

---

[11] 57 NRC 293 (2003).

[12] NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (Rev. 2) (July 1981).

[13] See LBP-03-04, 57 NRC 69 (2003).

The Applicant's current analyses, which are fundamentally undermined by large inherent uncertainties and narrow safety margins, should not be relied upon to demonstrate the safety of the proposed site. More needs to be done. The Applicant should demonstrate that a breached spent fuel storage cask would not result in a site-boundary radioactive dose exceeding regulatory limits, or should implement other remedies such as the installation of physical barriers. Such a decisive demonstration, or the implementation of genuine remedies, would ensure the adequate protection of public health and safety.

[original signed by]
Peter S. Lam
Administrative Judge

APPENDIX TO LICENSING BOARD DECISION

OF FEBRUARY 24, 2005

IN PRIVATE FUEL STORAGE PROCEEDING

In this Appendix, all three Board members provide additional information about both the earliest and the latest stages of the case.

In Part A, we set out the procedural history of those aspects of the proceeding not related to the one remaining Contention, and cover as well certain principles that govern our proceedings. This should be of assistance to those readers who have not previously followed the PFS proceeding.

In Part B, we explain why it has been nearly two years since our decision on the first phase of the hearing on that Contention, and detail what has been accomplished during that period. In this fashion, we have completed the report that the Commission sought from us if the proceeding took longer to conclude than it expected.

A. Early History.

1. The PFS Application. The PFS consortium of nuclear-powered electric generating companies filed its application with the NRC on June 20, 1997, seeking a temporary solution to the industry's perceived need to take action with respect to the growing quantities of spent nuclear fuel accumulating at reactor sites. The uncertainty and delays being generated by the Department of Energy's inability to fulfill its mandate to take that spent fuel from the utilities (such as by moving it to the proposed permanent underground repository at Yucca Mountain in Nevada) led PFS to seek NRC approval to build a facility for temporary above-ground storage of that spent fuel. The understanding – which we discussed in another decision issued earlier today (see LBP-05-05, above, 61 NRC at ___) (slip op. at 1-2) – is that the PFS facility would

store the spent fuel rods, currently housed at nuclear reactor sites around the country, until they could be moved directly to the permanent repository.[1]

The Applicant seeks to store the spent fuel on the Reservation of the Skull Valley Band of Goshute Indians, within the 99-acre secured portion of a larger site being leased from the Band for that purpose. While the Reservation is within the boundaries of the State of Utah, the special sovereign status of recognized Indian Tribes essentially protects the proposed activity from being subject to the State's ordinary regulatory jurisdiction. As mentioned earlier, then, one way the State has expressed its concerns over, and objections to, the proposal was by bringing its safety and environmental contentions to us for resolution.

The PFS application was reviewed by the NRC Staff. That process consumed over three years, during which time the Staff made any number of requests for additional information, and the Applicant revised its application nineteen times. The NRC Staff approved the application on September 29, 2000.[2]

2. The Hearing Opportunity. Early on during the Staff review of the application, the NRC published in the *Federal Register* the July 1997 notice of hearing. The notice stated that anyone opposed to the issuance of the license could request a hearing before an Atomic Safety and Licensing Board.

The Licensing Board is an independent adjudicatory branch of the NRC, whose judges are appointed,[3] and whose decisions are reviewed, by the Commissioners who head the NRC.[4]

---

[1] At this writing, it appears that DOE's application to the NRC for approval of the Yucca Mountain facility will not be filed any earlier than the end of 2005.

[2] LBP-03-04, 57 NRC at 82. By the time of our original 2002 hearing on the State's "credible accidents" contention, the application had been amended four more times.

[3] Although the Commissioners appoint judges to the overall Licensing Board Panel, it is generally the Panel's Chief Judge who assigns judges to particular Board proceedings.

[4] LBP-03-04, 57 NRC at 92 n. 28. Our decisions are reviewable by the Commissioners, with whom we have no interaction other than through our decisions and their formal, on the record, review thereof.

The Board's existence provides individuals and organizations who oppose any licensing action the NRC Staff proposes to take, or has taken, the opportunity to present the concerns they have to an independent, quasi-judicial forum within the agency.

As mentioned previously, several parties took that opportunity and presented some 125 issues that they wished to have adjudicated before the Board. The Board admitted those parties who it determined had demonstrated their legal "standing" to participate and who had proffered admissible contentions.

3. The Parties' Contentions. Several petitioners sought to oppose the PFS facility.[5] As mentioned above, the petitioners submitted some 125 contentions challenging the proposed facility. The number of contentions was reduced as the proceeding progressed. Many were dismissed initially on procedural grounds, such as not being filed within the proper time frame or for being outside the jurisdiction of the Board. Other issues, though appearing appropriate for consideration by the Board, were later decided on legal grounds, through "summary disposition" procedures, as they did not involve a significant factual dispute that would require evidentiary presentations. Some matters were settled. In other instances, a party that introduced a contention later withdrew it after determining that it no longer wished to litigate the issue.

[5] Along with the State of Utah, the Southern Utah Wilderness Alliance also presented several contentions, one of which went to evidentiary hearing. Other petitioners who participated to a lesser extent included the Skull Valley Band of Goshute Indians, Ohngo Gaudadeh Devia, Confederated Tribes of the Goshute Reservation, David Pete, Castle Rock Land and Livestock, Skull Valley Company, and Ensign Ranches of Utah. See LBP-98-07, 47 NRC 91, 156-57 (1998).

The several contentions that remained were the subject of full evidentiary hearings.[6] In that regard, the 45 days of evidentiary hearings conducted in 2002 on aircraft crashes, seismic standards, and environmental/wilderness values (as well as on a hydrological issue that was settled in mid-trial (see 57 NRC at 81 n. 6; p. C-4, above)) were all open to the public, with the vast majority of those sessions held in Salt Lake City.

We have commented previously on the concern, sometimes expressed by observers of our hearings, as to the NRC Staff's appearing to be too much on the side of an applicant. LBP-03-04, 57 NRC at 82, 83-84. As this case illustrates, that alignment occurs only after the Staff has conducted its lengthy review and the Applicant has responded by making changes that the Staff has insisted upon. The Staff's support of an applicant's position at the hearing does not, then, establish that the Staff has failed to carry out its duty to protect the public interest.

While the Staff's regulatory review plays an important role in the application process, and the presentation of its position based thereon is an important aspect of the hearing process, we insist upon treating the NRC Staff (with whom we have no extra-judicial organizational interaction) the same as any other party at the hearing. In particular, we subject the Staff's evidence to the same scrutiny as that of the other parties. See LBP-03-04, 57 NRC at 140 n.124 and accompanying text; see also n. 13, below.

---

[6] The Bollwerk-chaired Board (see p. A-1, n.19, above) conducted an evidentiary hearing in 2000 on the merits of several contentions, including financial assurance and emergency planning. Some of that Board's partial initial decisions include: Emergency Planning, LBP-00-35, 52 NRC 364 (2000), petition for review denied, CLI-01-9, 53 NRC 232 (2001); Financial Assurance (May 27, 2003) (unpublished pending review of proprietary information); Decommissioning (May 27, 2003) (unpublished pending review of proprietary information).

In addition to hearing the aircraft crash matter, the Farrar-chaired Board took evidence and issued partial initial decisions on Geotechnical Issues, LBP-03-08, 57 NRC 293 (2003), petition for review denied, CLI-03-08, 58 NRC 11 (2003); and Rail-line Alternatives, LBP-03-30, 58 NRC 454 (2003).

B. Recent Timing

In deferring its review of our March, 2003 decision on aircraft crash probabilities, the Commission indicted its expectation that we would be able to reach a decision on the subsequent "consequences" phase by the end of that year. Today's decision comes nearly 14 months after that target.

If someone were to ask "what went wrong", the simple answer would be:

Nothing. Analysis of the progress of this case over the past two years illustrates that: (1) the Staff's regulatory review process functioned as it should; (2) the Applicant used large amounts of time to refine the justifications for its application; and (3) during the periods that the process was under the Board's control, the diligence of all parties and our case management efforts kept the adjudicatory process moving on schedule.

This proceeding was convened to determine the safety of a proposal that could result in the Nation's stockpile of spent nuclear fuel resting aboveground, at an away-from-reactor site, for a very long time.[7] The current "consequences" phase involves a complicated and significant question that was a direct outcome of the Applicant's choice of a site about which safety concerns were triggered by the overflight of 7,000 F-16s a year.[8] As the parties

---

[7] That period was initially thought to be 20 years. The State unsuccessfully challenged its extension to 40 years. See CLI-04-22, 60 NRC 125, 148-50 (2004). Recently, the Commission approved a 40-year extension for on-site aboveground cask storage at one reactor site (see NRC News, No. 04-156, "NRC Approves 40-Year License Renewal for Independent Spent Fuel Storage Installation at Surry Nuclear Plant" (Dec. 8, 2004)). That decision indicated a continued belief that spent fuel could be stored in dry casks for at least 100 years without significant environmental impact because the additional years do not pose any obvious "aging-type" safety issues. Our decision today, then, could conceivably lead ultimately to very lengthy storage of spent nuclear fuel in Skull Valley.

[8] In other words, the issue we decide today was brought on by the Applicant's own election to move forward with a site that could readily be seen -- with a look upwards and a look to the standard screening formula -- to be a problematic one.

proceeded with this phase, and as is not uncommon in complex proceedings like this one,[9] the NRC Staff found the Applicant's submittals wanting, and therefore pursued clarification through a number of requests for additional information (RAIs). Because of these apparent shortcomings in the Applicant's submittals, additional (iterative) work was required to get the application to a stage where the Staff could support it. Those two parties' needs for more time to "get it right" led to the periodic (temporary) suspension of the formal adjudicatory process at the Applicant's request; all agreed that no purpose would have been served by wasting time (and effort) on adjudicating an incomplete or unsupportable application.

In various procedural orders,[10] we explained each resulting alteration of the original schedule we had set out for the parties, a schedule which had initially targeted a year-end 2003

---

[9] See Duke Cogema Stone & Webster (Savannah River Mixed Oxide Fuel Fabrication Facility), CLI-01-13, 53 NRC 478, 484-86 (2001) where the Commission set forth an aggressive adjudication schedule, which the Board was prepared to implement (see unpublished Memorandum and Order (setting Phase I schedule) (July 17, 2001)). The Applicant notified the Board on January 24, 2002, however, that it needed to amend its Construction Authorization Request and Environmental Report. The Applicant's changes, and the Staff's review of those changes, ultimately led to a two-year scheduling delay beyond the Board's control.

[10] See the following unpublished prehearing orders in which we dealt with scheduling:
- Scheduling Memorandum and Report (July 31, 2003);
- Scheduling Memorandum and Report (Aug. 15, 2003);
- Scheduling Order and Report (Sept. 9, 2003);
- Order Suspending Schedule (Oct. 10, 2003);
- Order Convening Conference Call (Regarding Contention Utah TT and Hearing Schedule) (Feb. 5, 2004);
- Order Summarizing Prehearing Conference Call (Regarding Contention Utah TT, Hearing Schedule, and Related Matters) (Feb. 19, 2004);
- Order Summarizing Prehearing Conference Rulings (Regarding Contention Utah TT and Hearing Schedule) (Feb. 27, 2004);
- Memorandum Concerning Scheduling (Apr. 15, 2004);
- Scheduling Order (Apr. 23, 2004);
- Memorandum of Conference Call (June 2, 2004);
- Memorandum and Order (Summarizing June 15 and July 1 Prehearing Conference Call) (July 14, 2004);
- Memorandum and Order (Summarizing July 15 Conference Call) (July 22, 2004).

decision and had set forth a roadmap for achieving that goal.[11] But all those scattered thoughts are worth recounting in one place, because together they demonstrate how additional time was necessary to enable the NRC's licensing process to follow its design course, and how this process eventually benefitted the public interest (and, as will be seen, even the interests of the Applicant, who, not untypically, indicated at every possible juncture a strong preference for agency rulings that come sooner rather than later).

1. We begin by observing that the agency's regulatory process can accommodate the evolving needs of an applicant to enhance its proposal from a safety standpoint,[12] or to develop a better information base to demonstrate its safety. As that preparatory process unfolds, however, the time consumed by an applicant's preparation cannot necessarily be attributed to the adjudicatory process or to the Board's oversight of that process. Moreover, all involved recognize that we have no supervisory power whatsoever over the Staff's performance of its regulatory review activities. See Duke Energy Corp. (Catawba Nuclear Station, Units 1 and 2), CLI-04-06, 59 NRC 62, 74 (2004) (citing, e.g., Curators of the University of Missouri, CLI-95-01, 41 NRC 71, 121 (1995)).

---

[11] See June 25, 2003 transcript of Conference Call, where we built on the parties' June 19, 2003 "Joint Report on Proposed Schedule," at 9-10, to set forth a schedule (referred to in our July 31, 2003 order, above) that would have met the Commission's year-end decisional timeframe; see also the schedule that superseded it (set out on p. 6 of our Sept. 9, 2003 order, above) that, even with the slippage encountered by then -- attributable to the Applicant's delay in filing expert reports, filing more reports than expected, and need to evaluate the timing of its response to Staff RAI's -- would have led to a decision in mid-April of last year. That second schedule was itself was suspended at the Applicant's behest a month later for what proved to be a very lengthy period.

[12] For example, in the midst of the preparation for the consequences hearing, the Staff's questions led the Applicant to discover an accident-related shortcoming in an aspect of cask design. The Applicant devised a solution and amended its license application to reflect the change (its Safeguards aspects preclude our detailing it here). This change, in turn, prompted the State to file on January 9, 2004, a new contention, denominated Utah TT, challenging the change as creating a different kind of problem, this one of an operational nature. At our suggestion, the parties were able to avoid litigating the new contention by settling the underlying dispute, by way of the Applicant's agreeing to do test runs that would eliminate the operational concern. See our unpublished Orders, above, of February 19, 2004 (at 3) and February 27, 2004 (at 2). This all took some time -- but cask design and facility operations were both made safer because of it.

Accordingly, it is paramount to recognize that the schedule for the adjudicatory process is not wholly, and sometimes not even largely, within the Board's management and control. In this instance and in others, one should expect a not insignificant portion of the time to be consumed by the interactions between the applicant and the NRC Staff, as the applicant polishes the application and its supporting data to enable the staff to accept its approach and conclusions.

Here, early on the Applicant needed additional time to provide its initial round of expert reports setting forth its position on the "consequences" issue, and then actually proffered more reports than were anticipated. This, in addition to the delays in generating the reports themselves, resulted in additional time for responsive filings.

At the same time, perhaps to ensure there was no possibility of the types of shortcomings identified in the positions it advanced before us in the course of the first aircraft hearing,[13] the Staff, apparently finding the application to be falling short of what was needed for its approval, made a concerted effort to pursue additional information prior to the hearing. Thus, it presented the Applicant with a series of RAIs, the second set of which resulted in the proceeding going into abeyance for an additional period of over four months -- at the Applicant's behest -- while the Applicant developed its answers.

The course followed here demonstrates how the process sometimes works. To fulfill their respective roles, the Applicant must submit a thorough and compelling application demonstrating that it meets the regulatory requirements, and the Staff must diligently seek out thorough answers to its concerns. In such a process, it should be expected that, as was the case here, the applicant will, of necessity, expend considerable effort and consume considerable time and resources in the course of responding (and perhaps in revising its application).

---

[13] See LBP-03-04, 57 NRC at 97 n.38, 109 n.66 (sensitivity analysis); 118-19 (aircraft formation analysis); 133-35 ("order of magnitude" evaluation); 133 n.97; 134 n.02 ("one-way" outlook); 135, n.105 (failure to sharpen focus); and 138 (lack of parallel action).

The extra time involved should be expected to benefit the public interest, as the Staff assures that the application satisfies the regulatory requirements. The additional information developed should as well put the Applicant in a better position to defend its proposal at the hearing, and it should allow the Staff to take a more forceful position at the hearing in support of the Applicant. In the hearing on seismic matters, for example, the Staff's support (albeit derived from a source other than RAI responses) played an important role in this Applicant's success.[14]

As it turns out, in the instant case, the extra time and effort also benefitted the Applicant – after all, it has today obtained a favorable decision. In contrast, had the evidence in this phase of the aircraft hearing been submitted in time for us to render a late-2003 decision, the Applicant might not have had the Staff's support. And whether it did or not, the Applicant's evidence available at that time may have proved inadequate for it to carry its burden of proof.

In thus indicating the Applicant may have benefitted from the extra time it devoted to preparing the information to support its application, we hasten to add that we have no interest in whether an applicant or an intervenor prevails in any of the matters that come before us. Two years ago, we ruled against the applicant on the first aircraft crash phase; today we rule in its favor on the second phase. In both instances, we did have an interest in the record being developed in a manner that "allow[s] us to make an informed decision" (LBP-03-04, 57 NRC at 141) on the merits without regard to which party our decision favors.

2. The foregoing observations apply to the great portion of the process, taking place in the nearly two years since our probability decision, that was <u>not</u> under our control. As they illustrate, we – like other Boards – control only a portion of the period during which an application is under agency consideration, which sometimes has been inaccurately attributed to time consumed by the adjudicatory process. The relative amount of time consumed by the adjudicatory process, compared to the Staff's regulatory review, will in large measure depend

---

[14] <u>See</u> discussion of Dr. Luk's work in LBP-03-08, 57 NRC at 352, 354-55, 357 (2003).

upon the degree to which the application, on which the hearing is to be held, comes with a thorough foundation at the outset.

In this particular instance, the part of the two-year process that was under our control was managed, we think it fair to say, in an efficient manner that sped both the hearing and our decision along, and was fair to all involved. Once the matter came back to us after being in abeyance, we set a schedule and adhered to it. This was due both to the diligence exhibited[15] and accommodations made[16] by all three parties (for which we commend counsel from the Applicant, the Staff and the State), and to our innovative management of both anticipated[17] and

---

[15] For all practical purposes, once the hiatus ended and a new schedule was instituted, the parties met their filing obligations in a timely fashion.

[16] For example, the parties on their own made major adjustments to their cross-country deposition schedules to accommodate the serious medical problems encountered by a key witness.

[17] For example, we required the parties to submit, during the run-up to the hearing, not only pre-filed direct testimony but pre-filed rebuttal testimony as well (a step not required by the former version of the Rules of Practice, still applicable here). Having done that, we were able to institute a practice, when a witness took the stand to adopt orally his written pre-filed direct and pre-filed rebuttal testimony, of having that witness also be asked on initial examination by his counsel to respond to any issues raised in the other parties' pre-filed rebuttal testimony. This avoided as much as possible having witnesses return to the stand on repeated occasions to provide rebuttal and other forms of responsive testimony, an approach which had seemed particularly inefficient during the earlier seismic hearings. See Telephonic Prehearing Conference of July, 15, 2004, Tr. at 15162-63. This technique worked here; whether it would work in other circumstances is an open question.

unexpected[18] matters, some of which were of a routine nature,[19] and some of which could have been confounding.[20]

In the final analysis, then, the fourteen month extension beyond the Commission's target date for completion of this stage of this case was simply attributable to the need to fulfill

---

[18] We found it helpful on occasion to depart from the usual order and to construct an impromptu "debate" between the witness on the stand and a prior witness from an opposing party. In this fashion, the competing views of both could meet head-on, or those views be reconciled on the spot, rather than through seriatim appearances. This not only promoted the efficient use of time, but it enabled, to the maximum extent practicable, sensible resolution of issues.

[19] We imposed measures to simplify the hearing logistics -- avoiding wasting time on housekeeping procedural matters -- that shortened the hearing's overall length. For example, we required the parties, not only to pre-file all their exhibits for our prehearing review, as is customary, but also to pre-stamp the copies to be formally introduced. In uncomplicated cases, that step might not be necessary -- but in this proceeding that simple pre-arranged administrative measure conserved enormous amounts of hearing time compared to earlier portions of this case.

In that regard, much time was consumed during the 2002 hearings by the need to stop the proceeding, each time an exhibit was identified and offered, to allow the court reporter to stamp each of the several copies and insert on each the necessary information (party name, exhibit number, date offered, and sponsoring witness). This proved especially burdensome and inordinately time-consuming when many exhibits were submitted simultaneously. During this phase, we required the parties to stamp and mark their exhibits in advance, thus allowing our law clerk simply to take possession of the exhibits without causing any interruption of the court reporter or of the proceeding. This was especially useful upon each party's starting to present its witnesses, occasions which led to the submission of a combined total of approximately 100 exhibits.

[20] For example, it was apparent that a variety of looming scheduling conflicts would have prevented the hearing's resumption for a considerable period if it were not concluded by September 15. We thus took the precaution of convening an unusual Sunday session on September 12 to assure that we finished on time.

This concern about ending the hearing served as a book-end to how we began it. To assure that the hearing started into substantive business promptly, without losing time for housekeeping matters, we had made arrangements for the parties to set up in their conference rooms off our hearing room on Sunday, August 8, the day before the hearing began.

properly the Atomic Energy Act's demands: to carry its burden of proof, an applicant must provide information sufficient to allow the agency to pass knowledgeable judgment on whether the license being sought is consistent with the protection of the public health and safety and the environment. Much of that is done outside our control. Where the process was within our control, we can report that there was no failure in the adjudicatory process or in our supervision of that process.[21]

This completes the Appendix.

---

[21] We note that this decision is being issued (for all practical purposes) within the time-frame the Commission typically expects (see p. A-3, n.22, above), even though (1) the hearing was long and the issues quite complex and (2) there arose another matter, also decided today (LBP-05-05, involving a recently-filed contention) that required our attention along the way.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LB ORDER ISSUING REDACTED VERSION OF FINAL PARTIAL INITIAL DECISION (LBP-05-29) have been served upon the following persons by deposit in the U.S. mail, first class, or through NRC internal distribution.

Office of Commission Appellate Adjudication
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Michael C. Farrar, Chairman
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Paul B. Abramson
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Peter S. Lam
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Sherwin E. Turk, Esquire
Laura C. Zaccari, Esquire
John T. Hull, Esquire
Office of the General Counsel
Mail Stop - 0-15 D21
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Diane Curran, Esquire
Harmon, Curran, Spielberg & Eisenberg, L.L.P.
1726 M Street, NW, Suite 600
Washington, DC 20036

Joro Walker, Esquire
Director, Utah Office
Western Resource Advocates
1473 South 1100 East, Suite F
Salt Lake City, UT 84105

Martin S. Kaufman, Esquire
Atlantic Legal Foundation
205 E. 42nd St.
New York, NY 10017

Docket No. 72-22-ISFSI
LB ORDER ISSUING REDACTED VERSION
OF FINAL PARTIAL INITIAL DECISION (LBP-05-29)

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

Joseph R. Egan, Esquire
Martin G. Malsch, Esquire
Egan, Fitzpatrick, Malsch & Cynkar, PLCC
The American Center at Tysons Corner
8300 Boone Boulevard, Suite 340
Vienna, VA 22182

Tim Vollmann, Esquire
3301-R Coors Road N.W., #302
Albuquerque, NM 87120

Stephen L. Simpson, Esquire
Office of the Solicitor
Department of the Interior
Division of Indian Affairs
1849 C Street, NW, Mailstop 6456-MIB
Washington, DC 20240

Jay E. Silberg, Esquire
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128

Richard Wilson
Department of Physics
Harvard University
Cambridge, MA 02138

Paul C. EchoHawk, Esquire
ECHOHAWK LAW OFFICES
151 North 4th Avenue, Suite A
P.O. Box 6119
Pocatello, ID 83205-6119

Paul H. Tsosie, Esq.
Calvin M. Hatch, Esq.
TSOSIE & HATCH
2825 East Cottonwood Parkway, Suite 500
Salt Lake City, UT 84121

[Original signed by Adria T. Byrdsong]

Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 28th day of October 2005

54 N.R.C. 255
(Cite as: 54 N.R.C. 255, 2001 WL 1455867 (N.R.C.))

**1 IN THE MATTER OF
PRIVATE FUEL STORAGE, L.L.C.
(Independent Spent Fuel Storage Installation)

Nuclear Regulatory Commission

CLI-01-22
Docket No. 72-22-ISFSI

November 14, 2001

*255 COMMISSIONERS: Richard A. Meserve, Chairman; Greta Joy Dicus; Nils J. Diaz; Edward McGaffigan, Jr.; Jeffrey S. Merrifield

DESIGN BASIS: INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

The threshold probability for design basis accidents at an Independent Spent Fuel Storage Installation (ISFSI) is one in a million (1 x 10 super-6). Events having a less than a one in one million probability of occurring are not "credible events" and do not have to be taken into account in designing an ISFSI.

DESIGN BASIS: CREDIBLE EVENTS

A facility need not be designed to withstand every conceivable accident, but only those found to be "credible." See, e.g., Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 2), ALAB-692, 16 NRC 921 (1982).

DESIGN BASIS: INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

"The public health and safety risks posed by ISFSI storage ... are very different from the risks posed by the safe irradiation of the fuel assemblies in a *256 commercial nuclear reactor, which requires the adequate protection of the public ... in the conditions of high temperatures and pressures under which the reactor operates." See Final Rule, Interim Storage of Spent Fuel in an Independent Spent Fuel Storage Installation at a Reactor Site; Site-Specific License to a Qualified Applicant, 60 Fed. Reg. 20,879, 20,883 (April 28, 1995) (response to public comments). This is because the danger presented by irradiated fuel is largely determined by the presence of a driving force behind dispersion, such as heat and pressure, neither of which is present in an ISFSI. Moreover, the radiological source term is lower at an ISFSI than at a reactor

both because the spent fuel has decayed over time prior to placement in an ISFSI and because there are fewer fuel assemblies in an individual cask than in a reactor.

REGULATORY GUIDES: APPLICATION

NUREGs, such as the Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, like all guidance documents, are not legally binding regulations. See, e.g., International Uranium (USA) Corp. (Request for Materials License Amendment), CLI-00-1, 51 NRC 9, 19 (2000); Curators of the University of Missouri, CLI-95-1, 41 NRC 71, 149 (1995).

REGULATORY GUIDES: APPLICATION

Where the NRC develops a guidance document to assist in compliance with applicable regulations, it is entitled to special weight. See, e.g., Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB-900, 28 NRC 275, 290 (1988); Consumers Power Co. (Big Rock Point Nuclear Plant), ALAB-725, 17 NRC 562, 568 (1983).

REGULATORY GUIDES: APPLICATION

Where a Staff guidance document was not drafted for use in evaluating applications of the type under consideration, then the guidance is persuasive only insofar as it may bear on distinct questions. Here, for example, the NRC Staff has appropriately considered the formulas in the Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants for calculating air crash probability, for that methodology pertains regardless of the type of facility at issue. But the Staff was right to refuse to use the Standard Review Plan's overall one in ten million (1 x 10 super-7) threshold probability for design basis accidents - which the NRC developed for reactors, not for facilities like ISFSIs whose failure would not pose nearly the same radioactive consequences as a reactor failure.

*257 MEMORANDUM AND ORDER

**2 In a May 31, 2001 order, the Atomic Safety and Licensing Board referred to the Commission its ruling on the design standard for accidental aircraft crash hazards at the proposed independent spent fuel storage installation (ISFSI) site at issue in this proceeding. [FN1] In that ruling, the Board found that the facility need not be designed to withstand aircraft crashes having less than one-in-one-million (1 x 10 super-6) annual probability of occurring. The Commission must determine, as a matter of law and policy, how probable an accidental aircraft crash would have to be to qualify as a "credible event" which the ISFSI must be designed to withstand without releasing dangerous levels of radiation. [FN2]

We note that the issue we consider today is only the threshold probability for accidental events and has no bearing on the issue of whether or to what extent intentional acts must be considered in designing the facility. [FN3]

We find the Board's 10 super-6 standard consistent with our own view, and hence affirm the Board's decision.

I. BACKGROUND

The Applicant, Private Fuel Storage, L.L.C., seeks a license to operate an ISFSI on the Skull Valley Goshute Indian Reservation in Utah. Contention Utah K/Confederated Tribes B claims the Applicant has not adequately considered credible external accidents that could affect the proposed facility. As admitted, the contention's principal concern was that aircraft, jettisoned ordnance from military aircraft, or land-launched missiles could crash into the proposed spent fuel storage facility. Through earlier summary disposition, the issues were narrowed to only hazards associated with the Salt Lake City International Airport; hazards from conventional ground weapons fired from Dugway Proving Ground; military aircraft crash hazards from Dugway Proving Ground, Hill Air Force ***258** Base, and the Utah Test and Training Range (UTTR); and hazards from cruise missile testing. [FN4]

In December 2000, PFS filed a Motion for Summary Disposition of these remaining portions of this contention, claiming that there was no longer any issue of material fact as to whether any of these hazards could credibly threaten to cause a release of radioactive material from the proposed ISFSI. In order to show no credible threat, PFS presented evidence that safety controls made various accident scenarios extremely unlikely, and in some cases that even if the posited accident did occur, no radioactive materials would be released. [FN5] As part of its claim that aircraft pose no credible threat, PFS argued that any event having a less than one chance in a million of occurring should be deemed not credible.

The Board agreed that one in a million is the appropriate "threshold probability," beneath which a posited accident can be ignored in the facility's design. The Board certified that portion of its ruling to the Commission. The Board also found that there remained issues of fact with respect to the likelihood of either an F-16 or jettisoned ordnance from an F-16 crashing into the facility; similar crashes resulting from air-to-air combat training activities conducted on the Utah Test and Training Range; the probability of an aircraft using the Moser Recovery Route crashing; the crash impact hazard from flights out of Michael Army Airfield; and the cumulative air crash hazard. Last, the Board granted summary disposition in PFS's favor with respect to various other issues, including the threat posed by cruise missiles, and air- to-ground and air refueling activities at the UTTR. Only the question of the proper threshold probability is under review here.

II. DISCUSSION

A. Design Basis

**3 As is the case for other NRC-regulated facilities, the site of a proposed ISFSI must be evaluated to identify and assess the likelihood of possible accidents, both natural and manmade, that could affect the facility. [FN6] These natural and man-induced events are made part of the ISFSI's design basis, ensuring that each component will continue to perform its designated functions under normal and *259 extreme conditions. [FN7] General design criteria require an ISFSI to be designed to "accommodate the effects of, and to be compatible with, site characteristics and environmental conditions ... and to withstand postulated accidents." [FN8] Applicable NRC regulations do not expressly address aircraft impact hazards, but related hazards such as fires and explosions are specifically addressed as hazards that the facility must weather without jeopardizing public safety. [FN9]

A facility need not be designed to withstand every conceivable accident, but only those found to be "credible." [FN10] Credible accidents are therefore generally called "design basis events" or "design basis accidents," and events too improbable to be considered credible are called "beyond design basis" events. If an event does not exceed the design basis, engineered controls will keep any radiation exposure to the public within prescribed limits. [FN11] If the proposed facility cannot be designed to withstand credible accidents without releasing excessive radiation, the site is unsuitable and NRC will deny the application. [FN12]

B. Threshold Probabilities for Design Basis

The Commission must decide the threshold probability for a design basis event at an ISFSI. Part 72 does not address this question directly, and no agency guidance explicitly applicable to Part 72 facilities answers this question. At other NRC-regulated facilities, the agency uses different threshold probabilities: one in ten million for nuclear power plants and one in a million for geologic repository operations areas (GROA). [FN13] Because no agency guidance or regulation applies, *260 the most reasonable basis for the Commission to reach a decision here would be to examine the risks associated with these two kinds of facilities to determine which is most comparable to the proposed ISFSI.

1. Standard Review Plan for Nuclear Power Reactors

With respect to power reactors, the NRC long ago determined that events having at least a one-in-ten-million (1 x 10 super-7) probability generally should be taken into consideration in facility design, an approach reflected in the Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants. [FN14] The Standard Review Plan also provides formulas for calculating, with a conservative margin, the probability of various hazards. The subchapter dealing specifically with aircraft hazards provides a formula that takes into consideration factors like the distance from the proposed facility to the airfield and the number of flights into and out of the airfield. [FN15]

**4 Estimating the probability of extremely unlikely events involves considerable uncertainty when sufficient data are not available to plug into the formula. Therefore, the Standard Review Plan for reactors deems a threshold probability of one in a million (1 x 10 super-6) to be

acceptable where, "when combined with reasonable qualitative arguments, the realistic probability can be shown to be lower." [FN16] That is, where a conservative estimate shows an event has no greater than a one-in-a-million probability, that event may be ignored in facility design if reasonable estimates result in a lower probability when conservative margins are not factored in. To illustrate, in Consumers Power Co. (Big Rock Point Plant), [FN17] a conservative estimate assumed that any navigational errors made by B-52s training near the Big Rock site would send the aircraft over the plant. The Board noted that a navigational error would in fact be just as likely to send an aircraft away from Big Rock as toward it, so the "realistic" probability of a B-52 overflight was lower than the conservative estimate showed. [FN18] Similarly, a conservative estimate assumed that 1500 aircraft would fly in and out of a nearby military base, whereas the realistic estimate, based on actual data from a recent year, showed only ninety-nine flights. [FN19] Because the conservative estimate of the cumulative aircraft hazards was approximately one in a million, and there were ***261** reasonable arguments that the realistic probability of a crash was lower, the Board in Big Rock found no need to redesign the plant to withstand an airplane crash. [FN20]

2. Geologic Repository Operations Area

In 1996, the NRC published revised regulations concerning design basis events at a GROA - the surface operations of a geologic repository - before permanent closure. [FN21] The statement of considerations published along with the revised regulations noted that:

Assuming bounding repository event consequences of roughly 0.2 Sv (20 rem), a lifetime risk to individuals in the general population of 0.05 fatal cancers per Sv of exposure, and a lower bound of 1 x 10 super-6 per year for the probability of occurrence of Category 2 design basis events, the estimated risk of cancer fatality from these low probability events would be 1 x 10 super-8 per year. Events which result in risks at or below this level do not contribute significantly to repository risk to an individual and, as such, can be neglected in the overall risk assessment. [FN22]

Thus, in considering bounding event consequences in which the initiating event probability is considered rather than the event sequence probability, the Commission determined that event probabilities of less than 1 x 10 super-6 would not significantly contribute to risk and could be screened from further consideration.

C. Parties' Positions

1. Staff's Safety Evaluation Report

The NRC Staff agreed with PFS and the Board that one in a million is the proper threshold probability for air crash hazards at an ISFSI. In its Safety Evaluation Report for the PFS facility, the NRC Staff used the formula found in the Standard Review Plan for reactors to assess the probability of an aircraft crash. [FN23] These calculations resulted in a cumulative hazard from

various civilian and military aircraft accident scenarios of approximately 7.4 x 10 super-7 . [FN24]

**5 Rather than use the one-in-ten-million threshold probability that the Standard Review Plan prescribes for power reactors, the NRC Staff determined that the *262 appropriate threshold probability for a design basis accident at the PFS ISFSI was one in a million. The Staff reasoned that a potential crash into the ISFSI would not have as dire consequences as a possible crash into a power reactor:

Compared to a nuclear reactor facility, an ISFSI is a relatively passive system that does not have complex control requirements and that has contents with relatively low thermal energy. Therefore, potential fuel damage and the associated radioactive source terms from a potential accident are significantly less than that expected from a potential accident at a nuclear reactor facility. As a result, the estimated consequences from a potential accident at an ISFSI are less severe than from a potential accident at a nuclear reactor facility. Therefore, the staff concludes that a threshold probability of 1 x 10 super-6 crashes per year is an acceptable value for evaluating aircraft crash hazards at the PFS facility. [FN25]

In short, the Staff found that the less severe consequences of a crash at the ISFSI reduced the overall risk and justified using a one-in-a-million rather than one-in-ten-million threshold probability. As it was not using the Standard Review Plan's reasoning for determining the threshold probability, the Staff did not use "qualitative arguments" to show that the "realistic probability" of a crash was actually lower than the probability formula would indicate.

2. Applicant's Argument

In its Motion for Summary Disposition, PFS argued that the Board should choose a threshold probability of one in a million because this is the standard used for the surface operations and storage area at a geologic repository. PFS contended that an ISFSI is more similar, in design and function, to the surface operations at the GROA than to a nuclear power plant. It pointed to the Commission's statement of considerations for the GROA design basis rule which showed that the Commission intended that the design standards for a GROA and Part 72 facilities be comparable: "Because operations at the repository are expected to be similar to operations at other facilities licensed by the Commission (e.g., 10 C.F.R. part 72 facilities), the Commission believes that it is appropriate that their design bases be comparable." [FN26]

PFS also argued that the one-in-a-million standard is appropriate because the consequences of a potential accident at an ISFSI, in terms of how much radiation could be released, would be much less severe than at a nuclear power plant. Because risk is the product of the probability of occurrence multiplied by the consequences, PFS contended that the overall risk associated with a potential crash at an ISFSI is lower than at a nuclear power plant. [FN27] This reasoning is similar *263 to that which the Commission used in its statement of considerations for the 1996 amendments to 10 C.F.R. Part 60 setting the one- in-a-million lower bound for a design basis event at the surface areas of a geologic repository. [FN28]

**6 In addition, PFS's motion for summary disposition provided arguments that the realistic

probability is actually less than the conservative estimates resulting from the formulas found in the Standard Review Plan. [FN29]

3. Utah's Argument

Utah now argues that summary disposition was premature. First, Utah claims that NRC should apply section 3.5.1.6 of the Standard Review Plan - that is, the reactor standard - because that section deals specifically with aircraft crash hazards. [FN30] Utah points out that Standard Review Plan § 3.5.1.6 provides for a threshold probability of 1 x 10 super-7 , and does not speak of using a higher probability where the "realistic" probability is lower. The section of the Standard Review Plan that deems a higher probability to be acceptable, where "realistic" probabilities are lower, is the general accident analysis section, § 2.2.3.

This approach, however, would have the Commission apply one portion of NUREG- 0800 that speaks specifically to airplane crash hazards, while ignoring another section that deals specifically with evaluation of hazards and with risk tolerance. [FN31]

Utah further claims that even if the "realistic probability" approach set out in Standard Review Plan § 2.2.3 were applicable, PFS has not provided reasonable qualitative arguments to show that its estimate is conservative and that an airplane crash's realistic probability is closer to one in ten million. Utah maintains that whether the calculations are conservative, and what the "realistic" figure is, are material factual issues that preclude summary disposition. [FN32]

D. Commission Analysis

As no law or regulation establishes the threshold probability for design basis accidents at an ISFSI, the Commission must select a standard it finds sufficiently protective. For the reasons set forth below and in LBP-01-19, we conclude that the 10 super-6 standard is workable and appropriate for the PFS facility.

Before reaching the substance of this policy question, we first turn to Utah's procedural argument that summary disposition was premature. We disagree. The ***264** applicable probability is not a question of fact, but a question of law and policy. Factual issues concerning conservativeness and realistic probabilities would only be material if the hazard analysis acceptance criteria found in Standard Review Plan § 2.2.3 were applicable. That is, if Utah were correct that NUREG-0800 is directly applicable to evaluating an ISFSI, then questions would remain concerning the estimate's conservativeness that would preclude the Board from finding that the threshold probability is one in a million. Therefore, if the Board had based its conclusion about the threshold probability on the Standard Review Plan, then the conclusion itself would be premature. But it did not.

Rather, the Board agreed with PFS's argument that the Commission had already indicated its intention that the design bases for Part 72 facilities and the surface operations of a geologic repository be "comparable." [FN33] The Commission's statement of considerations in the design

basis amendments to Part 60 suggested that the design bases for Part 72 facilities and the surface operations at the GROA should be the same. [FN34] In that statement, the Commission also articulated more generally its intention to "harmonize" Part 60 with Part 72. [FN35] Furthermore, throughout the statement of considerations in amending Part 60, the Commission referred to conforming various sections of Part 60 to their counterpart sections of Part 72. [FN36] Therefore, affirming the Board's decision is consistent with our past views on this subject.

**7 Moreover, we find little basis to choose the threshold probability used in the Standard Review Plan for reactors. The proposed facility is not, of course, a reactor. Furthermore, NUREGs, such as the Standard Review Plan, like all guidance documents, are not legally binding regulations. [FN37] Where the NRC develops a guidance document to assist in compliance with applicable regulations, it is entitled to special weight. [FN38] But where a Staff guidance document was not even drafted for use in evaluating applications of the type under consideration, then the guidance is persuasive only insofar as it may bear on distinct questions. Here, for example, the NRC Staff has appropriately considered the formulas in the Standard Review Plan for calculating air crash probability, for that methodology pertains regardless of the type of facility at issue. But the Staff rightly refused to use the Standard Review Plan's overall 10 super-7 design basis standard - which the *265 NRC developed for reactors, not for facilities like ISFSIs whose failure would not pose nearly the same radioactive consequences as a reactor failure.

Because the hazards associated with temporary storage of spent fuel differs significantly from the hazards associated with operating nuclear power plants and permanent geologic storage, the Commission has said that it will "not automatically apply all regulatory requirements to ISFSIs that it applies to other regulated activities." [FN39] The Commission has previously recognized that the "public health and safety risks posed by ISFSI storage ... are very different from the risks posed by the safe irradiation of the fuel assemblies in a commercial nuclear reactor, which requires the adequate protection of the public ... in the conditions of high temperatures and pressures under which the reactor operates." [FN40] This is because the danger presented by irradiated fuel "is largely determined by the presence of a driving force behind dispersion," such as heat and pressure, neither of which is present in an ISFSI. [FN41] Moreover, the radiological source term is lower at an ISFSI than at a reactor both because the spent fuel has decayed over time prior to placement in an ISFSI and because there are fewer fuel assemblies in an individual cask than in a reactor. [FN42] Thus, the Board reasonably refused to employ the 10 super-7 reactor design standard, and instead set the standard at 10 super-6 .

III. CONCLUSION

On the basis of the foregoing, we conclude that the threshold probability for design basis events should be set at one in a million (1 x 10 super-6). The Board's ruling in LBP-01-19 is, therefore, affirmed. The hearing should proceed on the remaining factual issues the Board found in that order.

Commissioner Dicus did not join in this opinion. She would have sent the matter back to the Board for a factual determination whether the consequences of a potential accident at an ISFSI are more similar to those of an accident at a *266 GROA or those of an accident at a nuclear

power reactor as a basis for setting the threshold probability.

**8 IT IS SO ORDERED.

For the Commission

ANNETTE L. VIETTI-COOK

Secretary of the Commission

Dated at Rockville, Maryland, this 14th day of November 2001.

FN1. See LBP-01-19, 53 NRC 416 (2001).

FN2. As this question has a potential impact on all Part 72 facilities, the Nuclear Energy Institute, a trade group representing the nuclear energy industry, has filed a motion for permission to file an amicus brief. The Commission by this Order grants the motion and has considered NEI's brief in reaching its decision.

FN3. In light of the September 11, 2001 terrorist attacks on the Pentagon and World Trade Center, the Staff has been directed to review its regulations to determine whether additional steps should be taken to design and defend regulated facilities against potential terrorism. The State of Utah has also filed a late-filed contention concerning the threat of terrorist acts, such as the intentional crash of a large plane into the facility. See State of Utah's Request for Admission of Late-Filed Contention Utah RR (Suicide Mission Terrorism and Sabotage), Oct. 10, 2001. In addition, Utah has asked the Commission to halt the proceedings until it has determined whether the regulations concerning ISFSIs should be revised. See State of Utah's Petition for Immediate Relief Suspending Licensing Proceedings, Oct. 10, 2001. Today's decision has no effect on the Staff's review of the regulations or the terrorist-threat-related petitions pending before the Board and Commission.

FN4. LBP-99-35, 50 NRC 180, 200-01 (1999).

FN5. See Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B, dated Dec. 30, 2000, Attachment D, Declaration of Jeffrey R. Johns, dated Dec. 27, 2000.

FN6. See 10 C.F.R. Part 72, Subpart E; § 72.90(c) ("Design basis external events must be determined for each combination of proposed site and proposed ISFSI or MRS design"); § 72.92, "Design basis external natural events"; § 72.94, "Design basis external man-induced events."

FN7. "Design bases" is defined in 10 C.F.R. Part 72 as:

that information that identifies the specific functions to be performed by a structure, system, or component of a facility or of a spent fuel storage cask and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be restraints derived from generally accepted state-of-the-art practices for achieving functional goals or requirements derived from analysis (based on calculation or experiments) of the effects of a postulated event under which a structure, system, or component must meet its functional goals. The values for controlling parameters for external events include-

....

(2) Estimates of severe external man-induced events to be used for deriving design bases that will be based on analysis of human activity in the region, taking into account the site characteristics and the risks associated with the event.

10 C.F.R. § 72.3.

FN8. 10 C.F.R. § 72.122(b)(1).

FN9. 10 C.F.R. § 72.122(c).

FN10. See, e.g., Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 2), ALAB-692, 16 NRC 921 (1982). There, calculations showed a greater than one-in-ten-million chance that Three Mile Island Unit 2 (located 2.7 miles from Harrisburg International Airport) could be hit by a 200,000-pound aircraft traveling at 200 knots. Therefore, the impact from an aircraft of that size and speed was determined to be a design basis accident and the reactor was designed to withstand it. Although heavier aircraft sometimes used the airport, the probability of one of them hitting TMI2 was determined to be so low that such a crash was not considered a design basis event.

FN11. See 10 C.F.R. § 72.106(b).

FN12. 10 C.F.R. § 72.90(d).

FN13. This one-in-a-million threshold probability for design basis events at a GROA also includes consideration of the probabilities and component failures. See discussion infra.

FN14. Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-0800 (Rev. 2, July 1981), §§ 2.2.1-2.2.2, "Identification of Potential Hazards in Site Vicinity"; and § 3.5.1.6, "Aircraft Hazards."

FN15. Id. § 3.5.1.6.

FN16. Id. § 2.2.3(II), "Evaluation of Potential Accidents."

FN17. LBP-84-32, 20 NRC 601, 639-52 (1984).

FN18. Id. at 642.

FN19. Id. at 648.

FN20. Id. at 651.

FN21. See Final Rule, "Disposal of High-Level Radioactive Wastes in Geologic Repositories; Design Basis Events," 61 Fed. Reg. 64,257 (Dec. 4, 1996). For the GROA, "design basis events" refers to the probability of the "event sequence" which includes an initiating event (e.g., an earthquake) and the associated combinations of repository system or component failures that can potentially lead to exposure of the public to radiation. Id. at 64,263. Here, however, we are only considering the appropriate threshold probability of the initiating event without consideration of the probability of system or component failures.

FN22. Id. at 64,265.

FN23. See Safety Evaluation Report (SER), Ch. 15, § 15.1.2.11, at 15-41-15-81.

FN24. Id. at 15-79.

FN25. Id. at 17-77.

FN26. 61 Fed. Reg. at 64,262.

FN27. See PFS Motion for Summary Disposition at 10.

FN28. See 61 Fed. Reg. at 64,259.

FN29. PFS Motion for Summary Disposition at 28-29.

FN30. State of Utah's Brief on the Question Certified in LBP-01-19, July 13, 2001, at 13.

FN31. NUREG-0800, § 2.2.3, "Evaluation of Potential Accidents."

FN32. State of Utah's Brief at 13-14.

FN33. LBP-01-19, 53 NRC at 430-31, citing 61 Fed. Reg. at 64,262.

FN34. 61 Fed. Reg. at 64,262.

FN35. Id. at 64,265.

FN36. See, e.g., id. at 64,264, considering section 60.130: "changes also provide consistency with the corresponding 'minimum' design criteria for an MRS, in part 72"; id. (regarding section 60.136: "The Commission adopts the basic [dose] provision of part 72 - namely a 0.05 Sv (5 rem) dose limit on or beyond the preclosure controlled area boundary"); id. at 64,265 ("The only other noteworthy deviation from Part 72" is that Part 60 refers to "Category 2 design basis events" while the corresponding section in Part 72 refers to "design basis accidents").

FN37. See, e.g., International Uranium (USA) Corp. (Request for Materials License Amendment), CLI-00-1, 51 NRC 9, 19 (2000); Curators of the University of Missouri, CLI-95-1, 41 NRC 71, 149 (1995).

FN38. See, e.g., Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB-900, 28 NRC 275, 290 (1988); Consumers Power Co. (Big Rock Point Nuclear Plant), ALAB-725, 17 NRC 562, 568 (1983).

FN39. See Final Rule, Interim Storage of Spent Fuel in an Independent Spent Fuel Storage Installation at a Reactor Site; Site-Specific License to a Qualified Applicant, 60 Fed. Reg. 20,879, 20,883 (April 28, 1995) (response to public comments).

FN40. Id.

FN41. Id.

FN42. We recognize that Utah has submitted a declaration in which it is claimed that a

worst-case scenario resulting from an aircraft crash could result in doses that are significantly larger than those estimated in the bounding consequences analysis for Category 2 design basis events at a GROA. Compare 61 Fed. Reg. at 64,265 with Declaration of Dr. Marvin Resnikoff Regarding Material Facts in Dispute with Respect to Contention K, dated January 31, 2001, ¶ 16. However, the affidavit does not explain the input assumptions used to determine the dose, nor does it discuss the physical differences between a reactor and the GROA. Because any dose analysis is highly dependent on input assumptions and because the physical nature of the facilities suggests that the consequences of an accident at an ISFSI are far more similar to those that might result from an accident at a GROA than one at a reactor, the affidavit is not sufficiently probative. Therefore, Utah's conclusions, without more, fail to raise a genuine issue of material fact. See Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 249 (1986) (summary judgment is appropriate when evidence is "merely colorable" or is "not sufficiently probative"); Advanced Medical Systems, Inc., CLI-93-22, 38 NRC 98, 102 & n.13 (1993).

END OF DOCUMENT

57 N.R.C. 69
(Cite as: 57 N.R.C. 69, 2003 WL 1345220 (N.R.C.))

**1 IN THE MATTER OF PRIVATE FUEL STORAGE, L.L.C.
(Independent Spent Fuel Storage Installation)

Nuclear Regulatory Commission

Atomic Safety And Licensing Board
Docket No. 72-22-ISFSI
(ASLBP No. 97-732-02-ISFSI)

LBP-03-4

March 10, 2003

*69 Before Administrative Judges: Michael C. Farrar, Chairman; Dr. Jerry R. Kline; Dr. Peter S. Lam

NUCLEAR REGULATORY COMMISSION: HEALTH AND SAFETY RESPONSIBILITIES

The NRC Staff's lengthy prehearing review process sets the stage for a hearing. Although the public may be concerned over the Staff's moving in concert with an applicant at a hearing, the Staff has come to such a position only after first satisfying itself that an application for a license passes muster under NRC regulations. In other words, the fact that the Staff eventually sides with an applicant at a hearing does not mean that the Staff has not been protecting the public interest.

REGULATIONS: SAFETY STANDARDS (CREDIBLE ACCIDENTS)

The Commission requires that any facility that it licenses be designed to withstand "credible accidents," that is, any accidents deemed sufficiently likely to occur that they should be guarded against. The probability criterion defining that likelihood is also defined by the Commission. Any potential accidents less likely than that criterion are considered "incredible" and are allowed to *70 be disregarded in designing the facility, that is, they do not become part of the facility's "design basis."

REGULATORY GUIDANCE: SAFETY STANDARDS (NUREG-0800)

To determine the probability of an aircraft crashing into a facility, a four- factor formula embodied in the "Aircraft Hazards" portion of Standard Review Plan NUREG-0800 has

regularly been used. The formula for calculating this annual probability is P = C x N x A/w, where C equals the aircraft's historic accident rate (in accidents per mile flown), N equals the number of flights per year, A equals the effective area of the facility in square miles, and w equals the width of the airway in miles.

REGULATORY GUIDANCE

The structure and language of the series of Staff guidance documents containing a "Standard Review Plan" like NUREG-0800 make it clear that they do not establish binding principles that need to be followed in all circumstances. Rather, they set out but one method that the Staff will treat as an acceptable approach for an applicant in complying with regulations.

REGULATORY GUIDANCE

As a general matter, strict compliance with guidance associated with a Standard Review Plan is not required by relevant statutes or NRC regulations. An applicant for a license has the option -- as it sets out to prove to the Staff in the first instance that its proposal meets applicable regulatory requirements -- either (1) to adopt an approach outlined in, and to demonstrate compliance with, the Standard Review Plan (thereby in effect ensuring Staff approval) or (2) to present and to justify some alternative approach. See Curators of the University of Missouri, CLI-95-8, 41 NRC 386, 397 (1995). By the same token, an intervenor, though not allowed to challenge duly promulgated Commission regulations in the hearing process (see 10 C.F.R. § 2.758), is free to take issue with the terms of the Standard Review Plan, which represents only Staff guidance and thinking, not official Commission requirements.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

**2 Although Standard Review Plan NUREG-0800 does not explicitly contemplate the use of a modification factor (called the R factor by the Applicant) to account *71 for pilot avoidance of a facility, such a factor is not prohibited by NRC regulations, Commission precedent, or any other legal principle. A Board thus may permit such a modification if it is factually and technically well founded.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

In assessing the value for pilot avoidance of a facility, the Applicant put forward two separate factors. For the first component, designated R1, the Applicant assigned an aircraft controllability value of 90% to account for various types of emergencies likely to occur in the vicinity of the facility. This value was accepted by the Board, albeit "just barely," as the evidence presented was highly debatable.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

The second component of the R factor, designated R2, purportedly accounted for the ability of pilots, before ejecting, to guide their crashing aircraft away from a particular ground site. The Board rejected the asserted 95% value for this component of the R factor because when the subject is the prediction of human behavior under stress, the successful establishment of near certainty inherently calls for a highly probative showing, which the Applicant did not meet in this case.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

RULES OF PRACTICE: BURDEN OF PROOF

The Board accepts that in the event of an aircraft failure, in the vicinity of the PFS facility or elsewhere, pilots would generally do what they could, consistent with their other responsibilities, to guide their aircraft away from vulnerable ground facilities before ejecting. However, the 95% value of R2 propounded by the Applicant -- who has the burden of proof in this case -- is far from sufficiently well founded. Probative contrary evidence undercut each of the three central factual premises -- visibility, time, and training -- underlying Applicant's expert beliefs. When the concept being advanced is "near certainty" the proof must necessarily be solid. In this case, the evidence is too uncertain to make safety-related decisions for nuclear facility licensing purposes.

*72 REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

RULES OF PRACTICE: BURDEN OF PROOF

Any prediction of human performance that claims there will be, particularly during emergency or other stressful conditions, 95% success -- which the Applicant asserts to be conservative compared to the 100% theoretically supportable by its approach -- could benefit from a rigorous, in-depth evaluation and analysis of reliable operational data, which is lacking in this case.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

Despite the extensive training provided to Air Force pilots, and notwithstanding their dedication, they commit human errors -- and such errors would be expected to occur -- particularly in instances where very high stress exists.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

**3 The Air Force's decision to produce and disseminate a training video provides additional evidence countering the Applicant's assertion that pilots nearly always do what they are trained to do. Incorporating that experience into a safety video to remind pilots of the need to follow their training is all to the good -- but it demonstrates the fallacy in any holding that would rely on pilots almost always doing what their training (superb though it may be) told them to do.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

The Air Force's publication of a document entitled ALSAFECOM 002/1996 embodied the clear message that despite the Air Force training, crew members continued to commit significant errors during emergency situations. These situations included being distracted during in-flight emergencies, delaying ejection due to futile attempts to recover failed engines, and ejecting below the minimum published altitudes. The issuance of the ALSAFECOM reemphasizes the need to adhere to the lessons that are learned during training and that these lessons are too often ignored -- powerful evidence against the notion that pilots can be counted on almost always to follow their training.

*73 REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

Evidence that pilots make mistakes in all phases of flight (including many that involve non-emergency, less stress-filled activities than a pre-ejection emergency) provides additional support for the finding that there is no sufficient basis to declare that they will almost never err when it comes to performing, in a high-stress situation, avoidance of a ground site.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800); SAFETY STANDARDS

It is far from certain that in a nuclear regulatory safety context, pilots can be counted on not to take improper action, or to take proper action, in emergency or non-emergency situations.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800); SAFETY STANDARDS

Opportunity to act and rigorous pilot training are certainly necessary conditions if there is to be a reliance on pilot behavior in a nuclear licensing action. But the evidence establishes that those conditions are not sufficient, and cannot be dispositive, particularly when the evidence reflects compelling examples of pilot errors made when the opportunity for taking the correct action

existed.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800); SAFETY STANDARDS (HUMAN FACTORS ANALYSIS)

The conflicting evidence about pilots' both following and ignoring their training leaves a record that shows reliable prediction of pilot behavior in an emergency is a serious and complex human factors analysis question. Where usually there is a grave concern that a human factors element will detract from safety assurances, here that element would be used to augment what would otherwise be a deficient safety showing. Although such an approach may not be entirely precluded, relying on it has to overcome the additional uncertainty of attempting to take credit for avoiding human error rather than, as is usually the case, making allowances for human error.

*74 REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

**4 In deriving the value for "N" in the NUREG-0800 formula, the Staff suggested that the overall number of flights should be reduced by one-half to account for the lateral offset of half the flights. The Staff asserts that because of that offset, the aircraft more to the east of the two (and the two easternmost aircraft in the usual formation of four) would pose a negligible probability of impacting the facility and thus can be discounted as contributors to the impact probability calculation. Applying the halving concept to reduce "N" results in an obvious additional direct impact on another aspect of the four-factor formula in NUREG-0800, that being the width, w, of the effective airway. It was not demonstrated by the Staff (and in fact seems facially invalid) that the technique used in deriving a value for "N" can be employed, while at the same time leaving the value for the width unchanged. On the other hand, if the halved N value were to be accompanied by a halving of the airway width, the result of the four-factor calculation would remain unchanged. Although NUREG-0800 provides for offset airways, it does not condone the method employed by the Staff.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800)

Because density is a function of width, the logical construct behind these elements suggests that the airway width, w, for purposes of the NUREG-0800 formula, should appropriately be determined based on where aircraft predominantly fly, not on the simple geographic width of the available airspace. Employing this standard, the remaining discrepancy among the parties' views reflects differing approaches which are a part of the overall uncertainty of the estimate. The evidence presented only serves to demonstrate that the actual value for w is indeterminate to the extent that it depends on individual pilot preference.

REGULATORY GUIDANCE: INTERPRETATION AND APPLICATION (NUREG-0800); SAFETY STANDARDS

While there is uncertainty in the estimates of the NUREG-0800 four factors, the uncertainty is not troublesome if the formula is used as it was apparently intended, i.e., as a rough screening device. The formula was to be applied cautiously. Thus, it is inappropriate to rely, as the Staff did in this case, on an order-of-magnitude confidence interval bracketing or surrounding the applicable acceptance criterion. Rather than stretch the acceptable criterion to let the applicant move forward in the licensing process, the appropriate course is to let the criterion and the screening *75 formula serve their purpose -- that of alerting the applicant and the Staff to a problem so that the applicant has the opportunity to address it.

REGULATIONS: SAFETY STANDARDS (DESIGN BASIS)

Under the Commission's site evaluation regulations (covering nuclear reactors and adapted for spent fuel storage facilities), an applicant must show that if a credible accident were to occur, the consequences would not result in the release of radioactivity that would cause doses in excess of 10 C.F.R. Part 100 guidelines. See 10 C.F.R. §§ 72.90, 72.94, 72.98, 110.10; NUREG-0800 at 3.5.1.6-2. As a legal matter, then, the ultimate focus is on a unified question, i.e., the probability of an accident that would lead to radiation doses beyond Part 100. As a practical matter, however, the regulatory focus and approach often turn out not to be on that unified question but on one of two separate, subsidiary issues, either of which can be determinative in particular circumstances. If it can be shown that the likelihood of the triggering accident is so low that the accident can be discounted as not credible, there is no need for an inquiry into whether the dose consequences would be excessive if an accident were to occur. On the other hand, an applicant can take the opposite approach and assume that the accident would occur, but attempt to demonstrate that there would be no consequences because the facility's "design basis" is shown to be such that it can withstand or mitigate them adequately.

NUCLEAR REGULATORY COMMISSION: ROLE OF NRC STAFF (REVIEW OF LICENSE APPLICATION)

**5 Under the Commission's time-tested licensing and hearing processes, the Staff's evaluation of an applicant's proposal -- reached as it conducts its independent review of an application -- is considered an integral part of the record that is developed regarding any contentions challenging what the applicant has put forth. Even though the Staff's position may not prevail at trial, it is presumed that the development and exploration of a contested issue will benefit from the Staff's analysis and presentation. Thus, a licensing board is reluctant to undertake to decide an issue of potential significance in the absence of Staff review of that issue in either its Safety Evaluation Report or its proffered testimony.

NUCLEAR REGULATORY COMMISSION: COMMISSION POLICY (CONDUCT OF LICENSING PROCEEDINGS)

RULES OF PRACTICE: REFERRAL OF RULING

Conscious of the Commission's instructions that licensing boards should adopt case-management techniques that will help move licensing proceedings along ***76** as expeditiously as possible, allowing an applicant to proceed on parallel tracks before the licensing board and the Commission -- rather than forcing it to proceed sequentially -- seems likely to best achieve that objective. Commonwealth Edison Co. (Byron Nuclear Power Station, Units 1 and 2), ALAB-770, 19 NRC 1163, 1169-70 (1984).

RULES OF PRACTICE: REFERRAL OF RULINGS

Although appellate proceedings ordinarily deprive a lower tribunal of jurisdiction over the substance of the matter that was before it, there is no fundamental inconsistency between the Commission's conducting a referred review of matters decided by the Board, while the Board simultaneously considers other undecided issues arising in that same proceeding.

TECHNICAL ISSUES DISCUSSED

The following technical issues are discussed: Independent Spent Fuel Storage Installation, NUREG-0800, Human Factors Analysis, Safety Standards, Pilot Avoidance, Credible Accident Scenario (Aircraft Crash Hazard), Sensitivity Analysis, Crash Rate of F-16s, Number of F-16 Flights, Effective Area of Facility, Effective Airway Width, Potential Ordnance Hazard, Orders of Magnitude, ALSAFECOM.

PARTIAL INITIAL DECISION

(Regarding "Credible Accidents")

Private Fuel Storage (PFS) is a consortium of electric utility companies that applied for an NRC license to build and to operate, on the reservation of the Skull Valley Band of Goshute Indians some 50 miles southwest of Salt Lake City, an aboveground facility for the temporary storage of spent fuel rods from the nation's nuclear reactors. During a 9-week trial in Salt Lake and at NRC Headquarters, ending in mid-2002, the Applicant PFS attempted to demonstrate -- over the opposition of the State of Utah and the Southern Utah Wilderness Alliance (SUWA) -- that its proposal was acceptable in terms of meeting certain safety and environmental regulatory criteria established under federal law, including the Atomic Energy Act and the National Environmental Policy Act (NEPA).

****6** Our decision today deals with just one of the issues considered at that trial, i.e., the chance that military aircraft operations in Utah's West Desert might ***77** pose a risk to the facility. [FN1] We find that probability to be too high when measured against the applicable NRC safety

criterion governing protection against the risk of accidents at a regulated facility.

Under that criterion (and speaking very generally [FN2]), an applicant must show either that (1) a postulated accident is so unlikely (i.e., not "credible") that it need not be guarded against, or (2) the facility's design is such that the accident's consequences would be of no real concern. Here, the "credible accidents" issue arises because the proposed facility would sit under the airway that pilots use to fly F-16s (single-engine military jet aircraft) from Hill Air Force Base, located to the north of Salt Lake City, down Skull Valley toward the southern entry to the military's Utah Test and Training Range (UTTR) in the State's West Desert.

The State urged us to find that, under standard NRC calculational protocols, the probability of an F-16 crash into the spent fuel casks is too high to ignore in our safety analysis. The Applicant urged that other factors -- particularly the expectation that pilots would take care to avoid the site before ejecting in an emergency situation -- serve to reduce the calculated accidental crash probability to a level low enough to be disregarded.

On the facts presented, and with the Applicant having the burden of proof, we find that the State's position on accident probabilities prevails: on the key issue, we essentially reject -- as insufficiently proven for nuclear regulatory safety analysis purposes -- the Applicant's "pilot avoidance" theory. Then, applying the probability criterion the Commission established in this very case, we find that there is enough likelihood of an F-16 crash into the proposed facility that such an accident must be deemed "credible." The result is that the PFS facility cannot be licensed without that safety concern being addressed.

As is apparent, there are at least two ways in which that concern might be alleviated. One would be for the Applicant to convince the Air Force to agree to reduce the number, and/or to alter the pattern, of Skull Valley overflights. Although we have no role to play in -- and thus no views on -- whether the formulation of any such agreement should be entertained, we do note that the emergence of that type of agreement seems relatively unlikely in view of the ***78** content of a written "limited appearance" statement (described later herein) filed on behalf of the Secretary of the Air Force early in our 2002 hearings. [FN3]

A second option for the Applicant would be to attempt to establish that the contemplated (or upgraded) design of the proposed facility's spent fuel storage casks is so robust that an F-16 crash would not have appreciable health and safety consequences. That matter is not now before us, for -- apparently believing that the issue would not need to be reached -- the Applicant shaped the application it submitted to the NRC Staff for review, and the material it submitted to us pretrial, in a manner that kept evidence on the "consequences" issue from reaching us in a fashion that would have allowed us to address that issue properly.

****7** If the Applicant were to rehabilitate its application by addressing that issue fully, this matter might eventually come before us again, this time with the benefit of Staff analysis. For now, we cannot approve the sought-after PFS license. [FN4]

Our decision today, so briefly summarized above, is necessarily a long one. In Part I, we set forth in narrative form the underlying reasoning that led us to that decision:

- In Subpart A, we open by setting the stage in terms of the procedural history of the "credible

accidents" contention and by recounting the context in which the matters now being decided arose.

• In the next three portions of the decision, contained in Subparts B through D, we explain our views on certain overarching issues. Specifically, Subpart B deals with the "pilot avoidance" issue, where the Applicant's *79 novel approach is embodied in a so-called "R" factor; Subpart C deals with the four other factors that go into a typical aircraft accident probability calculation; and Subpart D deals with the nature of the safety norm against which that calculation is measured.

• We go on in Subpart E to discuss why questions about the projected consequences of an accident -- including whether a crashing F-16 would penetrate a spent fuel cask -- were not considered at this hearing but may be considered at a later stage.

We then provide, in Part II, a lengthy "Detailed Analysis of Record and Findings of Fact" that reviews the evidence and includes determinations either providing support for, or resulting from, the opinions and holdings expressed in the earlier, narrative portion of this decision. Finally, in Part III, we recite briefly our formal Conclusions of Law and our Order.

An outline of the remainder of this Partial Initial Decision's contents, then, is as follows:

I. NARRATIVE OPINION

A. Introduction, Background, and Summary

This decision -- by our count the fifty-fifth one published in the course of carrying out the Licensing Board's adjudicatory role in this proceeding -- brings to a conclusion at our level (for a time, at least) the legal and factual debate over one issue crucial to the Applicant's plans. The debate on that and other issues has gone on for a long time, most visibly since the Applicant's proposal was noticed for hearing on July 21, 1997. [FN5] The State of Utah and a number of other ***81** parties opposed that proposal, filing some 125 "contentions," or issue statements, challenging the proposal from various safety or environmental standpoints.

Our previous decisions, or voluntary action by the parties, have since resolved -- whether on legal arguments, evidentiary presentations, settlement agreements, or some combination thereof -- most of those matters, leaving pending before this Board but three of those contentions. Those remaining three issues -- aircraft accidents, seismic safety, and rail-line alternatives -- were the subject of full-blown, trial-type evidentiary presentations in various Salt Lake City venues and in our own Washington, DC-area hearing room.

In total, that trial consumed, between April 8 and July 3 of last year, some 45 days of hearing evidence and of conducting related business. [FN6] The transcript of those proceedings covers some 11,000 pages; during those hearings, the parties presented direct testimony (and usually rebuttal testimony as well) from nearly forty witnesses, through whom they proffered some 475 exhibits. The parties submitted two sets of post-trial briefs on each of the three issues; those opening and reply "Proposed Findings of Fact and Conclusions of Law" and related materials totaled some 2200 pages.

The last of those briefs was filed on October 16, 2002, triggering the formal period for preparation of our decision. [FN7] As a prelude to the substance of today's decision, in Section 1 below we cover in more detail how the proceeding unfolded (and address a misperception about our proceedings), and then in Section 2 explain how the key issues developed.

1. The Procedural Setting

a. The Application Review

**9 All the issues, including the one matter we decide today, had their genesis in an application filed with the Nuclear Regulatory Commission by the Private Fuel Storage, L.L.C., consortium on June 20, 1997. Triggered by the nuclear power *82 industry's uncertainty about the timely availability of an underground repository for the permanent storage of spent nuclear fuel (as currently contemplated for Yucca Mountain in Nevada), the PFS application sought NRC approval for a facility for temporary aboveground storage of those same fuel rods, now located at various electric-power-generating reactors around the country.

The application envisions as many as 4000 casks -- each nearly 20 feet high and 11 feet in diameter, made of concrete and stainless steel -- resting on 500 concrete pads arrayed on 99 acres of the Reservation of the Skull Valley Band of Goshute Indians. [FN8] That Reservation is located within the borders of -- but is essentially not subject to regulation by -- the State of Utah; [FN9] it is in Skull Valley (which lies between the Stansbury Mountains to the east and the Cedar Mountains to the west), some 50 miles southwest of Salt Lake City (more locally, it is southwest of the town of Tooele and north of the Dugway Proving Ground).

The PFS application was duly reviewed by the NRC Staff. In this proceeding, as in others, the role of the Staff at that stage is to scrutinize the application carefully, to seek additional information where it deems it appropriate, and to indicate where it believes improvements in approach or design are necessary. (See also pp. 83-84 and Subpart E, below.)

At least partially as a result of that process, PFS filed some nineteen amendments to its application before, on September 29, 2000, the NRC Staff indicated it would approve the application. An additional four application amendments were filed thereafter, the last coming on November 21, 2001, some 4 years after the application was first filed.

b. The Hearing Process

As the Staff review was starting, the NRC published in the Federal Register the July 1997 hearing notice (referred to above) indicating, among other things, that anyone opposed to the issuance of the license could seek to intervene in the proceeding and to request a public hearing before an NRC Atomic Safety and Licensing Board. A number of parties did so, framing their challenges as the "contentions" called for by the NRC's procedural rules.

An NRC Licensing Board was duly appointed to preside over the proceeding in September 1997 (see 62 Fed. Reg. 49,263 (1997)). That initial Board was chaired by Chief Administrative Judge G. Paul Bollwerk, III, and had the same two technical members as this Board (Judges Jerry R. Kline and Peter S. Lam). After *83 that Board devoted enormous effort to resolving a vast number of preliminary matters in the case, responsibilities for the completion of the case from that point on were split between that original board, chaired by Chief Judge Bollwerk, and this second board, chaired by Judge Michael C. Farrar, all pursuant to, and as detailed in, a December 19, 2001, Notice of Reconstitution issued by Judge Bollwerk. [FN10]

**10 As the proceeding before the Licensing Board(s) took shape, the parties intervening in opposition to the project ordinarily found themselves aligned not only against the Applicant PFS

but also against the NRC Staff. Aware of that situation, some Salt Lake area residents who made presentations at the "limited appearance" sessions [FN11] we held last April 8th (at the Salt Palace) and April 26th (at Tooele High School) expressed sentiments seemingly critical of, or reflecting confusion about, the role played by the NRC Staff in proceedings like this.

In view of those sentiments, and the discussion later herein about the role of the NRC Staff (see Subpart E, below, pp. 139-41), it is worth repeating briefly the explanation we attempted at the time, about how the Staff's lengthy prehearing review sets the stage for the hearing. Although the public may observe the Staff's seeming to move in concert with an applicant once the hearing begins, the Staff has come to such a position at the hearing only after first satisfying itself -- as it did during the multiyear internal scrutiny described above (see p. 82) -- that an application passes muster. [FN12] In other words, that the Staff eventually sides with ***84** an applicant at a hearing does not mean that the Staff has not been protecting the public interest.

c. The Opposition Contentions Generally

From the outset of this proceeding, the primary opposition to the facility has come from the State of Utah. The Southern Utah Wilderness Alliance (SUWA) also pressed a number of contentions. (Other entities, including the Skull Valley Band, Ohngo Gaudadeh Devia, Confederated Tribes of the Goshute Reservation, Castle Rock Land and Livestock, Skull Valley Company, and Ensign Ranches of Utah, participated in a more limited fashion or eventually withdrew.)

Several of the State's contentions were the subject of a full evidentiary hearing in front of the Bollwerk Board [FN13] before we held the lengthy 2002 hearing described above. A number of other contentions had been rejected without a hearing on a variety of grounds. Some were dismissed at the outset for such reasons as not providing necessary supporting documentation, not raising issues litigable in this forum, and/or not furnishing sufficient justification for being filed outside established time periods. [FN14]

Other contentions, although initially admitted as appropriate to litigate, were later dismissed by one Board or the other on "summary disposition," a procedure invoked when there are no significant factual disputes about a matter and controlling legal principles warrant resolving it without the formal presentation of evidence at a trial. As to those issues, the Applicant was able to convince us that no evidentiary hearing was necessary to determine that the State's, or other parties', claims lacked merit. [FN15] In other instances, after discovery of additional facts bearing on particular claims, an intervening party withdrew contentions on the grounds that its concerns had been satisfied.

****11** Several of the State's contentions survived all this screening and moved into the hearing process before this Board. These State issues included two safety matters ***85** -- involving concerns about seismic activity and aircraft accidents -- as well as an environmental issue involving potential water pollution from operations. For its part, SUWA's surviving contention challenged the routing of the proposed rail spur as being inconsistent with environmental and other norms reflected in the National Environmental Policy Act and elsewhere.

Each of the foregoing four issues -- which eventually became the subject of the Salt Lake 2002 hearings -- arose in different fashion, and took different amounts of time to try before either the matter was settled (in the case of the water pollution issue) or the trial was completed. We need not discuss here the background of the other issues that remain pending, for that will be done in due course in the later decisions resolving those issues.

d. The "Credible Accidents" Contention Specifically

We focus instead on how the issue we decide today, involving the likelihood of aircraft accidents, has presented itself. Again speaking generally (see p. 77, above, and Subpart E, below), the Commission requires that any facility it licenses be designed to withstand "credible accidents," that is, any accidents deemed sufficiently likely to occur that they should be guarded against. The probability criterion defining that likelihood is also set by the Commission. Any potential accidents less likely than that criterion are considered "incredible" and are allowed to be disregarded in designing the facility, that is, they do not become part of the facility's "design basis."

Against that background, the State presented a contention -- eventually denominated Utah K/Confederated Tribes B -- arguing that a variety of risks from military and other operations in Utah's West Desert could lead to airborne and other accidents that could threaten the facility. [FN16] As the State saw it, the cumulative probability of those accidents made them a credible threat to public health and safety, such that they had to be taken into account in some fashion. In contrast, the Applicant, supported by the NRC Staff, saw those accidents as not credible and thus safely disregarded. The subsidiary issues that were the subject of our hearing on the contention are described in the next section.

***86** 2. The Key Issues

a. The Prior Decisions

The "credible accidents" issue presented in this proceeding has had a complicated history, a brief review of which should aid understanding of the action we take today. A more complete history appears in two prior rulings: (1) this Board's decision granting in part and denying in part the Applicant's motion for summary disposition and referring a key matter to the Commission for its pretrial resolution (LBP-01-19, 53 NRC 416 (2001)), and (2) the Commission's resolution of that matter (CLI-01-22, 54 NRC 255 (2001)). [FN17]

****12** In a nutshell, in LBP-01-19 we found there to be no reason to go to trial on a number of concerns the State had attempted to raise about the risk of potential flying or falling objects that might result from certain aspects of military or civilian aircraft operations or airborne testing experiments. [FN18] But some of those concerns, we held, did justify a trial. As to those, we sought Commission guidance on, and approval of our views about, the appropriate test for "credibility" of an accident -- did that test reach occurrences as unlikely as one in ten million ***87**

(1 x 10-7), the criterion applied to nuclear power plants, or for facilities like this [FN19] need it reach (as we thought) only those occurrences more likely to take place, i.e., with at least a one in a million (1 x 10-6) likelihood per year?

The Commission adopted the one in a million criterion, for the reasons it explained at some length in CLI-01-22. In essence, the Commission reasoned that, because of the lesser consequences that would attend an accident affecting a spent fuel cask than one affecting a nuclear power plant (see CLI- 01-22, 54 NRC at 265), [FN20] a greater likelihood of an accident (i.e., an accident anticipated to occur more frequently) could be tolerated for spent fuel facilities before requiring that the accident be designed against. [FN21] Accordingly, the Commission held that for proceedings of this nature, any accident with a likelihood of occurrence of less than one in a million per year could be disregarded. [FN22] Id. That is, then, the standard we apply to the F- 16 overflights and related matters.

b. The Accident Likelihood

Although a number of other accident scenarios were still before us (see Section C.6, below), principal focus as the trial began was on the risk from F- 16 flights down Skull Valley on their way to the UTTR. To determine the probability of an F-16 crash into the spent fuel casks, attention turned first to a four-factor formula the NRC Staff had developed long ago -- and embodied in the "Aircraft Hazards" portion of its Standard Review Plan (in a document known as "NUREG-0800," ***88** described more precisely below) -- that had regularly been used to calculate the risks of aircraft crashing into NRC- regulated facilities.

Although much argument took place about the values to be given various of the factors in this case, exception was not taken to the underlying legitimacy of the formula itself, i.e.,

$$P = C \times N \times A/w$$

whose factors for calculating yearly accident probability (P) represent, respectively:

- C -- the aircraft's historic accident rate (in accidents per mile flown);
- N -- the number of flights per year;
- A -- the effective area of the facility (in square miles); and
- w -- the width of the airway (in miles).

As will be seen, in this proceeding there was considerable controversy over deriving "C," the appropriate historic or projected accident rate to use; about projecting "N," the number of flights in future years; and about defining "w," the useable width of the airway (but essentially none about "A," the effective area of the facility). But in whatever fashion those disputes were resolved, it appeared early on, from its own calculations, that the Applicant would have some difficulty proving that the accident scenario was "incredible" under the basic four-factor formula.

**13 This led to the most extensive and crucial controversy, involving the Applicant's attempt to modify the basic four-factor formula by including a fifth factor (denominated "R"). We were told that such a multiplier would reduce the yearly accident probability by accounting for "pilot avoidance," i.e., the purported action pilots would be expected to take, when able to do so, in guiding their doomed planes away from particular ground locations -- like the PFS facility -- before ejecting.

Pointing to the nature of most inflight emergencies that might be expected over Skull Valley and to the quality of Air Force training to deal with those emergencies, the Applicant proposed to take an approximately 85% reduction in the accident likelihood because of the so-called R factor. [FN23] To justify that *89 reduction, it analyzed accident causes as reflected in the set of F-16 accident reports prepared by the Air Force, and then relied almost entirely on expert opinion about pilot behavior in emergencies provided by its three-man panel of former high-ranking Air Force officers (whose qualifications, including their familiarity with Skull Valley, we detail later); it also drew upon the accident reports for exemplars of such behavior.

In opposition, the State made two basic arguments: (1) the NUREG-0800 formula is set and will not admit of a fifth factor; and (2) the Air Force's accident reports and the Applicant's expert opinions do not support an 85% reduction value for R. In support of the second argument, the State -- relying in part on the opinions of its own expert, a former F-16 (and currently Southwest Airlines) pilot who, while serving at Hill Air Force Base, had flown over 150 missions in the UTTR and also served as Deputy Commander of the 388th Operations Wing -- pointed not just to its contrary interpretation of the contents of the reports themselves but also to the purpose for which the reports were prepared and to examples of circumstances in which pilots had erred by ignoring their training.

In essence, we reject the first of the State's arguments (against adding an R- type factor), but accept the second (about the value assigned to R here). We explain why we do so in Subpart B, below.

Having thus not given the Applicant the credit it attempted to assign to the fifth factor, we turn in Subpart C to consideration -- under the classic "four- factor" formula -- of the likelihood of an accident at the PFS site. On the facts presented, we find that probability exceeds the one-in-a-million criterion by over a fourfold margin. We then go on in Subpart D to explain why we cannot accept the Staff's argument that there is so much flexibility in the "one-in-a-million" criterion that the Applicant's proposal should -- notwithstanding the adverse Subpart C result -- be deemed to meet that criterion.

Our ultimate holding, then, is that the accident in question must be deemed "credible," which in turn demands additional analysis from the Applicant if it wishes to pursue its license application, such as by demonstrating that the accident's consequences are not significant. Given the importance that the "consequences" issue could thus well take on as the proceeding goes forward, we set out in Subpart E our understanding of how that matter had come to us only tangentially at the 2002 hearing and thus was -- as the Staff conceded -- not then ready for consideration. We go on to mention briefly how that issue can now become ripe for full consideration, if the Applicant chooses to exercise the option of attempting to demonstrate that there would be no untoward consequences if the "credible accident" indeed did take place.

*90 B. The Proposed Pilot Avoidance ("R") Factor

**14 As has been seen, in order more accurately to reflect its view of reality, the Applicant proposed to add a "pilot avoidance" factor -- called "R" -- to the NUREG-0800 [FN24] formula in an effort to show that the probability of an aircraft crash on the site is much less than the unmodified formula would indicate. As the Applicant sees it, inclusion of the R factor enables it to demonstrate that the facility meets the Commission's licensing requirements.

Underlying the R factor formula modification is the belief of the Applicant's experts that, when possible (which they say is 90% of the time), Air Force pilots would almost invariably (95% of the time) act affirmatively to avoid striking the facility's spent fuel casks in the event of an impending crash. If this predicted "pilot avoidance" behavior could be relied upon, goes the argument, it would reduce substantially -- by some 85% -- the calculated probability of impact on the site and thus permit NRC approval of licensing.

As has been noted (note 23, above), the R value the Applicant wishes to add as a factor in the probability formula is a function of two components. The R1 component represents the proportion of times a crashing plane is nonetheless "controllable," said by the Applicant to be 90%; the R2 component represents the proportion of times a pilot in control would avoid the site, said here to be 95%. With R set as equal to 1 - (R1 x R2), the product of the two components is 0.855 (representing site avoidance), and the value of R to be inserted in the formula is 0.145 (representing nonavoidance, or the occurrence of the accident). [FN25]

The State makes several arguments against adoption of the R factor. First, it says, the standard NUREG-0800 formula is set with its four factors and does not admit of any alteration. Second, claims the State, the values the Applicant proposes for the components of the R factor do not have sufficient support either in the historic accident reports or in the expert opinion proffered by the Applicant's witness panel.

As to the reports, the State says they do not justify the conclusion the Applicant would draw that 90% of the time a pilot would be in control of the aircraft in *91 an emergency. As to the expert opinion about pilots following their training and taking avoidance action when in control of their planes, the State argues those opinions are undercut by actual experience, including pilot errors that are not only recounted in the very reports that the Applicant presented, but that occur sufficiently frequently to warrant the Air Force's preparing and distributing a retraining video and a written safety reminder. Nor, says the State, can those reports serve as probative exemplars of the Applicant's theories of pilot behavior in issue here, when viewed with an understanding of the limited, very different purposes for which the reports were created.

**15 We discuss the parties' competing arguments in Sections 1 and 2 below. [FN26] Once again, we do not accept the State's argument that no alterations to the formula are legally or conceptually permissible. But we reject the value the Applicant proposes for its R factor alteration as not proven by the evidence before us.

1. Amending the Standard Formula

The State asserts that the Applicant's modification of the venerable four- factor NUREG-0800 formula is invalid, almost as a matter of law. [FN27] It points out that NUREG-0800 makes no reference to any R-type factor in the crash probability formula, and contains no suggestion that the pilot of a crashing aircraft might be able to avoid its impacting the ground site of concern. See State Findings ¶ 57. The State also notes that the key Staff witness -- Dr. Kazimieras Campe, who has for 30 years been evaluating accident hazards, including aircraft crashes (see Tr. at 4080 (Campe)) -- testified that he has never been presented a significant departure from the four-factor formula, and knows of no authoritative sources that recognize a pilot avoidance factor. See Tr. at 4109, 4126 (Campe).

We reject the State's arguments on this score. As we conclude, the structure and language of the series of Staff documents (like NUREG-0800) that set out ***92** the basis for the Staff's "Standard Review Plan" analysis make it clear that they do not establish binding principles that must be followed in all instances. Rather, they are intended as guidance, setting out but one method that the Staff will treat as an acceptable approach to complying with NRC regulations. To that end, NUREG-0800 declares in a standard cover-page explanation that "compliance with [this guidance] is not required."

This construction -- that compliance with guidance associated with the Standard Review Plan is not required by the relevant statutes or by NRC regulations -- has long been recognized in NRC practice and jurisprudence. As a general matter, an applicant for a license has the option -- as it sets about to prove to the Staff in the first instance that its proposal meets applicable regulatory requirements -- either (1) to adopt an approach outlined in, and to demonstrate compliance with, the Standard Review Plan (thereby in, effect assuring Staff approval) or (2) to present and to justify some alternative approach. See Curators of the University of Missouri, CLI-95-8, 41 NRC 386, 397 (1995). By the same token, an intervenor, though not allowed to challenge duly promulgated Commission regulations in the hearing process (see 10 C.F.R. § 2.758), is free to take issue with the terms of the Standard Review Plan, which represents only Staff guidance and thinking, not official Commission requirements. [FN28]

That general understanding of the role of the Standard Review Plan is captured in the materials before us. Specifically, with respect to the four-factor formula, NUREG-0800 recognizes in section III.2 (at 3.5.1.6-3) that the formula is just "one way" of calculating the probability of an aircraft crash. Building on that concept, Staff witness Dr. Campe, one of the original authors of the section of NUREG-0800 dealing with aircraft hazards, expressed the view that the use of R -- if factually supported -- would be an acceptable way to accommodate the ***93** concept that military pilots might avoid a particular ground site. [FN29] See Tr. at 4098 (Campe).

****16** Accordingly, although NUREG-0800 does not explicitly contemplate the use of an R-type modification factor, we hold that use of such a factor is not prohibited by NRC regulations, Commission precedent, or any other legal principle. Thus, the Board may permit such a modification if it is factually and technically well founded.

The dispute among the parties as to the use of the R factor, then, comes down to whether the components of the R factor, and the values the Applicant would assign them, are justified by the evidence before us. In the next section, we address whether those values were proven.

2. Evaluating the Proposed R Factor

a. The Applicant's Position

The overall R factor is a function of the frequency with which pilots undergoing an emergency in which a crash is likely can be expected to take avoidance action before ejecting from the aircraft. The State does not so much challenge the general theories behind the Applicant's promotion of the R factor's two components as it takes issue with the specific values the Applicant would give each of them.

The legitimacy of the R factor thus turns on whether the Applicant has adequately demonstrated (1) how often F-16 pilots are in control of their aircraft while experiencing emergencies; and (2) how often a pilot in such control will, before ejecting, take action to make sure the crashing plane avoids particular ground locations. The Applicant's conceptual basis for developing those two components derives from two beliefs held by its panel of expert witnesses, all retired high-ranking Air Force officers, one with special familiarity with statistical analysis, another with significant safety expertise, and a third with extensive flight experience in Skull Valley. [FN30]

The first belief is that, in an aircraft emergency, a pilot will often have the time and the opportunity to steer the disabled plane away from a ground site before ejecting. [FN31] The second is that a pilot with the time and opportunity to take such ***94** avoidance action will -- to a near certainty -- do so as a consequence of the rigorous training that pilots receive. See PFS Findings at 24-25.

With those assumptions in mind, the Applicant's experts proceeded to estimate the numerical value of R, relying on an analysis of historic F-16 accident reports and on their own expert opinion. See PFS Findings ¶¶ 69, 71. The Applicant determined the values of the R factor's two components through two separate analyses.

The R1 analysis first required an elaborate protocol to screen out inapplicable reports, i.e., reports addressing accidents that occurred under "non-Skull-Valley" conditions. See id. ¶ 72. In that regard, as will be discussed in more detail in Subsection C.4.a, below, the portion of an F-16's training flight that takes place over Skull Valley, while not risk-free, was viewed by the Applicant's experts as akin to "normal flight," in that operations over Skull Valley involve neither takeoff or landing nor (as described in note 70, below) the sort of high-risk maneuvers that take place in the UTTR.

****17** From the remaining set of accident reports, the experts determined the frequency (R1) with which pilots who had been operating in "Skull Valley conditions" were presented with the opportunity to steer the aircraft in an emergency situation, which the witnesses set at 90%. See PFS Findings ¶ 74. Then, the Applicant's panel drew upon their collective expertise to propound the view about R2 that, when encountering an emergency while traversing Skull Valley, a pilot able to control an F-16 about to crash will, before ejecting, guide the aircraft away from the PFS site (or from any site that should be avoided) 95% of the time. See id. ¶ 91. We delineate below the detailed methodology utilized by the Applicant in determining the values of the two

components.

(i) PROBABILITY OF A PILOT BEING IN CONTROL OF AN AIRCRAFT

As was noted above, the R1 component represents the percentage of F-16 crashes that might occur in Skull Valley in which the pilot would be expected to retain control of the aircraft. The Applicant asserts that the most likely cause of an emergency threatening a crash in Skull Valley -- with its "normal flight" conditions -- is engine failure, which leaves the pilot in some degree of "control" (see id. ¶¶ 68, 73), as that term was employed in the hearing. For all crashes that might occur in Skull Valley, the Applicant assessed at 90% the probability that the pilot would be in such control of the aircraft before ejecting. See id. ¶ 74.

The Applicant's expert witnesses reached this figure by independently assessing each of the Air Force's available reports (for fiscal years 1989 through 1998) about F-16 accidents (occurring anywhere) that resulted in the aircraft being destroyed. See id. ¶ 69. Those reports were prepared by Air Force Aircraft Accident Investigation Boards, each of which is typically chaired by a Colonel and includes experts on the relevant subject matter. See id. ¶ 70.

***95** Initially acting independently of each other, the three members of the Applicant's panel reviewed these accident reports. See id. ¶ 71. A joint review followed to resolve any discrepancies in their separate professional judgments. See id. As a result of this procedure, the experts categorized each accident on two principal counts: (1) could its causes have resulted from the flight conditions experienced during Skull Valley operations; and (2) did the pilot have enough control over the aircraft prior to ejection to steer the aircraft away from a site such as the PFS facility. See id. ¶ 72.

Out of the 121 F-16 accidents that destroyed the plane and for which reports were available, the Applicant's experts initially concluded that 61 were Skull- Valley-type events, and that in 58 of those -- or just over 95% -- the pilot retained control of the aircraft. See id. ¶ 74. [FN32] For purposes of conservatism, however, for the proportion of accidents that would leave a pilot in control, the Applicant took credit for only 90% rather than the calculated 95%. See id. For its part, the Staff concurs with the PFS assessment of the accident reports in this regard. [FN33]

(ii) PILOT'S ACTING TO AVOID THE SITE WHEN IN CONTROL

****18** As was also noted above, the second component, or R2, in the Applicant's aircraft crash hazard calculation involves the probability that a pilot who is able to control an aircraft experiencing an in-flight emergency would actually take sufficient action before ejecting to avoid a particular ground site. Starting with their strongly held beliefs about pilot training and dedication -- and before examining any of the accident reports and without conducting any statistical analysis -- the Applicant's expert panel assessed the value of this component to be 95%. See id. ¶ 92.

In reaching this judgment, the Applicant's panel considered a number of factors that they

believed were well founded and would aid a trained, dedicated pilot in accomplishing avoidance: (1) the time the pilot would typically have before ejecting (estimated at one or more minutes, as derived from Air Force data regarding F-16 performance following engine failure); (2) the pilot's ability to conduct restart operations or otherwise to complete all necessary emergency response actions in timely fashion; (3) the slight turn required to avoid the PFS facility; (4) the training that pilots receive about avoiding inhabited or built-up ***96** areas on the ground; [FN34] (5) the familiarity that pilots at Hill AFB would have with the location of the PFS facility; (6) the existence of open spaces around that facility; (7) the excellent weather and clear visibility typical of Skull Valley; and (8) the F-16 flight control computer that keeps the aircraft on a straight flight path after ejection. See id.

To corroborate its R2 estimate, the Applicant discussed fifteen accident reports as exemplars during the hearing. See Tr. at 3662 (Cole). After the Board repeatedly questioned the statistical legitimacy of such a limited proffer, [FN35] the Applicant submitted all of the relevant accident reports, which were duly introduced into evidence. [FN36]

b. The Staff's Position

The Staff asserts that taking credit for a pilot's ability to direct a crashing plane prior to ejecting is a legitimate approach and that the R2 value is not based on purely subjective opinion. [FN37] The Staff concurred that a pilot with adequate control of the aircraft and sufficient time to direct it away from a ground site before ejecting would indeed be able to have it avoid the facility at least 95% of the time. See Staff Findings ¶ 2.475.

In support of this position, the Staff joined the Applicant in strongly asserting that Air Force training will prepare a pilot to respond successfully to emergency situations. See id. ¶ 2.295; Staff Reply ¶ 104. As the Staff would have it, the ***97** success of the training programs is evidenced by the accident reports recounting occasions in which pilots have, in ejecting, been successful in causing their crashing planes to avoid objects on the ground. See Staff Reply ¶ 104. In this regard, the Staff points out that "[i]n no report do we find that a pilot with time and opportunity to avoid a ground site failed to do so." See id. ¶ 89. From this the Staff contends that the Applicant "could have reasonably set the determination at 100%, but, as a measure of conservatism chose to set the value at 95 percent avoidance." See id.

****19** The Staff also put forward a sensitivity analysis that it performed as part of its consideration of the 95% value presented by the Applicant. The Staff testimony characterized that sensitivity analysis as evaluating the effect of "increasing by 20 times" the predicted likelihood of a crashing plane hitting the PFS facility. See Campe/Ghosh Post Tr. 4078, at 21. Doing so, the Staff said, increases the overall crash probability by only a factor of 2.5. See id. From that, the Staff urged us to find that the crash probability is thus "not highly sensitive" to variations from the 95% avoidance factor. [FN38] See id.

c. The State's Position

The State asserts that the Applicant's R1 assertion -- that in 90% of crashes the aircraft is controllable -- is deficient on two grounds. First, although noting that much was made by the Applicant of the evidence that engine failure (see State Findings ¶ 70) -- a circumstance in which the aircraft remains controllable -- is the most likely cause of a crash, the State points out that, according to F-16 manufacturer Lockheed Martin, crashes that occur due to engine failures account for only 36% of Class A mishaps. See id. ¶ 67. From this, the State reasons that as a general matter, in a much lesser percentage than the Applicant's postulated 90% would control of the aircraft be retained. Id.

Second, asserting that the accidents that took place in "non-Skull-Valley" flying conditions should not be eliminated from consideration, the State claims that 42% of the 121 crash reports indicate the pilot did not have sufficient control of the aircraft to have avoided the PFS site. See State Reply at 36. Therefore, according to the State, only 58% of those crashes could have resulted in the pilot retaining control of the aircraft, rather than the 90% asserted by the Applicant. See id.

***98** Turning to the R2 component, the State asserts that the value of 95% used by the Applicant "is a purely subjective determination made collectively" by the Applicant's experts, one that "was made without performing any calculation or statistics" and indeed "was made prior to reviewing the F-16 accident reports." State Findings ¶ 69. The State also asserts that the statistical evidence is flawed because it lacks affirmative support; all that is being shown, it says, is the purported absence of negative information, as epitomized by the Applicant's experts testifying that "we found no case where they tried to avoid something, and they didn't avoid it." [FN39]

In short, the State vigorously challenges the correctness and reliability of the analytical protocols followed by the Applicant to obtain numerical values for R1 and R2. In addition to these specific challenges to the Applicant's data, the State makes two general arguments in an effort to undercut the Applicant's approach on a broader scale.

****20** First, the State argues that, because of the way the accident reports were compiled, they were never intended to be utilized as the Applicant is doing, and thus cannot validly be used to confirm the Applicant's theories. See State Reply at 35-36. The accident reports were prepared, goes this argument, under Air Force Instruction 51-503, which does not have as one of its intended purposes a determination of whether a pilot was able to control an aircraft during the emergency so as to avoid a ground site. [FN40]

The State's second argument is that the reports not only are unfit for use as evidence of the pilot avoidance action the Applicant would rely upon, but also that they cut against the Applicant's position. See State Reply at 47. As the State sees it, the reports contain examples of pilot error, and illustrate deviations from pilot training, that -- rather than supporting the Applicant's premise that pilot action is helpful -- demonstrate that pilots cannot always be counted on to perform as trained. See id. at 47-50; State Findings ¶¶ 99- 102.

d. The Board's Decision

R1. We find that the 90% controllability value the Applicant would assign to R1 is supported by sufficient evidence to justify our adopting it. The central issue on this point is whether it is legitimate to distinguish flight conditions in ***99** Skull Valley from those over the UTTR for purposes of distinguishing among the types of emergencies likely to be triggered in each. On that score, while certain maneuvers have to be conducted on the way down Skull Valley, and those maneuvers are not risk-free, they are significantly less intense than the mock combat and similar exercises that take place over the UTTR. See Aircraft Crash Report, Tab H at 8. We find it was appropriate, therefore, for the Applicant to limit its R1 analysis to the subset of F-16 crashes consisting of those that occurred in "Skull-Valley conditions." [FN41]

But this alone does not establish that the 90% controllability value is a permissible one. The State saw, in a number of the accident reports, facts that led it to argue that particular aircraft that the Applicant said were controllable, indeed were not. See State Reply at 37-38. We discuss those disputed reports in our Detailed Findings (B-14 to B-39) in Part II, below. As we find there, the Applicant has the better of that evidence, albeit just barely.

R2. In contrast, we find that the proposed 95% value for the R2 factor was unproven. In essence, the Applicant's experts believed that in an emergency situation, there was effectively a near certainty that a combination of factors -- primarily visibility, time, and training -- would lead ejecting pilots to send their crashing planes away from the PFS site. [FN42] See Tr. at 8882 (Jefferson). But when the subject is the prediction of human behavior under stress, the successful establishment of an assertion of near certainty inherently calls for a highly probative showing.

****21** To be sure, the Board has no quarrel with the general value system held by the Applicant's experts, to the extent that they strongly believe that Air Force pilots are well trained, that they will in good faith attempt to act to the best of their ability and training in an emergency situation, and that as pilots they are committed to high standards of human behavior. In that regard, we note the existence, in more than one official or unofficial accident report in the record, of heroic action whereby a pilot -- at the cost of his life -- stayed with his plane, ***100** rather than ejected safely, so as to be sure to avoid people in harm's way on the ground. [FN43]

The question is not, however, whether some pilots will perform heroic deeds, even at enormous personal risk, when called upon to do so. The question is, instead, whether the preponderance of the credible evidence supports the notion that, for nuclear safety regulatory purposes, pilots under the special stress of an ejection-type situation can be counted on almost invariably to perform exactly as their training has prepared them to do, or whether, in contrast, their performance is likely to be affected by such things as lack of time or visibility or by what amounts to, in the State's words, [FN44] "human factors" sources of errors.

We accept that in the event of aircraft failure, in the vicinity of the PFS site or elsewhere, pilots would generally do what they could, consistent with their other responsibilities, to guide their aircraft away from vulnerable ground areas [FN45] before ejecting. But the 95% value of R2 propounded by the Applicant -- which has the burden of proof -- is far from sufficiently well founded. [FN46] We are forced to conclude, for the reasons set out below, that the evidence supporting a high value for the R2 factor is too uncertain to be relied upon to make safety-related decisions for nuclear facility licensing purposes.

In short, probative contrary evidence undercut each of the three central factual premises --

visibility, time, and training -- underlying the Applicant's expert beliefs. When the concept being advanced is "near certainty," the proof necessarily must be solid. We find that in the face of the powerful evidence the State submitted to support its challenge, the Applicant has not met that burden -- to the contrary, the State's evidence predominates. [FN47]

***101** Detailed analysis exposes the weaknesses in the Applicant's three basic reasons supporting its claim of 95% "pilot avoidance" success, which we first paraphrase. See Tr. at 8882 (Jefferson). First, because the weather in the areas surrounding the PFS site is almost always clear, pilots can almost always see problematic ground areas. See PFS Findings ¶¶ 99, 129-130. Second, there is almost always sufficient time before ejecting for the pilots to take action to steer the crashing planes away from those ground areas. See id. ¶ 94. Third, the exceptional training Air Force pilots receive will almost always cause them, prior to ejecting, to attempt to guide their aircraft to avoid those areas. See id. ¶ 96. The State has vigorously challenged each of these asserted reasons.

****22** To put our evaluation of the State's challenge in perspective, the Applicant's asserted R2 value essentially predicts almost certain success in human performance during emergency, stress-filled conditions. [FN48] Prevailing on such a claim is difficult, precisely because it takes very little in terms of examples of failure to defeat such a high success claim. Moreover, any prediction of human performance that claims there will be, particularly during emergency, stressful conditions, 95% success -- which the Applicant asserts to be conservative compared to the 100% theoretically supportable by its approach -- could benefit from a rigorous, in-depth evaluation and analysis of reliable operational data, which is lacking here.

The State has mounted a frontal challenge to the Applicant's evaluation and analysis. As to the visibility factor, the State's expert witness pointed out a variety of reasons why an F-16 pilot might be precluded from seeing a land feature. Those reasons included line-of-sight problems because of the configuration of the cockpit and the attitude of the aircraft [FN49] and the ways scattered cloud formations or fog can obstruct a pilot's sights. [FN50] For the pilot deliberately to avoid a land feature 95% of the time, the pilot must either be able to see the site, or have situational awareness of its existence, that same 95% of the time. [FN51] The State's expert testimony cast significant doubt on whether the conditions necessary for visibility -- line of sight and meteorological conditions -- are present 95% of the time.

***102** Secondly, the State offered evidence that there are instances where sufficient time is not available for pilot actions to avoid problematic land features. In this regard, a major concern is that because a successful restart is the most desirable outcome in engine failure emergencies, pilots are trained -- and perhaps more importantly, strongly motivated -- to attempt repeatedly to restart the engine. [FN52] The motivation is obvious: a successful restart of the engine means the incident is over, the plane is saved, the pilot is no longer in jeopardy, and the pilot need not eject. [FN53] This may lead to too many (in terms of lost altitude) attempted unsuccessful restarts, resulting in too little time for taking all the other steps called for in the situation before ejecting. See Horstman Post Tr. 4214, at 18-19; State Exh. 57, U.S. Air Force, ALSAFECOM 002/1996 (1996) at 3 [hereinafter ALSAFECOM 002/1996].

Moreover, the time pressure increases as the plane's altitude diminishes for, as the Air Force Manual provision on ejection procedures stresses, minimum ejection altitude should be no less than 2000 feet above the ground to provide the pilot the best survival opportunity. [FN54]

Indeed, to promote pilot safety, Air Force training emphasizes that pilots should not eject too low. See Manual at 3-42. But the desire to avoid ejection (with its potential for personal injury and its certainty of aircraft loss) by restarting the plane sometimes leads to ejecting below the desired altitude. See ALSAFECOM 002/1996 at 3. In that situation, the pressure of belatedly carrying out other responsibilities can take away from the time needed to guide the plane away from the "populated areas" referred to in the Manual (see related discussion, note 67, below).

****23** Regarding the third asserted reason, the State introduced evidence that despite the extensive training provided to Air Force pilots, and notwithstanding their dedication, they commit human errors -- and such errors would be expected ***103** to occur -- particularly in instances where very high stress exists. The State demonstrated convincingly that four interrelated factors contribute to these pilot errors:

• Pilots are trained to focus on attempts to save the aircraft by constantly trying to restart its single engine. This can leave very little time for a safe ejection when the pilot eventually realizes that restarting the engine is futile. See Horstman Post Tr. 4214, at 15-16, 18-19; ALSAFECOM 002/1996 at 3. See also Tr. at 3979-80, 4008, 4010-11 (Cosby).

• Preparation for ejection from the aircraft -- which poses a significant threat to the pilot -- takes much of the pilot's attention, competing with trying to avoid a given land area, which the Manual says to do "if time permits" after attending to other matters. See Horstman Post Tr. 4214, at 15- 16, 18-19; Manual at 3-42; see also Tr. at 4030 (Cosby) (pilot might be pressured by restart or other concerns that may direct his attention away from trying to avoid the facility), 3896-99 (Bernard).

• Ensuring the plane's altitude is not too low to avoid major injury or fatality upon ejection from the aircraft also competes for the pilot's attention. See Horstman Post Tr. 4214, at 17.

• The stress level involved is expected to be extreme, in that a pilot is put in the situation where saving the plane, saving his own life, and saving lives on the ground create conflicting priorities. See Horstman Post Tr. 4214, at 20; ALSAFECOM 002/1996 at 3.

These factors, obviously interrelated with the time factor, effectively counter the notion that pilot training eliminates pilot error. [FN55]

***104** Specifically in this regard, we find compelling the purpose of the Air Force training video the State introduced late in the hearing. [FN56] This training video incorporates a cockpit video recording made on board Colonel Frank Bernard's F-16 aircraft during a 1986 training mission in which he ejected after he had engine trouble. The Air Force used the video -- which features not only the cockpit video but a recounting by Colonel Bernard both of how the situation and the belated ejection unfolded, and of the lessons he learned and wanted to pass on -- to provide safety training for F-16 pilots.

The central message of the Bernard Video can be taken as reinforcing the need in emergencies to follow training instructions, from someone whose failure to do so almost cost him his life when he ejected at only 170 feet above the ground. On the video, Colonel Bernard says it was an error on his part to have utilized all his time focusing on trying to solve his engine problem rather than to eject earlier, when he reached the minimum safe altitude prescribed by the Manual.

See also Tr. at 3896 (Bernard).

24 This video demonstrates, the State suggests, that even though Air Force pilots are well trained, they still make critical mistakes, mistakes so important and so frequent that the Air Force believed a "reminder video" was warranted. See State Findings ¶ 81. We agree that this dramatic evidence -- that pilots ignore their training often enough to warrant vivid reminders -- is highly probative of the issue before us. The Air Force's decision to produce and disseminate the training video featuring Colonel Bernard provides additional evidence countering ***105 the Applicant's assertion that pilots nearly always do what they are trained to do. [FN57] That his experience was incorporated into a safety video to remind pilots of the need to follow their training is all to the good -- but it demonstrates the fallacy in any holding that would rely on pilots almost always doing what their training (superb though it may be) told them to do.

With similar import to its production and dissemination of the Bernard Video, the Air Force published in 1996 the written document entitled ALSAFECOM 002/1996 to which we have previously referred. One of only four such directives published that year, that document embodied the clear message that despite Air Force training, crewmembers continued to commit significant errors during emergency situations -- including becoming distracted during in-flight emergencies, delaying ejection because of futile attempts to recover failed engines, and ejecting below the published minimum altitudes. Once again, in the Air Force's commendably reemphasizing the need to adhere to lessons learned in training, we find in its premise -- that training lessons are too often ignored -- powerful evidence that any suggestion that pilots can be counted on almost always to follow their training is not sustainable. [FN58]

We could rest our decision, rejecting the R2 value advanced by the Applicant, on the foregoing alone. But in examining -- for purposes of reviewing any direct "pilot avoidance" evidence -- all the F-16 accident reports submitted by the Applicant, we found something else, namely, a large number of examples of pilot error committed in other phases of the particular mishap flight being investigated. We list those in Part II, below, pp. 180-84, by quoting directly from forty of the reports, which embody the findings and conclusions of the investigator.

As that material indicates, the pilots involved in those accidents made a number of errors. To be sure, those errors were made in entirely different phases of their flights than that in which ground-site avoidance measures would be taken. But that is not the point. The point is that the evidence that pilots make such mistakes in other phases of flight -- many of which involve non-emergency, less stress-filled ***106** activities than the preejection sequence we have been considering -- provides additional support for our finding that there is no sufficient basis to declare that they will almost never err when it comes to performing, in a high-stress situation, "pilot avoidance" of a ground site. [FN59]

**25 In contrast, the accident reports relied upon for corroboration of the Applicant's claims were far less probative. [FN60] The fact that initially only 15 reports were offered for that purpose is telling. As the Board suggested during the hearing, the Applicant's assertion that the 95% R2 value was confirmed by the contents of only 15 out of a total of 121 available accident reports was questionable at the outset. See Tr. at 3663, 3668-70. As we see it, the reports are of limited value in that (1) pilot behavior is not specifically evaluated; (2) the methodology is open to biased selection with no meaningful objective measure of which reports should be included and which excluded; and (3) the methodology relies on inferences drawn from the investigative

reports rather than on direct observation of the facts surrounding the accidents. [FN61]

***107** Further in that record, much of the problem, as we see it, stems from trying to draw conclusions about one subject from investigative reports prepared for the purpose of inquiring into a different subject. Specifically, accident reports are prepared by the Air Force for the purpose of learning why an accident occurred. See Cole/Jefferson/Fly Post Tr. 3061, at 10; Horstman Post Tr. 4214, at 26. In the course of conducting the investigation and preparing the report, additional, collateral information may be obtained. But that information is not subject to the same scrutiny given to the principal topics before us. Moreover, as we read the reports, many are silent on whether the pilot, on the verge of ejecting, had the opportunity or the need to avoid specific ground targets. Others noted that the pilot avoided a specific ground feature but did not elaborate on how difficult that might have been, or on whether there were other features that might also have been avoided. See, e.g., PFS Exh. 115, 134, 140, 158, 205.

In short, the accident reports do not carry substantial weight in the Applicant's favor. As we read them, they stand for the proposition that, all things being equal, pilots with the opportunity to do so may well attempt to avoid ground features that should be avoided. But, as we have seen, the reports also make clear that, in many other respects, pilots frequently take action that they should not, or have been advised not to, take. This leaves us far from certain, in a nuclear regulatory safety context, that pilots can be counted on -- to the degree necessary for us to make the findings the Applicant would have us make -- not to take improper action, or to fail to take proper action, where this one particular facet of their flight activity is concerned. [FN62]

In the end, these reports and the related expert testimony failed to identify a rigorous test protocol whose elements would have permitted a valid statistical inference to be drawn from the data. What was presented did not contain consistent, probative data on the causes and frequency of human failure when the conditions ***108** and opportunity for successful action are present. [FN63] The Applicant's arguments are subjectively appealing; nonetheless, the evidence it cited is inadequate to permit a valid statistical inference on the hypothesis of reliable pilot action in an emergency. [FN64]

****26** To be sure, we have been shown evidence both of opportunity to act and of rigorous pilot training. These certainly are necessary conditions if there is to be a reliance on pilot behavior in a nuclear licensing action. But the evidence establishes those conditions are not sufficient, and cannot be dispositive, particularly when the evidence reflects compelling examples of pilot errors made when the opportunity for taking the correct action existed.

In sum, the conflicting evidence about pilots' both following and ignoring their training leaves us with a record that shows reliable prediction of pilot behavior in an emergency is a serious and complex human factors analysis question. In the final analysis, for the Applicant to prevail -- in the face of the compelling evidence presented by the State -- we seemingly would be obliged to stand "human factors" analysis on its head.

That is, where usually there is grave concern that a human factors element will detract from safety assurances, here that element would be used to augment what would otherwise be a deficient safety showing. We have been pointed to no instance, and are aware of none, in which the nuclear licensing basis is solely dependent on reliability of human behavior without the added protection of engineered safety features. Although such an approach may not be entirely

precluded, relying on it has to overcome the additional uncertainty of attempting to take credit for avoiding human error rather than, as is usually the case, making allowances for human error.

***109** The R2 issue cannot be resolved in the Applicant's favor either by subjective expert opinion that has not been borne out by events [FN65] or by an ad hoc analysis of data not collected for the purpose to which it is being put. This is particularly so in the face of the State's credible, probative evidence that significantly undercuts each of the three major premises -- visibility, time, and training -- that underlie the Applicant's experts' opinions that R2 should be assigned a value of 95%. [FN66]

By the very nature of its claim of virtual certainty there would be no pilot error in a high-stress situation, the Applicant set for itself an inherently daunting challenge to produce evidence that would successfully support its position. Having now thoroughly reviewed the showing that was made, it is clear to us that the Applicant has not met its burden of establishing by a preponderance of the evidence the validity of its claim that under emergency situations an F-16 pilot can almost always (95% of the time) guide a crashing plane so as to avoid a problematic land area. [FN67]

***110** We are persuaded that the State has shown by a wide margin -- with evidence that is far more deeply rooted than a few examples of failures -- that the Applicant's expert testimony advocating an R2 value of 95% is not adequately supported. We turn, then, to an analysis of the classic four-factor NUREG-0800 formula.

C. The Four-Factor Outcome

****27** With the "pilot avoidance" theory thus unproven, the question of whether an F-16 accident is sufficiently likely to be "credible" turns on application of the classic four-factor NUREG-0800 formula. The State's "credible accidents" contention is not, however, limited to concerns over F-16s flying down Skull Valley; it includes the potential for other aircraft, as well as ordnance, to strike the spent fuel casks on the PFS site.

In this subpart, we evaluate the evidence presented by the three parties regarding the application of the four factors to all the asserted accident scenarios. Although some of the values required for the four-factor calculation cannot be known directly, but must be derived from other data, leaving some margin of uncertainty, we find that in any event the evidence is insufficient to establish that the accident in question has "less than a one in a million per year" chance of occurring. Accordingly, it is "credible" and must be protected against.

1. Nature of the F-16 Flights

Military air operations in the vicinity of Skull Valley include (1) Air Force F-16 fighter aircraft transiting Skull Valley from Hill Air Force Base [FN68] on their way to the South Area of the Utah Test and Training Range (UTTR); [FN69] (2) F-16s ***111** returning on occasion from the UTTR South Area to Hill AFB via the relatively little-used "Moser Recovery Route" (MRR),

which runs in a northeasterly direction, crossing Skull Valley 2 to 3 miles north of the PFS site; (3) military aircraft, comprised mainly of large transports, flying on military airway IR-420 to and from Michael Army Airfield, which is located (within the Dugway Proving Ground) about 17 miles southeast of the PFS site; and (4) F-16s from Hill AFB and various other military aircraft conducting training exercises in the UTTR. [FN70] See PFS Findings ¶ 7.

We focus most of our attention on the first of the above categories, for it predominates the probability calculation. F-16s transiting Skull Valley en route from Hill AFB to the UTTR South Area typically use (according to information the Applicant received from the Air Force) a corridor ranging east of the proposed PFS site. See Cole/Jefferson/Fly Post Tr. 3061, at 16. The F- 16s typically fly through what is called the Sevier B Military Operating Area (MOA), between 3000 and 4000 feet above ground level (AGL), with a minimum altitude of 1000 feet AGL. [FN71] A few aircraft fly higher, through the Sevier D MOA, which overlays Sevier B between approximately 5000 feet AGL and 14,000 feet AGL. [FN72] It is unusual for aircraft to fly through Skull Valley at altitudes above 14,000 feet AGL. Aircraft fly through Skull Valley at approximately 350 to 400 miles per hour.

2. Methodology for Calculating the Crash Probability

In determining whether to license facilities, the NRC considers the possibility that various accidents -- such as aircraft crashes -- may affect them. In evaluating these potential accidents, the agency first determines whether these are sufficiently "credible," i.e., likely to occur, to warrant protective measures.

****28 *112** As explained earlier, the formula for calculating aircraft crash probability for nuclear facilities is

$$P = C \times N \times A/w$$

where P is the annual probability of an aircraft crash and the four factors represent, respectively, the Crash rate (per mile), the Number of flights (per year), the Area of the facility (in square miles), and the width of the airway (in miles). There is no dispute among the parties -- apart from that over the R factor -- that this formula is an appropriate method for calculating the aircraft crash hazard for the proposed facility. The governing Commission criterion, established in this case, allows a facility like this one to be licensed if the calculated probability of an aircraft crash on the site is less than one in a million (1 x 10-6) annually. (See also Subparts D and E, below.)

3. Summary of Disputed Issues

The State disputes the numerical values the Applicant and Staff would assign to three of the four factors required by the NUREG-0800 equation. The disputed factors are crash rate (C); number of aircraft (N); and width of airway (w). [FN73] According to the State, both the Applicant and the Staff have selected values for these parameters that are incorrect and result in estimates of annual crash probability on the proposed site that are too low.

The crash-rate factor is expressed in terms of crashes per mile for a specified aircraft type, such as the F-16. The Applicant put forward 2.736 x 10-8 per mile as the appropriate value for crash rate (C), basing that determination on Air Force crash data recorded from 1989 through 1998, the most recent 10-year period available when it performed the analysis. The State disputes whether this was the appropriate period to use, asserting that the Applicant should have used the crash rate of 4.10 x 10-8 per mile for the F- 16's entire service life. The Applicant's analysis is also inadequate, says the State, because it failed to take account of the higher crash rates that occur at the beginning and end of service life, as well as the likely higher crash rate of the Joint Strike Fighter that will replace the F-16 during the life of the facility and that will assertedly experience its own high crash rates associated with the beginning of service life. The Staff adopted the same crash-rate value as that proffered by the Applicant.

***113** The number of flights transiting Skull Valley (N) per year is also disputed. The Applicant asserts that the correct number is 5870 flights per year, which is based on Air Force data that are kept for the MOA (but not explicitly for Skull Valley). The State asserts that the Applicant's estimate is too low, and that the more correct value is 7040 flights per year. The Applicant's analysis is flawed, says the State, because it eliminated some flights from consideration and also used a historical average rather than the most recent data, which indicate a significant increase in aircraft traffic in Skull Valley. Although the Staff's basic estimate of annual Skull Valley flights agrees with the State's, the Staff went on in its analysis to reduce that value by half, based on certain analytical assumptions it made.

****29** The Applicant asserts that the width of the airway (w) in Skull Valley is 10 miles. [FN74] The State asserts that the Applicant has not taken into account the "buffer zone" effect the nearby "restricted area" airspace has in limiting practical airspace in the MOA, and other similar factors that reduce the effective width of the Skull Valley airway to 5 miles. To that end, the State points out that flights down Skull Valley are not only limited by the obvious physical presence of the mountains to both sides, but are further limited by the UTTR-related mandatory restricted areas (intrusion into which, without permission, has serious adverse consequences for pilots). Thus, the State argues, even though the theoretically usable width of the Valley's airway may be as large as the 10 miles asserted by the Applicant, [FN75] the reality is that the restrictions to the west and the presence of the Stansbury Mountains to the east cause pilots to observe "buffer zones" that as a practical matter decrease the width of the available airway.

The values the parties advance for each of the four factors are compiled in Table 1, below, the final line of which reflects the Board-calculated aircraft strike probability that is generated from use of each party's four factors: [FN76]

As may be seen, despite the varying views of the parties, not only the State's but also the Applicant's and the Staff's values fail to meet the 1 x 10-6 per year acceptance criterion adopted by the Commission in CLI-01-22.

***114** TABLE 1

	Applicant	State	Staff

Crash Rate	2.736 x 10-8 per mile	4.10 x 10-8 per mile	2.736 x 10-8 per mile
Number of Flights	5870 per year	7040 per year	7040 x 1/2 per year
Facility Area	0.1337 square mile	0.1337 square mile	0.1337 square mile
Airway width	10 miles	5 miles	10 miles
Probability [FN77]	2.15 x 10-6 per year	7.72 x 10-6 per year	1.29 x 10-6 per year

4. Board Analysis of Four Factors

a. Crash Rate of F-16s

**30 To calculate a crash rate, the Applicant utilized Air Force F-16 crash data reflected in the Data Development Technical Support Document for the Aircraft Crash Risk Analysis Methodology (ACRAM) Standard. As noted in the table, the final figure derived from these data was 2.736 x 10-8 per mile. [FN78] According to the Applicant, this figure represents an average of the Class A and Class B mishap rates [FN79] over the 10-year period from FY 1989 to FY 1998 for normal flight operations. [FN80] The Applicant asserts that it utilized this 10-year period in order "to minimize the effect of statistical fluctuations from year to year and to capture *115 the most recent, and thus most relevant, period at the time the analysis was first conducted." PFS Findings ¶ 25.

The State argues that the Applicant should have used the published mishap data for all 27 years that the F-16 has been in service. See State Findings ¶ 35; State Reply at 30-34. It points out that aircraft, like other products, experience problems at the beginning and end of service life that are higher than in mainstream service. These higher beginning and ending failure rates are so well recognized as to often be described as "bathtub curves," so named for the shape the statistical failure-rate curve takes. See Horstman Post Tr. 4214, at 13. As the F-16 approaches the end of its service life, says the State, it may well demonstrate the high crash rate characteristic of end-of-life performance, and the new aircraft that replace it can be expected to encounter high rates characteristic at the beginning of life. The State argues that relying on only the best-performing years of the F-16's service life skews the crash rate too low. See State Findings ¶ 35.

In addition, the State argues that since the Air Force mishap data did not separate the mishaps into the four phases of flight and the ACRAM report did not divide the data into Class A- and Class B-type occurrences, the data should not be divided for our purposes. See id. ¶¶ 28, 37-38. On this premise, and including all years in its calculations of the crash rate, the State asserts that

the more appropriate value for the F-16 crash rate is 4.10 x 10-8 per mile, i.e., some 50% higher than the rate put forward by the Applicant (and endorsed by the Staff). See id. ¶¶ 37, 38.

We accept that the "bathtub effect" may occur over the life of some products. But the crash data for the F-16 are not yet showing it. To be sure, when the F- 16 was first put into service, it experienced a crash rate higher than later in its lifetime. But there has been no perceptible upturn in crash rate as end of life approaches. [FN81] This occurrence was attributed by the Applicant's experts to improvements in pilot training, technology, and maintenance practices and procedures over the life of the aircraft. See Tr. at 3370-71 (Cole).

Indeed, Air Force data indicate that aggregate crash rates for all planes have steadily decreased over time. Based on this performance trend, the Applicant's panel believes that the eventual F-16 replacement aircraft would not raise the crash rate for Hill AFB operations. PFS Findings ¶¶ 30-35. That is particularly true because the F-16's replacement -- the Joint Strike Fighter -- is not scheduled ***116** to undergo its break-in period in Air Force service, much less at Hill AFB. Tr. at 8656-57 (Fly), 3371-72 (Cole).

****31** To be sure, an argument can be made that a better approach than the 10- year period the Applicant utilized would have been to use the lifetime crash data, excluding only the break-in period. But we find that such a "lifetime minus break-in" crash rate is little different from the crash rate calculated from the 10-year sample upon which the Applicant relied. PFS Findings ¶ 26. And we do not accept as representative of long-term trends the more selective data upon which the State's expert relied. We therefore find the crash rate proffered by the Applicant to be a reasonable one supported by the preponderance of the evidence.

b. Number of Flights

The Air Force does not keep records for Skull Valley transitions as a subset of Sevier B and D MOA usage and thus there exists no exact count of aircraft flying through Skull Valley. Revised Addendum at 3. Thus, the value for N, like that for C, the crash-rate factor, has to be derived from data prepared for other purposes and involving different considerations. [FN82]

Based on the average of the previous 2 years' data, and a proportional increase to reflect the authorized increase in F-16s at Hill in FY 2001, the Applicant estimated there will be 5870 flights per year along the airway in the future. See PFS Findings ¶ 54. That estimate began with approximately 5000 as the 2-year average number of aircraft using the Sevier B MOA, based on Air Force indications that was likely to be representative of the number of flights in Skull Valley. See id. ¶ 55. The Applicant took care to adjust that estimate upward by 17.4% to account for the fiscal year 2001 increase in the number -- from sixty-nine to eighty-one -- of F-16's stationed at Hill AFB. See id. ¶ 59.

The State believes the Applicant's estimate to be too low. First, the State believes that only the most recent year's data -- which showed a substantial increase from the previous year's -- rather than the average of the 2 years, should be used as a starting point. Second, the State would add in Sevier D flights, [FN83] noting that Air Force records indicate that most of the aircraft in both the Sevier B and D MOAs are F-16s transiting Skull Valley. In addition, some Skull Valley ***117**

F-16 flights are not reported because the flights are above both MOAs. The State asserts that those uncounted Skull Valley flights should serve as a rough offset to those in the MOAs that do not enter Skull Valley. See State Findings ¶¶47-50.

The State, adding the B and D MOAs together, estimated that the total number of flights in the Sevier airspace was 5997 in FY 2000. See id. ¶ 48. Increasing that number by 17.4%, just as the Applicant did, gave the State a total of 7040 estimated flights per year through Skull Valley. As we explain below, as to that basic estimate we find that the preponderance of the evidence more nearly supports the State's (and the Staff's) view than the Applicant's.

****32** For its part, the Staff adopted reasoning similar to the State's and likewise concluded that the number of flights over Skull Valley is approximately 7040 annually. See Staff Findings ¶ 2.117. In deriving a value for N, however, the Staff -- to account for those aircraft in the usual flight formations that the Staff believes would not pose a threat to the facility -- reduced the 7040 flights by half. See id. ¶¶ 2.118-.119.

We consider first whether to begin the derivation of the N value with the Applicant's (lower) 2-year average or the State's (higher) most recent year. Our purpose, of course, is to predict the number of flights that will likely take place annually during the facility's lifetime. This is an inherently problematic venture, however, given that the number of training missions down Skull Valley depends on a number of unpredictable variables.

The most notable variable is the extent of deployment of U.S. forces around the world to engage in military operations. The crucial factor is not the extra training that might be involved in the runup to deployment, but aircraft removal from Hill AFB as part of the actual deployment to international operations. If fewer aircraft are onsite, the number of training flights will, of course, be substantially diminished. See Cole/Jefferson/Fly Post Tr. 3061, at 18-20.

Another variable mentioned was the eventual replacement of the F-16 by the "Joint Strike Fighter." Its existence may lead to different kinds and numbers of training missions. See Cole/Jefferson/Fly Post Tr. 3061, at 22-23.

One variable not mentioned, but apparent in federal law, is the impact of the "Base Closing Act" 10 U.S.C. § 2687 (2000). That statute calls for periodic review of the relative value of all military bases. The result is that some bases might be closed, while those remaining open would be called upon to assume the extra burden of activities previously handled at those that were closed. In either event, the number of flights down Skull Valley could be quite different in the future than it is today.

As may be seen, then, selecting a value to represent N, the number of annual flights, is another less-than-definitive aspect in the application of the four- factor formula. Not wishing (or being permitted) to speculate on future events lacking any basis in the record, we make the decisions that are within our grasp.

***118** The first is the choice between the recent 2-year average (proposed by the Applicant as smoothing out year-to-year changes) and the higher, most recent year (proposed by the State and endorsed by the Staff). We choose the latter on the basis of the general NUREG-0800 thesis (§ III.2, at 3.5.1.6-4) -- itself fully consistent with a fundamental principle of safety assessment --

that its proper use involves the selection of conservative input values. Similarly, the State's and the Staff's inclusion of flights from the Sevier D MOA is the better approach both to deriving an accurate conceptual count, and to following the NUREG-0800 thesis mentioned above.

**33 In the absence of data nearly applicable to the issue before us, and given the resulting need to derive useful data somewhat subjectively, we see some merit in the Applicant's estimation of 5870 flights per year over Skull Valley. But based on all the evidence, we find more persuasive the State estimate of the overall number of flights at 7040, in which the Staff concurs. The difference represents the uncertainty of the estimate, which is not further reducible on our record.

We turn now to the Staff's suggestion that the overall number of flights thus derived (upon which it and the State agree) should be reduced by one-half. See Staff Findings ¶ 2.119. The Staff came to that conclusion by looking at the lateral offset within each two-ship formation (and by considering a normal four-ship formation as two formations of two aircraft each, one formation flying in front of a second one). The Staff asserts that because of that offset, the aircraft more to the east of the two (and the two easternmost aircraft in the usual formation of four) would pose a negligible probability of impacting the facility and thus can be discounted as contributors to the impact probability calculation. See Staff Findings ¶ 2.118.

The Staff would therefore say that the number of aircraft to be considered is only half the total estimated to be flying down Skull Valley. Thus, the Staff would use 3520, not 7040, as the value of N in the probability equation. See Staff Findings ¶ 2.119. Correspondingly, the Staff technique would thus reduce the calculated probability by a factor of two.

Applying that halving concept to reduce "N" has, however, an obvious additional direct impact on another aspect of the four-factor formula. That is, when the Staff reduces the number of aircraft by half, it does so because aircraft occupying certain offset portions of the available airway are said to produce negligible hazard to the facility. See Staff Findings ¶ 2.119. But this has significant implications for another factor, i.e., the definition, and the width, of the effective airway. Manifestly, that width must be reduced by half to account for the Staff's elimination from the probability calculation the flights in the other half.

Put another way, it was certainly not demonstrated -- and in fact seems facially invalid -- that the technique the Staff used in deriving a value for the N factor can be employed, while at the same time leaving the value for the width of airway ***119** unchanged. [FN84] On the other hand, if the halved N value (appearing in the numerator of the formula) were to be accompanied by an equivalent halving of the airway width (appearing in the denominator), the result of the four-factor calculation would remain the same (as would the density of the remaining aircraft), and the calculated result would again be in accord with the realities of the situation.

Before leaving this subject, we note that NUREG-0800 makes provision for offset airways, but not in the fashion the Staff would employ here. It does so, in the very definition of the "w" value, by adding to the actual width of the airway another width value, namely, twice the distance that the nearest edge of the airway is offset from the facility. [FN85] But in situations like that we face here, in which the nearest edge of the airway in effect lines up with the facility, the formula suggests no adjustment from the values applicable to an airway centered on the facility. In effect, then, NUREG-0800 treats an airway centered over a site the same as one with its edge at the site, thereby again providing an element of conservatism that is fully in keeping -- for purposes of a

screening formula -- with the overall approach that NUREG-0800 explicitly adopts.

**34 Viewed in this light, the Staff's attempted reduction of N is, in effect, simply a different way of making the very adjustment for an "edge of site" airway that NUREG-0800 declined -- apparently deliberately -- to recognize. For that reason, as well as because it failed to make the fundamental change to the width of the airway that should accompany the elimination of the flights in one-half of that airway, [FN86] we reject the Staff's proposal as inconsistent with the premises underlying the four-factor formula as well as lacking any sound technical basis.

c. Effective Area of Facility

The Applicant calculated the effective area of the facility to be 0.1337 square mile. This figure was obtained by considering how the facility's actual ground area is enlarged as a target in relation to the glide angle of the crashing aircraft as it ***120** approaches the site. In proffering this maximum area figure, the Applicant points out that it is conservative in that it considers the facility to be at full capacity (4000 spent fuel storage casks) -- a status that may never be achieved. See PFS Findings ¶ 38.

The Staff and the State did not dispute the Applicant's calculation. See State Findings ¶ 52; Staff Findings ¶ 2.51. The Board has reviewed it and we find that 0.1337 square mile is reasonable and supported by the preponderance (indeed all) of the evidence before us. [FN87]

d. Width of Skull Valley Airway

In calculating a value for w, the Applicant assumed that the Sevier B MOA could be treated like an airway, with F-16 flights evenly distributed across its width from the Stansbury Mountains on the east to the edge of the restricted airspace (east of the Cedar Mountains) in the west. Taking the maximum potential usable airspace in that corridor at the latitude of the facility, the Applicant came up with a 10-mile width for the airway. See PFS Findings ¶ 43.

The State countered by arguing that the portion of the Sevier B MOA in actual use by F-16 formations is narrowed because of pilots' practices. In the State's view, the airway width is about 6 miles, extending from east of the western Sevier B MOA boundary to west of the eastern MOA boundary (near the Stansbury Mountains). See State Findings ¶¶ 43-44. It points out that State Exhibit 156B, which is an illustration originally taken from the Applicant's Crash Report, indicates that at an altitude of 3000 to 4000 feet AGL, the maximum airspace available is 10 miles wide at the latitude of the facility. See State Reply at 12-13. By the State's reckoning, however, most pilots will not use the full ***121** airspace available to the west to avoid straying into the bordering Restricted Area further west, and likewise, to give the Stansbury Mountains a wide berth, will not use all the airspace in the east. See State Reply at 13 n.21.

Because of these buffer zones, the State asserts, most F-16s that pass through Sevier B MOA tend to fly, for all practical purposes, within about a 6-mile- wide flight path. Allowing for other adjustments, the State concludes that the value that should be utilized in the formula for the

airway width is 5 miles. See State Findings ¶ 44.

**35 The parties are in accord that F-16s do not fly further west than approximately 1 mile east of the UTTR Restricted Area. See Tr. at 8572 (Horstman); Tr. at 3415-16 (Fly); SER at 15-63. With respect to airspace on the east, there is evidence that the distance pilots remain west of the Stansbury Mountains varies from "a couple thousand feet" (Tr. at 8647-48 (Fly)) to up to 3 miles. Tr. at 8613-14, 8571-72, 8593-94 (Horstman), 8648 (Fly). [FN88] Thus, notwithstanding that pilots have about 10 miles of potentially usable airspace in Skull Valley, the preponderance of the evidence compels the conclusion that the State is correct in its assertion that, in practice, the effective airspace used in formation flying is narrower than that 10 miles.

To determine how much narrower so as to arrive at a "w" value, we must return to first principles, namely, that probability of impact is a function of average flight density in the vicinity of the site. Density, in turn, is a function of airway width. The logical construct behind these elements suggests that the airway width, for purposes of the formula, should appropriately be determined based on where aircraft predominantly fly, not on the simple geographic width of the available airspace.

Employing that standard, the remaining discrepancy among the parties' views reflects differing approaches which are, again, a part of the overall analytical uncertainty of the estimate. The evidence presented only serves to establish that the actual value of the airway width is indeterminate to the extent that it depends upon individual pilot preference. From that perspective, the preponderance of the evidence supports the State's viewpoint, but only to the extent that the State has correctly urged that the airspace actually used is 6 miles. The State's further adjustment to 5 miles lacks evidentiary support, while the 10 miles advocated by Applicant and Staff does not account for the predominant pilot practice shown by the evidence.

*122 5. Calculated Four-Factor Probability

Utilizing in the NUREG-0800 equation the four values found in Section 4, above, the Board calculates the probability of impact on the site as follows:

P = Crash Rate x Number of Flights x Area of Facility / width of Airway

= (2.736 x 10-8)/mile x 7040/year x 0.1337 sq. mile / 6 miles

= 4.29 x 10-6 per year.

Consequently, we find on the basis of the evidentiary record before us that the Applicant has failed to meet the Commission's acceptance criterion articulated in CLI-01-22.

We note, as Table 1 reflects, that without the aid of the R factor none of the parties' inputs produces a result that would satisfy the 1 x 10-6 per year standard. In fact, the variance that exists (a more than threefold difference between the Applicant and the State, and a sixfold difference between the Staff and the State) reflects the unavailability of direct, observable data that, in turn, results in input values having to be derived by indirect means. Not surprisingly,

therefore, the arguments in favor of one or another estimate -- for example, both estimates of N -- are supported by plausible arguments. Be that as it may, pursuing the four-factor analysis any further to attempt to reach a more precise resolution of these differences would not be productive given that, as we noted earlier, the evidence is insufficient to give the critical second component of the proposed R factor the weight the Applicant would assign it.

6. Other Aircraft Risks

****36** Although the predominant contributor to hazard to the PFS site is F-16 flights over Skull Valley, the Board must also consider hazards arising from other sources in order to arrive at an overall assessment of the overflight crash probability. We do so at length for some scenarios, but briefly for those whereupon examination it is apparent that the probabilities in most instances are so low (in the 10-8 range) that our decision would not be materially affected by even relatively large changes in their values.

a. Moser Recovery Route

The major area of additional concern for the State involves aircraft activity on the Moser Recovery Route (MRR). [FN89] The MRR provides an alternative for aircraft ***123** returning from the UTTR South Area to Hill AFB. [FN90] It is utilized only during marginal weather conditions, or at night, under specific wind conditions that require the use of a northwest-heading approach to Runway 32 at Hill AFB. See Cole/Jefferson/Fly Post Tr. 3061, at 11. The Air Force is not otherwise inclined to use the MRR because it can create conflicts with Salt Lake City International Airport commercial and other traffic. Cole/Jefferson/Fly Post Tr. 3061, at 11; Aircraft Crash Report at 48a & n.56A.

The Air Force does not keep precise data on the number of flights per year that use the MRR. [FN91] All parties, therefore, had to look elsewhere to derive estimates of annual MRR flights.

The Applicant estimates that approximately 5% of the F-16 flights return to Hill AFB via the MRR. Cole/Jefferson/Fly Post Tr. 3061, at 97. That estimate drew upon conversations between General Cole and the Vice Commander of the 388th Fighter Wing at Hill AFB and a civilian air traffic controller in the Salt Lake City Air Traffic Control Center. Tr. at 3456-58 (Cole).

To estimate the number of flights that will occur on the MRR in the future, the Applicant assumed that the sortie rates on the UTTR, and thus the number of flights on the MRR, increased proportionally to the number of F-16 flights in Skull Valley. Using FY 1998 data for UTTR F-16 sorties, the Applicant estimates that some 280 flights used the MRR in 1998. [FN92] The Applicant then increased this number of sorties proportionally to account for the increase in F-16s in FY 2000 and FY 2001, and to account for the increase in number of F-16s to be stationed at Hill AFB in the future. Cole/Jefferson/Fly Post Tr. 3061, at 97.

Defining the MRR airway width as 11.5 miles, and using previously selected values for the crash rate, effective area, and R, the Applicant estimated the crash impact probability to be 2.0 x

10-8 per year. Cole/Jefferson/Fly Post Tr. 3061, at 97. Without the R factor of 85.5% reduction, which we have previously rejected, that probability would have been approximately 1.4 x 10-7 per year.

The Staff prepared an independent analysis of the number of flights on the MRR using actual FY 2000 UTTR data, estimating there are 353 flights per year on the MRR. See SER at 15-80 to 15-82; Staff Findings ¶2.529. The Staff agreed with the Applicant that about 5% of UTTR sorties used the MRR, because (1) the MRR is used only under specific wind conditions; (2) the MRR is not favored by Air Force pilots due to conflicts with Salt Lake City International Airport ***124** air traffic; and (3) because Air Force personnel have confirmed that the MRR is rarely used. See Staff Reply ¶ 1143. Using the NUREG-0800 formula, the Staff determined the hazard probability from aircraft traversing the MRR to be 2.5 x 10-8 per year using a value similar to the Applicant's to account for pilot avoidance. Campe/Ghosh Tr. 4078, at 40; SER at 15-82.

****37** The State asserts that future flight numbers along the MRR are likely to be substantially larger than projected by either the Applicant or the Staff. See State Findings ¶ 110. The increase will occur, says the State, because the Air Force plans to increase the frequency of night flying to train pilots in using night-vision goggles. According to the State, up to 33% of all future flights on the UTTR are likely to be night training flights, all of which, it says, will return via the MRR. Horstman Post Tr. 4214, at 30.

The State also asserts that there will be some 10,410 aircraft using the UTTR in future years. This estimate is substantially larger than estimates used by the Staff or Applicant, each of which relied on their previous estimates of F- 16 flights transiting Skull Valley.

The State calculates, using the foregoing data, that the projected number of aircraft using the MRR will be 3436 per year (10,411 x 33%). That value for N resulted in the State's estimating crash probability on the PFS site from MRR flights as 1.64 x 10-6 per year. See State Findings ¶ 111. If accepted, this estimate would, by itself, and without regard to the contribution of other accident scenarios to cumulative risk, indicate sufficient probability of impact to exceed the NRC acceptance criterion of 1 x 10-6.

In estimating the MRR use factor, the State assumed that a 33% increase in UTTR night training activity automatically translated to a corresponding numerical increase in MRR use because of its understanding of an Air Force report that all those increased night flights would use the MRR for recoveries. That Air Force statement was, however, of a contingent nature: use of the MRR for night flight recovery is contingent upon the existence of certain wind conditions. Indeed, the Air Force expects no overall increase in MRR usage resulting from its night training. Campe/Ghosh Post Tr. 4078, at 39; Cole/Jefferson/Fly Post Tr. 3061, at 98 & n.168. The State's assertion that 33% of all UTTR flights will use the MRR is therefore lacking in record support.

As to the other part of its estimate, the State derived its view that approximately 10,410 flights would use the UTTR by extrapolating from fluctuations in use data for prior years. Specifically, the State viewed the data as reflecting an upward trend portending more flights on the MRR after the year 2001 than had occurred up to that time.

The UTTR data do not, however, show any such unambiguous upward trend before 2001. A more realistic interpretation of the data is that UTTR flight numbers simply fluctuated from year

to year without showing any overall trend. We find it invalid to select a particular short period's incidental upturn in fluctuating data ***125** for extrapolation as if it were a trend. The Board therefore finds that the State's projected number of UTTR flights was derived by invalid techniques, and is thus lacking in record support.

****38** We find that the State's overall analysis of the crash probability on the PFS site arising from flights on the MRR is not appropriate, because both its estimate of future aircraft use on the UTTR and its estimate of the percentage of UTTR flights returning along the MRR are overstated. We therefore reject the State's MRR crash probability estimate of 1.64 x 10-6 as unfounded. On the other hand, the Board finds that the Staff estimate of crash probability of approximately 1.6 x 10-7 per year (without credit for a pilot avoidance factor) is reasonable, as is the Applicant's somewhat different estimate of 1.4 x 10-7, for the reasons expressed in their analyses.

The Board recognizes that all numerical values used in this analysis are derived from indirect estimates, rather than consisting of actual counts of aircraft using the MRR. All such estimates are subject to considerable but unmeasured uncertainty. Nevertheless, even in the face of this analytical uncertainty, we can conclude there is reasonable assurance of only small crash probability from MRR traffic because, in this instance, there is some margin between any of the reasonable estimates and the acceptance criterion. In other words, the screening formula worked well enough here -- unlike the analysis of Skull Valley flights -- to permit this particular accident scenario to be put aside (other than for cumulative risk purposes).

b. Michael Army Airfield

Another State concern is the hazard posed by aircraft flying to and from Michael Army Airfield (MAA) on IR-420. MAA is located on Dugway Proving Ground, 17 miles south-southwest of the PFS site. IR-420 is a military airway that runs from the northeast to southwest and terminates about 7 miles north of the PFS site, at the northern edge of the Sevier B MOA. See Cole/Jefferson/Fly Post Tr. 3061, at 98; Campe/Ghosh Post Tr. 4078, at 41.

The majority of flights to and from MAA am F-16s conducting training exercises. See Campe/Ghosh Post Tr. 4078, at 41. The Applicant used the same method to calculate the probability of an MAA-related aircraft impacting the PFS site it did for F-16s transiting Skull Valley. See PFS Findings ¶ 195.

There are also a number of large cargo aircraft flying to and from MAA. NUREG- 0800 provides an in-flight crash rate of 4.0 x 10-10 per mile for large commercial aircraft. The Applicant applied that crash rate to its estimated maximum of approximately 414 annual flights to MAA by aircraft other than ***126** F-16s. [FN93] See PFS Findings ¶ 195. PFS calculated the effective area of the site as 0.2116 square mile, using the same method employed to calculate the effective area of the PFS site relative to an F-16. Using the NUREG-0800 formula, the probability of any of these aircraft impacting the PFS facility is negligible, i.e., 3.0 x 10-9 per year. See PFS Findings ¶ 195.

The State did not submit any testimony on the hazard posed from aircraft flying to and from

MAA in the direction of IR-420. See PFS Findings ¶ 195. Similarly, the Staff does not dispute the Applicant's estimate of risk posed from flights transiting IR-420. See Staff Findings ¶ 2.542. For our part, we have examined the calculations and find them reasonable and supported by the preponderance of the evidence, allowing this accident sequence to be put aside as well.

c. Utah Test and Training Range

**39 The State has also expressed concern over the hazard to the facility from aircraft training on the UTTR. Aircraft on the UTTR South Area perform a variety of activities, including air-to-air combat training, air-to-ground attack training, air-refueling training, and transportation to and from the MAA. See Cole/Jefferson/Fly Post Tr. 3061, at 90-91. The Applicant asserts that the hazard from air-to-air combat training on the UTTR poses a negligible hazard to the PFS facility because activity on the UTTR occurs too far away from the facility. See PFS Findings ¶¶ 185-186.

The UTTR South Area is composed of four restricted areas, and the PFS site is located 2 miles from the eastern edge of two of the restricted areas. In much the same manner that pilots try to avoid encroaching into restricted airspace when flying down Skull Valley, it is reasonable to assume that pilots will also try to avoid performing restricted activities outside of the controlled area for fear of harming other aircraft as well as to avoid serious consequences for violating Air Force policy. Hence, the Applicant assumes a 3-mile buffer zone inside the UTTR restricted airspace as a practical limitation on how close pilots will fly to the outer edge of the UTTR.

Review of the F-16 crash reports indicates that most accidents would occur toward the center of the restricted ranges. Relying on the asserted 5-mile glide distance of the plane (see PFS Findings ¶¶ 186-189), the Applicant asserts that accidents that did not leave the pilot in control of the aircraft would not pose a threat to the PFS facility: the facility would be 2 miles from the eastern boundary *127 of the UTTR airspace, and a 3-mile buffer will be observed inside that boundary. Using the NUREG-0800 formula, the Applicant thus calculated that the crash probability from F-16s performing activities in the UTTR is less than 1 x 10-8 per year.

In response, the State asserts that the Applicant's estimate of crash hazard is unrealistic because it is reduced by the R factor. See State Findings ¶ 123. In addition, State's witness Dr. Resnikoff argued that an aircraft could indeed pose a hazard to the facility, based on the assumption that a crashing F-16 could fly 10 miles before impact. See Resnikoff Post Tr. 8698, at 17-19; Tr. at 8792-94 (Resnikoff). Using these data, the State calculated the hazard to the facility from this activity to be 2.74 x 10-7 per year.

We agree with the Applicant that a 5-mile glide for an F-16 is a reasonable estimate. The State's witness based his belief in a 10-mile glide distance from a preliminary estimate the Applicant made before it obtained and analyzed the actual accident reports, which showed different data. In any event, even after removing the R factor, the UTTR risk is small compared to that posed by F-16s in Skull Valley.

d. Military Ordnance

The final area of concern for the State involves the potential hazard to the facility from ordnance explosions. Ordnance can pose a hazard to the PFS facility both directly and indirectly in four respects: (1) an F-16 carrying ordnance might crash directly into the facility; (2) an F-16 carrying ordnance might jettison ordnance directly onto the facility; (3) an F-16 carrying ordnance might crash near the facility causing an explosion that can impact the facility; and (4) an F-16 carrying ordnance might jettison it near the facility with similar explosive impact.

****40** Although the Applicant and the Staff assessed the probability of each of the four scenarios in their respective analyses (see Aircraft Report at 74- 83k; SER at 15-83 through 15-93), the State addressed only the second scenario, the probability of jettisoned ordnance directly striking the facility. See Resnikoff Post Tr. 8698, at 19-20; see also State Findings ¶¶ 114-122; State Reply at 53-54. We consider below each of the four scenarios.

(i) HAZARD FROM DIRECT IMPACT FROM F-16 CARRYING ORDNANCE

The Applicant has determined that the probability that an F-16 transiting Skull Valley with live ordnance on board would crash into the facility is about 7 x 10-9 per year. Aircraft Crash Report at 78. This estimate is based on the assumptions that: (1) the fraction of crashing F-16s that do not jettison their ordnance is 10%, and (2) only 5% of all F-16s carry bombs. Id. The Board finds these assumptions ***128** reasonable, and even with the uncertainties involved, the estimated probability of 7 x 10-9 per year is well within the acceptance criterion of 1 x 10-6 per year.

(ii) HAZARD FROM DIRECT IMPACT OF JETTISONED ORDNANCE

In calculating the probability of jettisoned ordnance directly hitting the facility, the Applicant used the following formula: P = N x C x e x A/w. See PFS Findings ¶ 196. In this modification of the NUREG-0800 formula, N represents the number of annual flights through Skull Valley carrying live and/or inert ordnance; C is the F-16 crash rate per mile; e is the percentage of crashes that leave the pilot in control of the aircraft and able to jettison the ordnance; A is the combined dimensions of the CTB and storage pad area; and w represents the width of the airway. See id. ¶ 197.

The Applicant estimates that N, the number of aircraft carrying live or inert ordnance through Skull Valley per year, is 150. See id. This estimate is based on the average number of F-16s carrying ordnance through Skull Valley in FY 1999 and FY 2000 (2.556% of the total number of Skull Valley sorties, increased by 17.4% to account for the additional aircraft based at Hill AFB in FY 2001) -- or 2.556% of 5870. See id.; Cole/Jefferson/Fly Post Tr. 3061, at 102.

For C, the Applicant used the crash rate for F-16s calculated above, or 2.736 x 10-8 per mile. See PFS Findings ¶ 197. The Applicant then assumed that the pilot would jettison ordnance in 90% of all crashes, when the pilot is in control of the aircraft (in crashes attributable to other causes, it was assumed that the pilot would eject quickly and would not jettison ordnance). See id. Therefore, e is equal to 0.9.

The Applicant determined A, the product of the width and the depth of the cask storage area, plus the product of the width and depth of the CTB, to be 0.08763 square mile. See id. Finally, the Applicant treated Skull Valley as an airway with a width, w, of 10 miles. See id. Based on these input values, the Applicant calculated the hazard to the facility from jettisoned ordnance to be 3.2 x 10-8 per year. See id.

41 The State, on the other hand, uses an unmodified NUREG-0800 formula to calculate the crash probability for jettisoned ordnance: P = N x C x A/w. See State Findings ¶ 120. The State disputes the Applicant's use of e, asserting that PFS offered no evidence in support of the assumption that ordnance will be jettisoned less frequently than the F-16 crash rate. See State Findings ¶ 122. In calculating N, the State relied on the following data for combined sorties carrying ordnance for the 388th and 419th Fighter Wings: 866 sorties in FY 1998, 193 sorties in FY 1999, and 164 sorties in FY 2000. See id. ¶ 115. Because the Applicant does not know the reason for the decline in the number of sorties carrying ordnance from FY 1998 to FY 2000, the State argues that it is neither realistic nor conservative ***129 to assume that future flights through Skull Valley will carry ordnance less often than flights in FY 1998. See id. ¶ 116.

Thus, using data from FY 1998, the State posits that 21.2% (866 flights carrying ordnance/4086 total flights through Skull Valley) of Skull Valley flights carried ordnance in 1998. See id. ¶ 117. Using the total number of estimated flights for Skull Valley per year -- 7040 -- (see id. ¶¶ 46-48) the State then determined N, the number of F-16s that will carry ordnance through Skull Valley, to be 21.2% of 7040, or 1492. See id. ¶ 119. In its calculation of N, the State assumed that all F-16 sorties with ordnance transit Skull Valley. See id. ¶ 117.

Alternatively, the State suggests that even if the Board were to accept the Applicant's methodology of determining the percentage of all flights carrying ordnance by dividing the number of sorties carrying ordnance (866) by the number of UTTR South Area sorties (5726), [FN94] rather than Skull Valley sorties, the Applicant's value for N is not sufficiently conservative. See id. ¶¶ 118-119. Using the Applicant's reasoning, the State calculates that 15.1% of all flights (866/5726), including those through Skull Valley, carried ordnance in FY 1998. See id. ¶ 118. The State further argues that it would be neither conservative nor realistic to adopt a value for N of less than 1063 (15.1% x 7040). See id. ¶ 119.

With respect to the remaining variables, the State used an F-16 crash rate, C, of 4.10 x 10-8. See id. ¶ 120; See also id. ¶ 38. For A, the State determines the area to be 0.12519 square mile, assuming a skid distance similar to that of an F-16 and a 35-degree impact angle. See State Findings ¶ 120; Resnikoff Post Tr. 8698, at 20. Finally, the State finds the width of the airway, w, to be 5 miles. See State Findings ¶ 120; see also id. ¶ 44. Based on these input values, and a value of N of 1492, the State estimates the annual probability of impacts from jettisoned ordnance to be 1.53 x 10-6. See State Findings ¶ 120. Using the alternative value of N, 1063, the State argues that it would not be realistic to use an annual probability of less than 1.09 x 10-6. See id. ¶ 121.

**42 For its part, the Staff agrees with the Applicant's use of C, 2.736 x 10-8; of e, 90%; and of w, 10 miles. See Staff Findings ¶¶ 2.483-.484. Relative to variable N, although the Staff considers the Applicant's value of 150 (2.556% of 5870) to be acceptable, the Staff estimates N to be slightly higher. See id. ¶ 2.493. The Staff used only the data from FY 2000 in calculating N. See id. ¶ 2.487. The fraction of the number of flights carrying ordnance, adjusted to account

for the number of additional flights due to the twelve additional F-16s stationed at Hill AFB, was estimated by the Staff to be 2.3%. See id. ¶ 2.493. Thus, N was found by the Staff to be 2.3% of 7041 flights, or 162. See id. ¶ 2.493.

With regard to A, the Staff finds the Applicant's estimation of the cask storage area to be acceptable; however, in its calculation, the Staff increased the size of ***130** the area of the CTB by using the length and width of the CTB at its widest point, resulting in a marginal increase. See id. ¶ 2.495. Based on the above input values, the Staff estimates the annual probability of jettisoned ordnance impacting the facility to be 4.4 x 10-8. See id. ¶ 2.499.

The Board finds the Applicant's and the Staff's use of the modified NUREG-0800 formula (P = C x N x e x A/w) to be appropriate in estimating the probability of jettisoned ordnance directly impacting the facility. The Board finds, however, that the values for N and w should be different from what the Applicant proposes, as will be explained below.

As we determined above in our discussion of the probability of an F-16 crashing into the PFS facility, we find the value of C to be 2.736 x 10-8 (see pp. 114-16, 120-21, above) and w to be 6 miles. See p. 121, above. Based on the reasoning presented, we find the Applicant's estimation of e and A to be reasonable. As was noted above in Section B, we are satisfied that pilots would be able to maintain control of their aircraft in 90% of crashes (see p. 98, above), and it is reasonable that they would jettison their ordnance -- one of the first things they are instructed to do, and one that enhances their own safety -- on those occasions. [FN95] Thus, we find the value of e to be 90%.

With respect to A, the State's expert asserted that the Applicant should have used a "skid area" surrounding the facility to account for jettisoned ordnance potentially skidding into the facility, which it asserted should be based on a skid distance similar to that of a crashing F-16. See Resnikoff Post Tr. 8698, at 20. General Jefferson testified, however, that unlike an F-16, which would crash at a very shallow 7-degree angle, jettisoned ordnance would not skid because it would fall and impact the ground at a very steep angle. Tr. at 8869 (Jefferson). Because the sole basis for Dr. Resnikoff's assertion was an undocumented conversation between himself and Lieutenant Colonel Horstman, see Tr. at 8801-05 (Resnikoff), we find the Applicant's estimation of the area of the facility reasonable and conclude that A is 0.08763 square mile. [FN96]

****43** The parties arrived at widely different values for the remaining variable, N. Of the 3 years of data available for the number of F-16s carrying ordnance, the Applicant chose to use the two most recent years of data, FY 1999 and FY 2000, ***131** in calculating the percentage of flights carrying ordnance per year. See PFS Findings ¶ 197. The State, on the other hand, considered only the data from FY 1998, the year with the highest number of flights carrying ordnance. See State Findings ¶ 116. For its part, the Staff took into account data for FY 2000 only, the most recent year available. See Staff Findings ¶ 2.493.

The Board finds that the most appropriate method of determining N is to use all of the data available, that is, data from FY 1998 through FY 2000. Therefore, we find the percentage of flights carrying ordnance through Skull Valley per year to be 8.34%. We arrived at this percentage by dividing the number of 388th and 419th Fighter Wings' flights carrying ordnance over the 3 years for which data were available by the total number of flights: (866 + 193 + 164)/(4086 + 4586 + 5997) = 0.0834. See Revised Addendum, Tab HH at 3, 13, 14 n.30. We

previously estimated the number of flights along the Skull Valley airway in the future to be 7040. See pp. 116-19, above. Thus, we estimate N to be 587, or 8.34% of 7040.

Based on the above inputs, we calculate the probability of jettisoned ordnance directly impacting the PFS facility as follows:

P = C x N x e x A / w

= 2.736 x 10-8/mile x 587 x 0.90 x 0.08763 sq. miles / 6 miles

= 2.11 x 10-7 per year

For clarity, we display the parties' calculations, and ours, in Table 2, below. As thus indicated, we find that the Applicant has met the Commission's acceptance criterion of 1 x 10-6 per year articulated in CLI-01-22.

TABLE 2

Estimated Probability of Jettisoned Ordnance Directly Impacting the PFS Facility

	Applicant	State	Staff	Board
N	150	1492 or 1063	162	587
C	2.736 x 10-8	4.10 x 10-8	2.736 x 10-8	2.736 x 10-8
e	0.90	1.0 (no factor)	0.90	0.90
A	0.08763 sq. mile	0.12519 sq. mile	slightly larger than 0.08763 sq. mile	0.08763 sq. mile
w	10 miles	5 miles	10 miles	6 miles
P	3.2 x 10-8	1.53 x 10-6 or 1.09 x 10-6	3.5 x 10-8	2.11 x 10-7

*132 (iii) HAZARD POSED BY NEARBY EXPLOSIONS OF ORDNANCE (on Board an F-16 or Jettisoned from an F-16)

**44 The Applicant provided analyses on the potential hazard posed by nearby explosions of

ordnance on board or jettisoned from an F-16. See PFS Findings ¶¶ 200-203. The State did not challenge any of these findings.

Before adopting the Applicant's findings by default, the Board examined the merits of the underlying analysis; we find it to be logical and reasonable. A detailed description of that analysis is provided in PFS Findings ¶¶ 200-203, and PFS Reply ¶¶ R170-R172, as well as in Staff Findings ¶¶ 2.500 to 2.516. The Applicant's use of an "explosion damage radius" for a 2000-pound ordnance employing overpressure limits for the spent fuel storage cask and the Canister Transfer Building is appropriate, since the 2000-pound ordnance is the largest carried on board an F-16. The Applicant's assumption of a 1% chance of explosion for ordnance jettisoned from, or carried aboard, a crashing F-16 (see PFS Findings ¶ 203) is reasonable based on the testimony that Air Force pilots do not arm the live ordnance they are carrying while transiting Skull Valley near the facility. Id. ¶ 202. Therefore, the Applicant's estimate of a 1 x 10-. 10 per year probability of explosion of ordnance sufficiently nearby that the overpressure would impinge on the facility is reasonable.

In summary, the Board finds that the Applicant's analysis is adequate in estimating the hazard probability posed by military ordnance in three of the four respective ways discussed above. The Board's own analysis indicates, however, that a higher hazard probability is more appropriate for that posed by jettisoned ordnance, but the Board's raised estimate, 2.11 x 10-7 per year (relative to the Applicant's value of 3.2 x 10-8 per year), is still within the Commission's 1 x 10-6 per year acceptance criterion.

7. Cumulative Hazard

Because of the risk from F-16 flights down Skull Valley alone, the estimated cumulative hazard posed to the PFS facility from aviation activity in the Skull Valley fails to meet the Commission's threshold criterion for credible accidents of less than 1.0 x 10-6 per year. The additional hazard from flights on the MRR and from jettisoned ordnance accidents adds somewhat to the potential excessive risk.

This finding would ordinarily mean that our analysis was for now at an end, and that a grant of the license would not be justified. But the Staff believes that the probability criterion is flexible enough to avoid that result. We consider and reject that argument in Subpart D, below.

*133 D. Compliance with the Commission's Safety Criterion

As has been seen in Subpart C, the Applicant has fallen well short in its attempt to establish that the accidents in question have less than a one in a million per year chance of occurring -- we found that the accident likelihood is over four times that high. Rather than have that result be determinative, however, the Staff asserts that the governing Commission criterion (established in CLI-01-22) is not a rigid one, but is flexible in its application. Indeed, the Staff says, through both counsel and a witness, the standard is sufficiently flexible that it is really only intended as an "order of magnitude" guide. See Tr. at 3000-01 (Turk); Tr. at 8914 (Campe).

**45 In response to our inquiry, the Staff indicated that it would have that order of magnitude flexibility "bracket" the criterion. Explaining further, the Staff opined that the Commission's "less than one in a million" really means that a showing of as much as "5 x 10-6" would still pass muster. See Tr. at 3003-06 (Turk); Tr. at 8914 (Campe). In other words, the Staff's view is that an accident scenario with a probability as high as "one in two hundred thousand" would pass a test that seems to demand "less than one in a million," [FN97] which itself was a (legitimate) markdown (see pp. 86-87, above) from "less than one in ten million."

While there may well be uncertainty in the accuracy of the various estimates now before us for the four factors (see Subpart C, above), we find that uncertainty not troublesome if the formula is utilized as it apparently was intended, i.e., as a rough screening device (see Tr. at 4127-28 (Campe)). [FN98] Indeed, this view is fully in keeping with the thinking of the authors of the formula, at least as expressed in nonadversarial circumstances at the time of the formula's creation and embodiment in the Standard Review Plan. [FN99] At that point, they indicated that use of the NUREG-0800 four-factor formula "gives a conservative upper bound ***134** on aircraft impact probability if care is taken in using values for the individual factors that are meaningful and conservative." NUREG-0800 at 3.5.1.6-4 (§ III.2, emphasis added).

As we read that text, it indicates clearly that the formula was intended to be applied cautiously. [FN100] Yet, reformulating the acceptance criterion in the Staff-proposed manner would amount to overriding the conservatism that apparently was deliberately built into the formula. [FN101] We thus disagree with the Staff that in the face of such analytical uncertainty we should create, and rely upon, an order-of-magnitude confidence interval bracketing or surrounding the acceptance criterion. [FN102] This is particularly true in this instance, given that NUREG-0800 places special focus on "military training routes," and precludes any waivers of full examination if such routes are "associated with a usage greater than 1000 flights per year" (§ II.1(b)). Here, there are multiple thousands of flights.

In the end, this illustrates the wisdom of using the classic NUREG-0800 formula only to the degree to which it was intended. As we see it, and as the Staff's Dr. Campe described it during the trial (Tr. at 4126-28 (Campe)), the formula provides an excellent screening device for those concerned about unlikely accidents. That is, even when the values for the formula's four factors are imprecise, the calculation might produce a result not close to the governing criterion. In that circumstance, the formula will have told its user with a reasonable amount of confidence either that (1) the accident being inquired about has so little likelihood of occurring that no further thought need be given it; [FN103] or (2) that it has so great a likelihood of occurring that the proposed site may be unsuitable. [FN104]

46 In sum, it comes down to this: the one-in-a-million "credible accidents" criterion derives from the NRC's site suitability regulations. The Applicant ***135 selected this site in full knowledge that it was under a busy military training airway. Rather than stretch the one-in-a-million criterion to let the Applicant move forward, the appropriate course is to let that criterion and the screening formula serve their purpose -- that of alerting the Applicant and the Staff to a problem so that the Applicant has the opportunity to address it. [FN105] If, instead, all that happened was to stretch the criterion as the Staff argues -- or to alter the basic formulaic result through hypotheses not borne out by the facts as the Applicant proposes -- the result would be to look away from, rather than to look more closely at, an identified problem.

In this instance, the Applicant needs to take the next step and address the "consequences" issue (see Subpart E, below), either by demonstrating that an F- 16 would not penetrate a cask (either as now designed or as it might be hardened), or that, even if it did, there would be no significant radiation impact for the public. [FN106] If the Applicant can make either of those showings, [FN107] the NUREG-0800 formula and the "credible accidents" standard will have served their purpose of ensuring that the thousands of military overflights neither render the site unsuitable nor threaten to unleash any significant consequences.

E. Accident Consequences.

We indicated earlier in this decision that we had rejected from consideration in the 2002 hearings certain testimony the Applicant had proffered on the "consequences" ***136** issue. Because that issue may now prove crucial to the eventual outcome of this proceeding, we think it appropriate to provide an explanation of why that testimony was not then entertained, but similar testimony may well now be.

Under the Commission's site evaluation regulations (covering nuclear reactors and adapted for spent fuel storage facilities), an applicant must show that if a credible accident were to occur, the consequences would not result in the release of radioactivity that would cause doses in excess of 10 C.F.R. Part 100 guidelines. See 10 C.F.R. §§72.90, 72.94, 72.98, 110.10; NUREG-0800 at 3.5.1.6- 2; Campe/Ghosh Post Tr. 4078, at 4-6. As a legal matter, then, the ultimate focus is on a unified question, i.e., the probability of an accident that would lead to radiation doses beyond Part 100.

As a practical matter, however, the regulatory focus and approach often turn out not to be on that unified question but on one of two separate, subsidiary issues, either of which can be determinative in particular circumstances. Specifically, if it can be shown that the likelihood of the triggering accident is so low that the accident can be discounted as not credible, there is no need for an inquiry into whether the radiation dose consequences would be excessive if the accident were to occur. [FN108] At other times, the opposite approach is taken -- an applicant will assume the accident would occur, but will attempt to demonstrate that even if the event happens there would be no dose consequences. Usually, this would be because the facility's "design basis" is shown to be such that it can withstand the postulated accident, or mitigate it adequately. [FN109]

****47** Throughout this proceeding, in the pleadings and in Commission and Licensing Board decisions, there was great emphasis on, and full development of, the "probability" issue, involving the likelihood of an aircraft accidentally striking the facility. On the other hand, the "consequences" issue -- that of excess dose -- emerged not only belatedly, but also obliquely and scantily, in the State's and Applicant's proffered pretrial testimony in the form of discussions about the likelihood of cask penetration. [FN110] For related reasons which will be seen, the Staff proffered no testimony on the subject.

***137** The validity of the State's proffered testimony was put into play 2 weeks before trial in the form of the Applicant's and the Staff's motions in limine to have that testimony excluded on legal grounds. [FN111] For its part, the Applicant called our attention to what it perceived as a

problem about the scope of this evidence by urging us to exclude the State's proposed testimony on one aspect of the cask penetration issue, [FN112] In this regard, at oral argument Applicant's counsel confirmed the Board's assumption that, in the belief the accidents under scrutiny had less than a one in a million likelihood of occurring, the PFS application had in effect represented to the Staff "don't worry about the military accidents ... we don't have to design against" them. Tr. at 2986 (Farrar). Counsel indicated that the radiological dose consequences issue was not within the confines of our proceeding and assured us that Applicant would not attempt to litigate that issue. Tr. 2986-87, 2990-91, 2995- 96 (Barnett). Instead, as Applicant's counsel explained and its testimony stated, [FN113] its limited "cask penetration" testimony was offered merely to demonstrate the overall conservative nature of its accident probability calculations. Tr. 2986-87, 2988 (Barnett). [FN114] See also proffered Johns Testimony, A7, last sentence; proffered Cole/Jefferson/Fly Testimony, A163, at 112.

For similar reasons, the Staff urged an even broader exclusion of the State's testimony, reaching another aspect of the cask penetration issue. Staff Motion § 4. This position was in harmony with the fact that the Staff had proffered no testimony whatsoever on the cask penetration and dose consequences matter; its counsel explained that the Staff had taken that approach "because we believe that [given] the probability it does not have to be addressed." Tr. at 2983 (Marco) (emphasis added).

***138** This explanation was repeated a few minutes later, when Staff counsel explained that because the Staff "conservatively assume[s] that the impact of the plane will result in [excessive] consequences," it "doesn't get to" the consequences issue and instead "start[s] by looking to see what is the probability of occurrence." Tr. at 2998 (Turk). This was in keeping with the Staff's testimony, indicating that, in practice, only the annual probability of occurrence of an aircraft crash is calculated, as if a conservative assumption was made that the crash would cause the Part 100 guidelines to be exceeded. Campe/Ghosh Post Tr. 4078, at 6. In other words, the Staff proceeds initially as if the probability of exceedance is 1. Id.

****48** Notwithstanding its position, the Staff did not take directly parallel action against the Applicant in that it did not formally challenge, by way of a separate motion, the Applicant's testimony on one of the same subjects on which it had challenged the State. The Staff did, however, present an understated challenge by noting in its motion to exclude the State's testimony that, if that testimony were indeed to be excluded, fairness would dictate that the Applicant's proposed testimony on "cask penetration" should be excluded as well. Staff's Motion in Limine (Mar. 25, 2002) at 5 n.4.

For its part, the State was willing to let all the testimony on this subject remain, pointing out that its position that -- "consequences" could be a legitimate part of the case -- was founded, in part, on a ruling of our predecessor Board on an earlier motion for summary disposition. [FN115] But the State, like the Staff, noted the obvious, i.e., that if the State's testimony on the "consequences" issue were to be excluded, so should be the Applicant's (Tr. at 2992 (Soper)). [FN116]

That earlier Board ruling does bear on the issue. The Applicant had then urged, as did the Staff in its support of the Applicant's motion, that in light of the low probability of an aircraft crash accident, "such accidents are not credible and hence the [facility] need not be designed to withstand their effects." [FN117] Disagreeing, our predecessor Board, chaired by Judge

Bollwerk, made it clear ***139** that there remained room in the proceeding for that issue, and refused to rule it out at that point. [FN118]

But even though the door had thus been left open for "consequences" to become part of the case, by the time we came to make our ruling on the Applicant's and Staff's in limine motions, we concluded that door had since been shut, at least for purposes of the mid-2002 hearing. [FN119] Because our ruling there (Tr. at 3008-(Farrar)), referring to the "way the contention was framed," was rendered in extremely shorthand fashion in light of the lengthy argument and the other matters still to be addressed at the time, at this juncture we think it worth providing a further explanation of our reasoning.

In short, although the question of accident consequences was touched on from time to time prior to the hearing, [FN120] we concluded the issue had not generally been framed with the focus or quantification that would have allowed at the hearing a considered, precise decision on the likelihood either of cask penetration or of exceeding Part 100 dose levels. [FN121] This lack of focus or quantification was apparent in two respects.

1. The first involved the absence of Staff review of, or a position on, the matter. Whatever may have transpired between the Applicant and Staff during the lengthy application review process, [FN122] on this subject the Staff did not put forward ***140** its own analysis, either in the Safety Evaluation Report (SER) it produced or in the testimony it proffered to us. See SER; Campe/Ghosh Post Tr. 4078.

****49** As a result, we were reluctant to undertake to decide an issue of such potential significance without the benefit of any formal review of it (or presentation of evidence on it) by the Staff. To be sure, the Staff's conclusions based on its safety and environmental reviews -- whether contained in the SER and FEIS documents, [FN123] or reflected in witness testimony -- are ultimately subject to the same testing in the hearing as those of any other party, and are not given by virtue of their source any more importance than that of any other party. [FN124] But under the Commission's time-tested licensing and hearing processes, the Staff's evaluation of an applicant's proposal -- reached as it conducts its independent review of the application -- is considered an integral part of the record that is developed regarding any contentions challenging what an applicant has put forward. [FN125] Even though the Staff's position may not prevail at trial, it is presumed ***141** that the development and exploration of a contested issue will benefit from the Staff's analysis and presentation.

2. Additionally, a serious question existed in this instance about whether a comprehensive record on consequences could have been developed, based upon the prefiled testimony offered just before the hearing, that would have allowed us to make an informed decision. As we have just emphasized, the Staff put forward no proposed testimony on either penetration or consequences. The State's proposed testimony simply presented limited material on consequences to illustrate that the accident in question, if it occurred, was a matter significant enough to devote attention to. Nor was the Applicant's prefiled testimony at all extensive. [FN126] Rather, the Applicant sought to present limited material on consequences simply to add conservatism to its incredibility calculations, i.e., to reassure the public and the decisionmakers that not only was the accident so unlikely that it need not be guarded against, but that any lingering doubts in that regard could be safely disregarded because of the asserted lack of consequences. [FN127]

Having sufficient other reason to exclude the testimony, we were pointed in the same direction by the just-described paucity of it. As we listened to the April 8 oral arguments, it became clear that -- because of the pendency of the "probability" issue that could moot the need to consider "consequences" -- that latter matter had not been fully developed and certainly appeared not ripe for trial. [FN128] No party asked us to reconsider our ruling setting the issue aside.

That was the situation on the eve of the evidentiary hearing in Salt Lake. That situation has now changed, with our ruling today indicating that -- in connection with the significant presence of F-16 military aircraft in Skull Valley airspace -- ***142** the Applicant has failed to demonstrate that its proposed facility will meet the applicable cumulative probability acceptance criterion regarding aircraft crashing at or affecting that facility. In light of that ruling, the door is now again open [FN129] -- at the Applicant's option -- for a "consequences" presentation, [FN130] which might include cask penetration and radiation dose issues. In that connection, at the appropriate juncture (see note 130, above), the State will have the opportunity to continue to participate (see inquiry from State counsel, Tr. at 3007 (Soper)). [FN131]

****50** The question remains as to how further consideration of this issue should proceed. On the one hand, given that all we have held thus far is that the Applicant's F-16 crash probability showing was inadequate to meet the Commission-endorsed acceptance criterion, it is clear that our decision does not foreclose the Applicant from eventually obtaining a license; further proceedings before us on the consequences issue may thus well be in the offing.

On the other hand, the Applicant may want to seek early Commission review of our decision on the probability issue. Certainly, the steps likely needed to make the necessary further showing on the consequences issue -- such as assembling a revised licensing presentation, undergoing Staff review, and participating in possible prehearing and hearing proceedings before this Board -- will take some period of time. Thus, even if the Applicant believes it can prevail regarding a further consequences showing, it nonetheless may want to seek reversal of our decision that its showing on the aircraft crash probability issue fell short.

Conscious of the Commission's instructions that we should adopt case- management techniques that will help move licensing proceedings along as expeditiously as possible, [FN132] allowing the Applicant to proceed on parallel tracks before us and before the Commission -- rather than forcing it to proceed sequentially -- seems likely to best achieve that objective. Indeed, NRC precedent supports just such an approach.

Specifically, in the Byron reactor operating license proceeding, the Appeal Board was called upon to consider a Licensing Board decision concluding that, notwithstanding the possibility the applicant might be able to make a further showing that would support a license, the applicant's initial failure to make its case mandated a final decision denying the license. In reversing that decision, the Appeal Board indicated that the Licensing Board should have retained jurisdiction for the receipt of further evidence, without prejudice to the applicant ***143** seeking "discretionary appellate review of the [Licensing] Board's appraisal of the existing" record. Commonwealth Edison Co. (Byron Nuclear Power Station, Units 1 and 2), ALAB-770, 19 NRC 1163, 1169-70 (1984). [FN133]

In the situation before us, there may be some question about whether today's decision is now appealable as of right, since it may or may not be deemed to dispose finally of a "significant

portion of the case." [FN134] Given the significance of our ruling here, and the fact it builds upon a previous Commission determination dealing with this subject, we perceive no reason to put upon the parties the burden of coming before us to debate whether we should refer our ruling to the Commission for its review (and, if we declined, of then asking the Commission to direct us to refer our ruling). Accordingly, pursuant to 10 C.F.R. § 2.730(f), we are referring today's ruling to the Commission for immediate review. [FN135] Of course, whether such review should indeed be undertaken is for the Commission to decide. 10 C.F.R. § 2.786(g).

****51** Although appellate proceedings ordinarily deprive a lower tribunal of jurisdiction over the substance of the matter that was before it, we perceive no fundamental inconsistency between (1) the Commission's conducting a referred ***144** review of the accident probability matters we have decided today, and (2) our simultaneously undertaking consideration of the matter of accident consequences (which we have explained is, as a practical if not a legal matter, a separate issue). Certainly, following such a course appears to be what the Appeal Board in Byron had in mind.

Accordingly, we will take that approach (unless the Commission directs us otherwise). To that end, we request that within 20 days of the issuance of this decision, the Applicant, the State (as the Lead Intervenor on the contention that is the focal point of our ruling today), and the NRC Staff provide us with a report that outlines their views, either jointly or separately, as to how they wish to proceed on the matter of accident consequences relative to Skull Valley F-16 aircraft crashes.

II. DETAILED ANALYSIS OF RECORD AND FINDINGS OF FACT

In this part of our decision, we provide the detail that underlies the reasoning expressed in the "Narrative" first part. This "Detailed" Part II contains three subparts, each with its own Table of Contents. Each of the three Subparts is, however, constructed somewhat differently.

The first, Subpart A, beginning on page 145, simply presents the background and contextual matters that set the stage for the major issues covered in the second and third subparts. Most of what it covers was essentially noncontroversial.

As will be explained in the opening of Subpart B (see p. 160), which deals with the proposed "R" factor, most of that subpart consists of a detailed analysis of the evidentiary record. We take that approach because our ultimate finding there (rejecting the Applicant's 95% "pilot avoidance" theory) is based less on disagreement with the individual factual threads the Applicant wove into its argument than with our determination -- based on our view of the impact of the State's countering evidence as a whole -- that the Applicant's proposals about the existence of the conditions necessary for success do not provide the appropriate framework for deciding the matter. Instead, we find in essence that those conditions are not sufficient for success, given the evidence of human error, under stress, leading to failure.

We take a more traditional approach in Subpart C (see p. 202). There, we do make the more customary "findings of fact" on the various disputed matters concerning the application of the four-factor formula not only as to the main issue -- the risk from F-16 flights down Skull Valley -- but also as to the other potential aircraft and ordnance hazards to the facility.

Beyond what is expressed in this Part II, we have carefully considered all of the other arguments, claims, and proposed findings of the parties relative to the matters in dispute. To the extent those party positions are not specifically ***145** addressed herein, it is either because we find them immaterial, without merit, and/or unnecessary to this decision, or because they are subsumed in the rulings we do make.

A. Introduction and Summary

1. Procedural Background

A.1 In ruling initially on the admissibility of contentions, the Board was faced with several Petitioners having presented similar issue statements. Accordingly, the Board prepared "Contention Utah K/Confederated Tribes B" to consolidate the elements of the separately filed "credible accident" contentions. That new contention read:

CONTENTION: The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the ISFSI and the intermodal transfer site, including the cumulative effects of the nearby hazardous waste and military testing facilities in the vicinity and the effects of wildfires.

LBP-98-7, 47 NRC 142, 253, recons. granted in part and denied in part on other grounds, LBP-98-10, 47 NRC 288, aff'd on other grounds, CLI-98-13, 48 NRC 26 (1998).

A.2 As required by the Commission's rules in 10 C.F.R. § 2.714(b), several "bases" in support of the contention were submitted by the Petitioners. In admitting the contention, however, the Board limited the contention's scope to the following matters: (1) the impact upon the facility from (a) accidents involving materials or activities at or originating from the Tekoi Rocket Engine Test Facility, the Salt Lake City International Airport, Dugway Proving Ground (including the Michael Army Airfield), Hill Air Force Base, and the Utah Test and Training Range, and (b) wildfires occurring in Skull Valley; and (2) the impact upon the Applicant's Rowley Junction Intermodal Transfer Point (ITP) of activities or materials from the aforementioned facilities, as well as hazardous materials ***146** from other facilities in the area. LBP-98-7, 47 NRC at 190-91, 214, 234-35, 247-48. [FN136]

A.3 Following the Board rulings on admissibility of contentions, the parties proceeded with discovery on the remaining issues. On June 7, 1999, the Applicant filed a motion for partial summary disposition of Contention Utah K/Confederated Tribes B, arguing that there was no genuine dispute of fact as to those portions of the contention relating to hazards posed by Tekoi; wildfires; the testing and storage of biological, chemical, and hazardous materials at Dugway; ordnance disposal and unexploded ordnance on Dugway; landings at Michael AAF of aircraft carrying "hung bombs"; and the X-33 experimental space plane. [FN137]

A.4 The Board granted in part, denied in part, and deferred in part the Applicant's motion. See LBP-99-35, 50 NRC 180, recons. denied, LBP-99-39, 50 NRC 232 (1999). In light of its ruling, the Board then rewrote the contention to read:

CONTENTION: The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the ISFSI, including the cumulative effects of military testing facilities in the vicinity.

****53** LBP-99-39, 50 NRC at 240. In a subsequent ruling clarifying LBP-99-35, the Board dismissed those portions of contention Utah K/Confederated Tribes B relating to the ITP. LBP-99-39, 50 NRC at 236-38; See LBP-99-34, 50 NRC 168 (1999).

A.5 In 2001, pursuant to another Applicant summary disposition motion, the Board dismissed issues pertaining to ordnance usage at Dugway and cruise missile testing on the UTTR. LBP-01-19, 53 NRC at 422-29. As discussed below, in the same order the Board further defined the scope of the issues concerning hazards posed by aviation activities in and around Skull Valley and resolved specific issues concerning all the civilian aviation hazards and some of the military aviation hazards.

A.6 In analyzing aviation-related hazards, the Applicant prepared a comprehensive report on the aviation activities in the vicinity of the site and the specific hazards each activity posed to the facility. See PFS Exh. N, Aircraft Crash Impact Hazard at the Private Fuel Storage Facility (Rev. 4) (Aug. 10, 2000) [hereinafter ***147** Aircraft Crash Report]. The report was prepared principally by Brigadier General James L. Cole, Jr., USAF (Ret.), Major General Wayne O. Jefferson, Jr., USAF (Ret.), and Colonel Ronald E. Fly, USAF (Ret.), who served as expert consultants to the Applicant on military and civilian aviation and who eventually testified as witnesses for the Applicant in this proceeding. Their analysis drew upon their broad experience and professional judgment, and incorporated extensive information obtained from the U.S. Air Force.

A.7 The report first assessed the scope of the military and civilian activities in the vicinity of the Applicant's site. It then assessed the aviation traffic associated with each activity and calculated the crash impact probability at the facility for each activity. In calculating the crash impact probabilities, the report determined specific crash rates for each type of aviation activity and accounted for the specific locations and volume of aviation traffic relative to the Applicant's site.

A.8 In assessing the hazard posed by potential F-16 crashes, the report assessed in depth the ability of a pilot to direct a crashing aircraft away from the facility before it struck the ground. That assessment was based on (1) analysis by General Cole, General Jefferson, and Colonel Fly of all of the available Air Force aircraft accident reports concerning F-16 crashes over the 10-year period from Fiscal Year (FY) 1989 to FY 1998 and (2) their professional judgment

regarding the ability of F-16 pilots to respond to in-flight emergencies. In the end, the report assessed the cumulative hazard to the proposed facility and concluded that the crash and jettisoned ordnance impact probability was less than 4.17 x 10-7 per year.

A.9 That report, as amended, played a principal role when the remaining issues were litigated in a hearing that began on April 9, 2002, and continued intermittently (along with other unrelated contentions) through July 3, 2002. These issues -- all tied to the "inadequate consideration of credible accidents" contention -- included: (1) F-16s transiting Skull Valley, including the problems of both aircraft crashes and jettisoned ordnance; (2) aircraft flying on the Moser Recovery Route (MRR); (3) aircraft flying to and from Michael Army Airfield (MAAF) on the flight path designated as IR-420; (4) aircraft conducting air-to air combat training on the UTTR; (5) impact from jettisoned ordnance; and (6) the cumulative hazard to the Applicant's facility from aircraft accidents and ordnance.

****54** A.10 In accordance with timelines we established, the parties submitted prefiled testimony, presented other evidence relevant to their respective positions, and filed extensive post-hearing briefs. Our findings of fact and conclusions of law regarding the credible accidents contention are based upon our review and analysis of all those materials.

***148** 2. Legal Standards

A.11 The Commission has established criteria for evaluating those characteristics of a proposed site that may directly affect the safety of an ISFSI to be located there. As set forth in 10 C.F.R. Part 72, Subpart E, §§ 72.90, 72.94, and 72.98, proposed sites must be examined with respect to, among other things, the frequency and severity of naturally occurring and man-induced external events that could affect the facility's safe operation, and the existence of manmade facilities and activities that might endanger the proposed facility or affect the facility design.

A.12 The regulations further provide that "design basis" external events must be determined with respect to a proposed facility's site and design. 10 C.F.R. § 72.90(c). Design bases are defined, in 10 C.F.R. § 72.3, in pertinent part, as follows:

§ 72.3 Definitions

....

Design bases means that information that identifies the specific functions to be performed by a structure, system, or component of a facility or of a spent fuel storage cask and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be restraints derived from generally accepted state-of-the-art practices for achieving functional goals or requirements derived from analysis (based on calculation or experiments) of the effects of a postulated event under which a structure, system, or component must meet its functional goals. The values for controlling parameters for external events include --

....

(2) Estimates of severe external man-induced events to be used for deriving design bases that will be based on analysis of human activity in the region, taking into account the site characteristics and the risks associated with the event.

A.13 In accordance with 10 C.F.R. § 72.24, an application for an ISFSI under Part 72 must include a Safety Analysis Report (SAR) describing the proposed facility, which must contain, among other things, "[a] description and safety assessment of the site on which the ISFSI ... is to be located, with appropriate attention to the design bases for external events," 10 C.F.R. § 72.24(a) as well as information concerning the facility's design, including identification of the design criteria, design bases, and "the relation of the design bases to the design criteria." 10 C.F.R. § 72.24(c)(2). Further, the design and performance of structures, systems, and components (SSCs) important to safety must be analyzed for those events that are considered to be within the design for the facility, including consideration of "[t]he adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of ***149** the consequences of accidents, including ... manmade phenomena and events." 10 C.F.R. § 72.24(d)(2).

****55** A.14 The Commission has established "General Design Criteria" for an ISFSI, as set forth in 10 C.F.R. Part 72, Subpart F. Pursuant to 10 C.F.R. § 72.120(a), an application to store spent fuel in an ISFSI "must include the design criteria for the proposed storage installation," which "establish the design, fabrication, construction, testing, maintenance and performance requirements for structures, systems, and components important to safety as defined in § 72.3."

A.15 Minimum requirements for an ISFSI's design criteria include, among other things, "[p]rotection against environmental conditions and natural phenomena," 10 C.F.R. § 72.122(b), whereby SSCs "must be designed to accommodate the effects of, and to be compatible with, site characteristics and environmental conditions associated with normal operation, maintenance, and testing of the ISFSI ... and to withstand postulated accidents," 10 C.F.R. § 72.122(b)(1) (emphasis added). Events that do not constitute credible accidents need not be included within the design bases of the facility. See CLI-01-22, 54 NRC at 259. As noted above, the Commission specifically approved the use of a 1 x 10-6 annual probability of occurrence standard for design-basis accidents for away-from-reactor ISFSIs. CLI-01-22, 54 NRC at 263.

A.16 In practice, only the annual probability of occurrence of an aircraft crash is calculated, as if a conservative assumption was made that the crash would cause the Part 100 guidelines to be exceeded. Campe/Ghosh Post Tr. 4078, at 6. In other words, the Staff proceeds initially as if the probability of exceedance is 1. Id.

3. Testimony Presented

A.17 Prefiled written testimony concerning Contention Utah K/Confederated Tribes B was submitted by the Applicant, the NRC Staff, and the State of Utah. The Applicant's witnesses appeared first, followed by the Staff's witnesses, with the State's witnesses testifying last.

A.18 The Applicant submitted three sets of prefiled testimony, which consisted of the testimony

of a total of five witnesses. The witnesses presented in the Applicant's first set of prefiled testimony were: (1) Wayne O. Jefferson, Jr., a retired U.S. Air Force Major General, who assisted the Applicant with the quantitative calculations and modeling the Applicant performed concerning the probability that a crashing aircraft would impact the facility as well as with the review of relevant F-16 accident reports; (2) James L. Cole, Jr., a retired U.S. Air Force Brigadier General, who assisted the Applicant with the assessment of the aircraft crash hazard to the facility, and whose primary focus pertained to overall aviation safety, general Air Force issues, and certain F-16 operations; and (3) Ronald E. Fly, a retired U.S. Air Force Colonel, who assisted the Applicant in ***150** its assessment of the risk to the facility posed by aircraft crashes and ordnance impacts, and whose primary focus was F-16 operations, F-16 emergency procedures, and flight operations in and around the UTTR. "Testimony of James L. Cole, Jr., Wayne O. Jefferson, Jr., and Ronald E. Fly on Aircraft Crash Hazards at the Facility -- Contention Utah K/Confederated Tribes B" [hereinafter Cole/Jefferson/Fly] Post Tr. 3061, at 1-7.

****56** A.19 Applicant witness Wayne Jefferson retired from the Air Force in 1989 with the rank of Major General. He served in the Air Force for over 30 years and has accumulated 4450 flying hours in nine different types of aircraft. General Jefferson served as a B-52 wing commander with the Strategic Air Command and has held other positions of responsibility with the Strategic Air Command. For example, in 1983-1984, he was Assistant Deputy Chief of Staff for Operations, overseeing the entire scope of the Strategic Air Command's worldwide bomber, tanker, missile, and reconnaissance operations, including training-range development and flight operations. In addition, General Jefferson has been formally trained by the Air Force to serve as an Accident Board president, including management of the investigating team, preservation of the crash site, working with law enforcement officials, and interviewing participants and witnesses.

A.20 Since retiring from the Air Force, General Jefferson has been a consultant in management, management training, and quantitative probabilistic analysis. He holds a master's degree in operations research from Stanford University and a master's degree in business administration from Auburn University. Cole/Jefferson/Fly Post Tr. 3061, at 4-5; Jefferson Qualifications at 1.

A.21 General Jefferson has never flown an F-16 fighter aircraft, has never flown through Skull Valley, and has never ejected from any aircraft. Tr. at 3189, 3216 (Jefferson). General Jefferson performed all crash probability calculations for the Applicant. Tr. at 3187 (Cole), 3189 (Jefferson). General Jefferson has no prior experience using NRC guidance document NUREG-0800 nor prior experience in using the DOE Standard for aircraft crash analysis, DOE-STD-3014-96. Tr. at 3193, 3699 (Jefferson).

A.22 We find General Jefferson to be qualified as an expert witness on the subjects of U.S. Air Force aircraft operations, weapons testing and training operations, and probabilistic analysis.

A.23 Applicant witness James Cole retired from the Air Force in 1994 with the rank of Brigadier General. Over his career, he accumulated 6500 total flying hours in seven different types of aircraft, with 3000 flying hours in heavy jet aircraft. General Cole served as Chief of Safety of the U.S. Air Force from 1991 to 1994 and in that capacity directed the entire Air Force safety program. He was responsible for accident prevention and investigation in all aspects of ground and air operations and personally reviewed and approved every Air Force Accident

Safety Investigation report for all types of aircraft. ***151** General Cole was also commander of the 89th Airlift Wing, where he directed transportation for the President of the United States and other senior government officials and foreign dignitaries. He has served as a pilot flight commander, chief pilot, assistant operations officer, operations officer, and squadron commander of a C-141 heavy jet transport squadron. General Cole flew airdrop missions, special operations low-level missions, night-vision-goggle missions, including clandestine approaches to airfields and blackout landings. Cole/Jefferson/Fly Post Tr. 3061, at 1-2; Cole Qualifications at 1-2.

****57** A.24 General Cole has never flown in an F-16 fighter aircraft, has never flown through Skull Valley, and has never ejected from any aircraft. Tr. at 3142, 3158-60 (Cole). General Cole has not previously done a crash impact evaluation or performed a study on the issue of whether an F-16 pilot would be able to avoid a ground site. Tr. at 3156, 3157 (Cole).

A.25 We find General Cole qualified as an expert witness on the subjects of military aircraft operations and aviation safety matters.

A.26 Colonel Fly, who has piloted but never ejected from an F-16, retired from the Air Force in 1998. Cole/Jefferson/Fly Post Tr. 3061, at 6; Tr. at 3125, 3217 (Fly). He served in the Air Force for 24 years as an F-16 pilot, instructor, fighter squadron commander, operations group commander, and wing commander. Cole/Jefferson/Fly Post Tr. 3061, at 1-2. Colonel Fly has approximately 1200 flying hours in the F-16 as a pilot and instructor. Colonel Fly served as Commander of the 388th Fighter Wing at Hill AFB from 1997 to 1998 and has flown F-16s on the UTTR and through Skull Valley. Id. He was also Commander of the UTTR when the range was transferred to the 388th Fighter Wing in 1997. Id. Colonel Fly routinely reviewed accident reports as a pilot and has experience in strategic planning, operational analysis, international affairs, space operations, and logistical support. Id. He is specifically knowledgeable about the operations of military and civilian aircraft that fly in and around Skull Valley, Utah, including military aircraft that fly from Hill AFB and on the UTTR. Id. at 6; Fly Qualifications at 1-2.

A.27 We find Colonel Fly to be qualified as an expert witness on the subjects of U.S. Air Force F-16 aircraft operations and training operations, including operations at Hill AFB.

A.28 The Applicant also presented prefiled testimony of two other individuals. They were: (1) Stephen A. Vigeant, a Certified Consulting Meteorologist employed as a Lead Environmental Scientist by Stone & Webster, Inc., who obtained and evaluated information regarding the weather in the region of the Applicant's facility to support an analysis of the impact of weather on aviation activities in the region; and (2) Jeffrey R. Johns, a Licensing Engineer employed by Stone & Webster, Inc., who was responsible for the preparation of the Applicant's Safety Analysis Report pertaining to accident analyses and radiation protection for the proposed facility. "Testimony of Stephen A. Vigeant on Aircraft Crash ***152** Hazards at the PFSF -- Contention UtahK/Confederated Tribes B" [hereinafter Vigeant], Post Tr. 3090, at 1-2; "Testimony of Jeffrey Johns on Aircraft Crash Hazards at the PFSF -- Contention Utah K/Confederated Tribes B" [hereinafter Johns]; Post Tr. 3205, at 1-2. By stipulation of the parties, Mr. Johns' testimony was accepted into evidence without cross-examination. Tr. 3204-07 (Johns).

A.29 Applicant witness Stephen Vigeant received a Bachelor of Science degree from Lowell Technological Institute in meteorology and a Master's degree in meteorology from Pennsylvania

State University. Vigeant Post Tr. 3090, at 1; Vigeant Qualifications at 2. Mr. Vigeant has been involved in meteorological aspects of nuclear power plant licensing and environmental impact assessment and licensing for more than 20 years. He has provided consulting services in the areas of climatological analyses, meteorological monitoring, meteorological field studies, and design-basis meteorological investigations. Vigeant Qualifications at 1. However, he is not a pilot, has, not flown through Skull Valley, and has not studied the extent to which a pilot can see under various cloud conditions and altitudes. He provided only meteorological data. Tr. at 4047-50 (Vigeant).

**58 A.30 We find Mr. Vigeant to be qualified as an expert witness on the subject of meteorology.

A.31 Applicant witness Jeffrey Johns received a Bachelor of Science degree from Stanford University in Biological Sciences. Johns Qualifications at 2. Mr. Johns has over 20 years of experience in the nuclear power industry and 10 years of experience with the licensing of ISFSIs. Johns Post Tr. 3205, at 1; Johns Qualifications at 1. He has experience in accident analyses for ISFSIs and was responsible for preparation of portions of the Applicant's Safety Analysis Report. Johns Post Tr. 3205, at 1-2. As a Licensing Engineer for the PFS project, Mr. Johns is familiar with the shielding design provisions of the HI-STORM 100 storage system, confinement design provisions of the canister, and the protection afforded the canister by the HI-STORM 100 storage overpack from postulated events such as tornado-driven missiles and explosions. Id. at 1.

A.32 We find Mr. Johns to be qualified as an expert witness on the subject of the susceptibility of the Applicant's facility design to overpressure produced by an explosion.

A.33 In addition to the above witnesses who prefiled their testimony, the Applicant presented Michael Cosby, who testified individually by telephone regarding his experience as a pilot who had ejected from an F-16. Tr. at 3977- 4031 (Cosby). Michael Cosby is an active-duty Colonel in the U.S. Air Force and is presently stationed with the 177th Fighter Wing in Atlantic City, New Jersey. Colonel Cosby is the operations group commander for the Fighter Wing and has been in that position for 3 years. Tr. at 3985 (Cosby). He has over 2500 flight hours in the F-16, with a total of 8900 flight hours in various aircraft. Tr. at 3986 (Cosby). Colonel Cosby has been an F-16 pilot during his entire career in the Air Force and has served as a functional check flight pilot, a four-ship flight lead, *153 and an instructor pilot. Tr. at 3982, 3984, 3985 (Cosby). He flew 78 combat missions during Desert Storm and flew over 308 combat sorties during Operation Northern Watch and Operation Southern Watch. Tr. at 3984 (Cosby). Colonel Cosby ejected from an F-16 on April 21, 1993. Tr. at 3978-82 (Cosby).

A.34 We find Colonel Cosby to be qualified as an expert witness on F-16 operations, including ejection therefrom.

A.35 The Staff presented a panel of two witnesses concerning this contention. They were: (1) Kazimieras M. Campe, a Senior Reactor Engineer in the Probabilistic Safety Assessment Branch, Division of Systems Safety and Analysis, NRC Office of Nuclear Reactor Regulation, who reviewed the Applicant's Safety Analysis Report (SAR) pertaining to external hazards and participated in the Staff's preparation of the SER; and (2) Amitava Ghosh, a Principal Engineer at the Center for Nuclear Waste Regulatory Analyses, a federally funded research and development center, which is a division of Southwest Research Institute, in San Antonio, Texas.

"NRC Staff Testimony of Kazimieras M. Campe and Amitava Ghosh Concerning Contention Utah K/Confederated Tribes B (Inadequate Consideration of Credible Accidents)" [hereinafter Campe/Ghosh], Post Tr. 4078, at 1-3; see Staff Exh. C [hereinafter SER]. Dr. Ghosh also reviewed the Applicant's SAR pertaining to external hazards and participated in the preparation of the Staff's SER. Campe/Ghosh Post Tr. 4078, at 1-3; see SER.

****59** A.36 Staff witness Kazimieras Campe has 30 years' experience in the NRC (and its predecessor, the Atomic Energy Commission) assessing the risk posed by external manmade hazards with respect to nuclear facilities. Campe/Ghosh Post Tr. 4078, at 1; Campe Qualifications at 1. "As far as looking at the issue of aircraft hazards, along with all other site related hazards," he has "looked at almost every plant in the country." Tr. at 4090; see Tr. at 4122 (Campe).

A.37 Dr. Campe was the principal contributor to the document referred to as NUREG-0800, which contains section 3.5.1.6, "Aircraft Hazards," of the NRC's Standard Review Plan. That document is utilized by the Staff in evaluating aircraft crash hazards at nuclear power reactors and other facilities. Campe/Ghosh Post Tr. 4078, at 6. He currently conducts safety reviews of risks posed to nuclear facilities by external manmade hazards, such as aircraft activity, as well as risks posed to other modes of transportation (e.g., railroads, highways, navigable waterways, and pipelines). Campe/Ghosh Post Tr. 4078, at 1-2; Campe Qualifications at 1-2. Dr. Campe, however, has no pilot experience. Tr. at 4116 (Campe).

A.38 We find Dr. Campe to be qualified as an expert witness on the subject of the assessment of risk associated with aircraft activity.

A.39 The second Staff witness, Amitava Ghosh, has over 20 years of experience in conducting both academic and industrial research, consulting, and teaching in mining, geological, and geotechnical engineering. Campe/Ghosh Post Tr. 4078, at 2; Ghosh Qualifications at 1. Dr. Ghosh has experience with respect to probabilistic risk assessments and the design of surface and subsurface ***154** facilities. Campe/Ghosh Post Tr. 4078, at 2; Ghosh Qualifications at 1. Dr. Ghosh is currently the technical lead for preclosure activities of the proposed high-level nuclear waste repository at Yucca Mountain and is currently involved with probabilistic risk assessment, identification of hazards and initiating events, and repository design. Campe/Ghosh Post Tr. 4078, at 2; Ghosh Qualifications at 1. Like Dr. Kampe, Dr. Ghosh has no pilot experience. Tr. at 4116 (Ghosh).

A.40 We find Dr. Ghosh to be qualified as an expert witness on the subject of the assessment of risk and the identification and analysis of hazards posed to nuclear waste facilities.

A.41 In support of its contention, the State presented initially the prefiled testimony of two witnesses. They were: (1) Hugh Horstman, a retired U.S. Air Force Lieutenant Colonel, who has been assisting the State with respect to this contention since 2000; and (2) Marvin Resnikoff, a Senior Associate at Radioactive Waste Management Associates in New York, who performed calculations on behalf of the State regarding the probability and consequences of aircraft crashes at the Applicant's proposed facility. "State of Utah's Prefiled Testimony of Lieutenant Colonel Hugh Horstman (U.S.A.F. Retired) Regarding Contention Utah K/Confederated Tribes B" [hereinafter "Horstman"], Post Tr. 4214, at 1-2; "State of Utah's Prefiled Testimony of Dr. Marvin Resnikoff Regarding Contention Utah K/Confederated Tribes B" [hereinafter

"Resnikoff"], Post Tr. 8698, at 1, 4.

**60 A.42 Lt. Colonel Horstman has more than 20 years' experience as a pilot in the U.S. Air Force, including over 2500 hours as a pilot and over 1000 hours as a navigator. Horstman Post Tr. 4214, at 1-2. He has flown over 1800 hours as an F-16 and F-111 fighter pilot. Horstman Post Tr. 4214, at 1-2. He was also an instructor pilot for both the F-16 and F-111 fighter aircraft as well as an instructor navigator. Id.

A.43 From October 1997 through June 1999, Lt. Colonel Horstman was the Deputy Commander of the 388th Operations Group at Utah's Hill Air Force Base. Id. at 1. In this position, he commanded the F-16 Operations Group and 1500 personnel. Id. The Operations Group was responsible for the administration of all 388th Fighter Wing flying activity, including the sorties flown in the Utah Test and Training Range airspace. Id. The Operations Group was also responsible for managing the UTTR airspace and for managing the three fighter squadrons stationed at Hill Air Force Base. Id. In addition, Lt. Colonel Horstman was responsible for the flight line maintenance of all F-16C aircraft assigned to the 388th Fighter Wing. Id.

A.44 Lt. Colonel Horstman has flown over 150 training missions in the UTTR, including air-to-air combat missions, air-to-ground combat missions (e.g., precision ordnance bombing), low-level training missions, targeting pod, and night-vision-goggle missions. Id. at 2. While stationed at Hill AFB he was responsible for planning training missions and instructing F-16 pilots. Id. He *155 flew F-16 training missions as an instructor pilot, as a flight lead, and as a mission commander. Id. In those capacities he was responsible for assessing individual pilot performance on various tasks, including emergency procedures. Id. Lt. Colonel Horstman is intimately familiar with the UTTR land and airspace, including the military operating areas over the area of the Applicant's proposed site. Id. He was not trained to serve on accident investigation boards, having served only once briefly as interim board president. PFS Aircraft Findings at 8; Tr. at 8496-97 (Horstman).

A.45 Lt. Colonel Horstman retired from the Air Force in 1999. Horstman Post Tr. 4214, at 1. Lt. Colonel Horstman continues to fly as a commercial pilot of Boeing 737 jets for Southwest Airlines. Id.

A.46 We find Lt. Colonel Horstman to be qualified as an expert on the subjects of F-16 aircraft and training operations, including those occurring at Hill AFB and in the UTTR. We have considered the Applicant's challenge to his credibility, based on the changing positions Lt. Colonel Horstman took on the Applicant's multilevel categorization of the accident reports. We find the confusion to have been understandable in light of the manner in which the material was presented, and do not find that, or any other reason, sufficient to cast general doubt on Lt. Colonel Horstman's credibility.

**61 A.47 State witness Dr. Marvin Resnikoff is the Senior Associate of Radioactive Waste Management Associates ("RWMA"), a private technical consulting firm based in New York City. Resnikoff Post Tr. 8698, at 2. He holds a doctoral degree in high-energy theoretical physics from the University of Michigan. Id. Dr. Resnikoff has done research on radioactive waste issues for the past 27 years and has extensive experience and training in the field of nuclear waste management, storage, and disposal. Id.

A.48 Dr. Resnikoff has done research on technical issues related to the storage of radioactive waste, including spent nuclear power plant fuel, and is familiar with spent fuel storage systems that are now in use or proposed for future use in the United States. Id. Dr. Resnikoff's experience includes technical review and analysis of numerous dry cask storage designs. Id. Dr. Resnikoff has estimated the probability of accidents regarding air, train, and truck accident rates for the states of New York, Nevada, and Utah. Id. at 3.

A.49 Dr. Resnikoff stated that he has no independent expertise concerning hazards posed by aviation activities to facilities on the ground. PFS Findings at 9; Tr. at 8719-20 (Resnikoff). He has no background in aeronautical engineering or in analyzing the performance of military aircraft. Tr. at 8717- 18 (Resnikoff). Prior to this case, he has not calculated the probability of an aircraft impacting a particular site on the ground. PFS Aircraft Findings at 9; Tr. at 8719-20 (Resnikoff). Likewise, prior to this case, he has not performed studies or work pertaining to the probability of impacts of external events to facilities. Tr. at 8806 (Resnikoff).

***156** A.50 With respect to Dr. Resnikoff's expertise in the field of probability and statistics, he has not had formal training in statistics, although he considers himself a self-taught statistician and has applied elementary statistics in past assignments. Tr. at 8817 (Resnikoff).

A.51 We consider Dr. Resnikoff to be qualified to testify as an expert with respect to the calculations he performed using the NUREG-0800 equation to derive the probability of aircraft crashes at the Applicant's proposed facility and in the general techniques of mathematical analysis.

A.52 The testimony of Colonel Frank Bernard, USAF (Ret.), was also sponsored by the State of Utah. Tr. at 3880 (Bernard). Colonel Bernard's testimony, like that of Colonel Cosby, was not prefiled but was presented in person and was submitted in response to the Board's inquiry as to conflicting testimony regarding pilot ejections.

A.53 Colonel Bernard served in the Air Force from 1967 to 1972, as well as in the Air Force Reserve from 1972 until 1993. Tr. at 3881 (Bernard). During this time, he accumulated approximately 1200 flight hours in the F-16 and approximately 3500 total aircraft flight hours. Tr. at 3881-82 (Bernard). Colonel Bernard has flown the F-105, the D-29, the D-39, and the F-16. Tr. at 3881 (Bernard). He ejected from an aircraft twice in his career: (1) from an F- 105 aircraft that had been damaged in a 1969 midair collision in Southeast Asia, and (2) from an F-16 that suffered an engine failure during a military exercise in Canada in 1986. Tr. at 3882-83, 3888-89 (Bernard). Colonel Bernard is also familiar with Hill AFB because he was stationed there from 1973 until his retirement. Tr. at 3881 (Bernard).

****62** A.54 We find Colonel Bernard to be qualified in the area of F-16 operations, including the ejection experience.

4. Aircraft Operations in Skull Valley

A.55 The Board had before it a comprehensive report on the potential hazards posed to the facility by military aircraft and jettisoned ordnance. The report was submitted as PFS Exhibit N,

Aircraft Crash Impact Hazard at the Private Fuel Storage Facility," Revision 4 (Aug. 10, 2000) [hereinafter Aircraft Crash Report], and PFS Exhibit O, the Revised Addendum to the Aircraft Crash Report [hereinafter Revised Addendum]. The Revised Addendum also contains the Applicant's responses to a series of Requests for Additional Information (RAIs) from the NRC Staff regarding aircraft crash hazards. The report and its addendum were principally prepared by the Applicant's expert witnesses on aviation hazards, Brigadier General James L. Cole, Jr., USAF (Ret.), Major General Wayne O. Jefferson, Jr., USAF (Ret.), and Colonel Ronald E. Fly, USAF (Ret.).

***157** A.56 Aviation activity in the vicinity of the Applicant's site consists of, in addition to civilian commercial and general aviation, military operations associated with the Utah Test and Training Range, an important training range operated by the Department of Defense. See LBP-01-19, 53 NRC at 432; State Exh. 41 [hereinafter UTTR Capabilities Guide]; Horstman Post Tr. 4214, at 4-5. This range and the associated airspace, which is even larger than the ground footprint, are used for aircrew training and weapons testing. State Exh. 41. UTTR Capabilities Guide; Horstman Post Tr. 4214, at 4-5. Missions on the UTTR include air-to-air and air-to-ground combat training, both day and night as well as low and high altitude. UTRR Capabilities Guide; Horstman Post Tr. 4214, at 4-5.

A.57 The airspace over the UTTR extends somewhat beyond the range's land boundaries and is divided into restricted areas, in which the airspace is limited to military operations, and military operating areas (MOAs), which are located on the edges of the range, adjacent to the restricted areas. Horstman Post Tr. 4214, at 4-5. The Applicant's site lies within the Sevier B MOA, 2 miles to the east of the edge of the UTTR restricted airspace, and 18 miles east of the eastern UTTR land boundary. Id.

A.58 The airspace directly above the Applicant's proposed site, extending from 100 feet to 5000 feet above ground level, is within Sevier B MOA. Id. The location of Sevier B MOA relative to the Applicant's site is shown on State Exh. 186. Sevier B is part of the UTTR airspace and various portions of it are used for military low-altitude training, air-to-air combat training, major exercises, and cruise missile testing. Horstman Post Tr. 4214, at 4-5.

A.59 The airspace directly above the Applicant's site also contains an MOA known as Sevier D, extending from 5000 feet to 13,750 feet above the ground. Id. at 5. Sevier D is also part of the UTTR airspace and major exercises as well as cruise missile testing are authorized in various portions of this MOA. Id.

****63** A.60 Military air operations posing a potential risk to file Skull Valley facility include (1) Air Force F-16 fighter aircraft transiting Skull Valley from Hill Air Force Base to the UTTR South Area; (2) F-16s from Hill AFB returning from the UTTR South Area to the base via the Moser Recovery Route, which runs to the northeast, 2 to 3 miles north of the Applicant's site; (3) military aircraft, comprised mainly of large transport aircraft, flying on military airway IR-420 to and from Michael AAF, which is located on Dugway about 17 miles southeast of the Applicant's site; (4) F-16s from Hill and various other military aircraft conducting training exercises on the UTTR; and (5) jettisoned ordnance from aircraft flying over Skull Valley. LBP-01-19, 53 NRC at 432.

A.61 Civilian aircraft also will be flying in the general area of the Applicant's site, including: (1)

aircraft flying on Federal Airway J-56, which runs east-northeast to west-southwest about 12 miles north of the Applicant's site; (2) aircraft flying on Airway V-257, which runs north to south approximately 20 miles east of the site; and (3) other minimal general aviation activity, which has ***158** not been reported but nonetheless could occur in the area. We have previously ruled on the extent of the minimal hazard to the facility posed by commercial and general aviation. LBP-01-19, 53 NRC at 449-52. The cumulative potential hazard to the facility is calculated from the sum of the probabilities of hazards from both civilian aviation and military activity. Id. at 452-54.

A.62 During recent years, F-16 fighter aircraft stationed at Hill Air Force Base have regularly transited Skull Valley in a southerly direction through Sevier B and Sevier D MOAs enroute to the UTTR South Area range. Horstman Post Tr. 4214, at 6-8; Tr. at 3455 (Jefferson). Most of the flights through Skull Valley are in Sevier B MOA, and are concentrated in a corridor in the vicinity of the Applicant' s proposed site. Horstman Post Tr. 4214, at 6-8; Tr. at 3455 (Jefferson). These F-16s conduct low-altitude training, perform G(ravity) awareness turns, practice terrain masking (radar avoidance), and engage in other training maneuvers while transiting Skull Valley. Horstman Post Tr. 4214, at 8-9.

A.63 The military activity in the Sevier B and Sevier D MOA airspace varies from year to year. The number and type of missions flown as well as the number and type of bombs and other ordnance carried depend on Air Force tactics and training needs, national policy, budgets, and the state of world conflict. Id. at 5; Tr. at 3352-55, 3494 (Jefferson). It is difficult to anticipate changes in the level of military training in the UTTR and MOAs. The F-16 fighter has been flying for over 27 years and is scheduled to be replaced by year 2010. Tr. at 3367 (Jefferson), 3372 (Cole). The Board has before it no definitive evidence as to the nature of future Skull Valley training missions or weapon systems after the F-16 is retired.

****64** A.64 The Applicant received information from Hill AFB indicating that F-16 fighter aircraft transiting Skull Valley enroute from Hill AFB to the UTTR South Area typically pass to the east of the facility's site. Cole/Jefferson/Fly Post Tr. at 3061, at 14; Campe/Ghosh Post Tr. 4078, at 9; Tr. at 3397-98, 3402-04 (Cole); see Tr. at 3422-24 (Fly). The F-16s typically fly through the Sevier B MOA, between 3000 and 4000 feet above ground level (AGL), with a minimum altitude of 1000 feet AGL. [FN138] Cole/Jefferson/Fly Post Tr. 3061, at 14; Campe/Ghosh Post Tr. 4078, at 9; Tr. at 3396-97, 3404 (Cole); Tr. at 4356-57, 4369 (Horstman). A few aircraft fly higher, through Sevier D MOA, between approximately 5000 feet AGL and 14,000 feet AGL. Cole/Jefferson/Fly Post Tr. 3061, at 14. It is unusual ***159** for aircraft to fly through Skull Valley at altitudes above 14,000 feet AGL (18,000 feet mean sea level). Tr. at 4372-73 (Horstman). Aircraft fly through Skull Valley at approximately 350 to 400 knots indicated airspeed (KIAS). Cole/Jefferson/Fly Post Tr. 3061, at 14.

A.65 The Applicant asserts that in FY 1999 and FY 2000, an average of approximately 5000 F-16 flights transited Skull Valley per year. Id. at 14 & n.10; Campe/Ghosh Post Tr. 4078, at 10. Because 12 F-16s were added to the 69 aircraft stationed at Hill AFB in the third quarter of FY 2001, the Applicant estimated through extrapolation that approximately 5870 flights per year will transit Skull. Valley during the life of the facility. Cole/Jefferson/Fly Post Tr. 3061, at 20-21. This estimate was made by increasing the 5000 annual flights by 17.4% to account for the additional F-16s. Id. at 16, 20-21. The Applicant's witnesses asserted that the continuing modernization and increased technological capability of newer military aircraft will likely result

in fewer aircraft and a reduction in annual sorties over the life of the facility, Id. at 22-23.

A.66 F-16s use the airspace above Skull Valley primarily as a transition corridor to the UTTR. Id. at 15; Campe/Ghosh, Post Tr. 4078, at 11. Typically F-16s will start a descent after turning south from over the Great Salt Lake and descend below 5000 feet AGL before entering the Sevier B MOA. Cole/Jefferson/Fly Post Tr. 3061, at 15; Campe/Ghosh Post Tr. 4078, at 11. They typically fly in pairs that spread out in a tactical formation which may be 1 to 2 miles across. Cole/Jefferson/Fly Post Tr. 3061, at 15; Campe/Ghosh Post Tr. 4078, at 11. The typical maneuvers that F-16s may undertake while transiting Skull Valley are part of what is referred to as the "normal phase" of flight in that it consists of activities like operations checks (to see if the aircraft is functioning properly), G-awareness turns (to ensure that the pilots' flight suits are functioning properly and to prepare the pilots to take higher G-forces in more aggressive maneuvering on the range (Aircraft Crash Report, Tab FF at 16-17; Tr. at 3523-24, 13,030 (Fly); Tr. at 13,032 (Cole)), and "fence checks" (to simulate flying from friendly airspace into enemy airspace). Aircraft Crash Report, Tab E at 3; Tr. at 3522-24 (Fly). Air-to-air combat training does not take place in Skull Valley itself. Tr. at 4242-43 (Horstman).

5. NUREG-0800 Applicability and Methodology

****65** A.67 A document known as NUREG-0800 contains the portion of the "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" applicable to the review and evaluation of aircraft hazards. Campe/Ghosh Post Tr. 4078, at 5.

A.68 The formula for calculating aircraft crash probability for nuclear facilities is set forth in NUREG-0800 § 3.5.1.6-3 as:

***160** P = C x N x A/w, where:

C = inflight crash rate per mile for aircraft type,

N = number of flights per year along the airway,

A = effective area of the facility in square miles,

w = width of airway in miles.

Resnikoff Post Tr. 8698, at 5-7; PFS Exh. RRR [hereinafter NUREG-0800].

A.69 As described in NUREG-0800 § 3.5.1.6, "Aircraft Hazards," the Staff uses probabilistically based screening criteria in determining the acceptability of an aircraft hazard with respect to a nuclear facility site. Campe/Ghosh Post Tr. 4078, at 5-6; see NUREG-0800 § 3.5.1.6. The Staff reviews an applicant's assessment of aircraft hazards to a facility and determines whether those hazards should be incorporated into the facility's design bases. Campe/Ghosh Post Tr. 4078, at 6; NUREG-0800 at 3.5.1.6-1.

Against this background, we turn in Subparts B and C to the detailed analysis and findings

underlying, our resolution of the major factual disputes that came before us.

B. Determination of R Factor -- "Pilot Avoidance"

In this subpart, we portray in some detail the arguments and evidence that the respective parties put forward. As observed in our Narrative Opinion, this was the most critical issue before us, and we are resolving it essentially on the basis that the Applicant had not carried the burden of proof on its claim of near certain success in human performance under stress-filled conditions.

The reason that claim was unproven was not so much because of any specific showing by the State on a particular, narrow factual issue. Rather, it was because the evidence the State presented -- covering a number of different problem areas -- created a record wherein the preponderance of the evidence did not support, and indeed substantially undercut, the Applicant's assertion that pilots would, before ejecting, almost invariably (95% of the time) act affirmatively to guide their aircraft away from striking the PFS facility in the event of an impending crash.

That being the case, in this subpart we do not articulate a Board position on each individual factual issue contested by the parties. Rather, we devote considerable attention to analyzing the record evidence and the parties' arguments in some detail, then find generally that in view of the totality of the evidence presented by the State, the Applicant has not sustained its claim that pilots will ***161** successfully avoid the site in virtually every instance. The powerful countering evidence about human error, under stress, leading to failure, carries the day.

****66** In some instances, the material, related herein covers the same ground as did the Narrative, but in more detail. To the extent that repetition therefore exists, the alternative was to expand the Narrative to include the additional details, at the expense of interfering with the flow of the Narrative's reasoning.

B.1 We begin by restating the issue. The Applicant took the position that a pilot's potential ability to avoid hitting the site in the event of a crash reduced the crash impact probability, determined by the four-factor formula, by 85.5%. Cole/Jefferson/Fly Post Tr. 3061, at 17-18. The probability that a pilot would avoid the site in the event of a crash is equal to the product of (1) the probability that a pilot would be in control of the aircraft with time to maneuver it away and (2) the probability that, given those conditions, the pilot would actually direct the aircraft away from the site before ejecting. Tr. at 3769-70 (Cole); Cole/Jefferson/Fly Post Tr. 3061, at 17.

B.2 In calculating the value for R, the Applicant first considered the percentage of accidents that could occur in Skull Valley that would leave a pilot in control of the aircraft after the event. Cole/Jefferson/Fly Post Tr. 3061, at 17. This factor, R1, as derived by the Applicant, was estimated to be 90%. Id. The Applicant then considered the percentage of the time in which the pilot would indeed direct a controllable aircraft away from the Applicant's facility. This factor, R2, as opined by the Applicant, was estimated to be 95%. Id.

B.3 The Applicant multiplied R1 by R2 to determine the percentage of crashing F-16s that

would avoid the facility. Id. Thus, the Applicant considered that 85.5% (90% x 95%) of the crashing F-16s would avoid the facility. The calculated crash probability to the facility was accordingly reduced by using a value for the R factor in the equation of 14.5% (equal to 100% minus 85.5%). Id. at 18.

We provide below an outline of the many subissues involved in reaching our overall verdict that the "95% pilot avoidance" theory was unproven.

With that outline in place, we set out below the body of evidence and arguments that underlay the decision we reached in the Narrative.

1. Estimate of R1 Value

B.4 The factor R1 represents the fraction of potential accidents in which a pilot would have sufficient time and control of the aircraft to direct the aircraft away from a fixed ground site in Skull Valley. Cole/Jefferson/Fly Post Tr. 3061, at 17. The Applicant's analysis indicated that a pilot whose aircraft was experiencing an in-flight emergency would have sufficient time and control to avoid the Applicant's facility approximately 90% of the time. Id. This determination was based on the Applicant's expert panel's review of accident reports obtained from the Air Force. Id.

*163 B.5 These accident reports were prepared after each aircraft mishap under Air Force Instruction (AFI) 51-503, which directs investigators to determine the cause of the accident, to preserve all available evidence; to provide a complete factual summary for use in claims, litigation, disciplinary actions, adverse administrative proceedings, and for other purposes in accordance with AFI 51-503. Id. at 10. The reports follow a set format which describes the circumstances surrounding the accident, including a summary of the history of the flight, the flight mission, preflight activities and planning, the actual flight activity, crash impact information, the functioning of the emergency escape mechanism, rescue activity, maintenance

and mechanical factors, supervisory factors, pilot qualifications and performance, navigational aids and facilities, weather, and pertinent directives and publications. Id. The flight activity section provides relevant information as to pilot actions after the emergency begins. Id. Each report may conclude with a statement of opinion by the investigating officer as to the cause of the accident. Id. The reports are prepared by an accident investigation board typically chaired by a Colonel and comprised of subject matter experts, including pilots of the relevant aircraft type. Tr. at 3659-60 (Cole); see Tr. at 4033-38, 4041-42 (Cole); Tr. at 4038-40 (Fly); Tr. at 4040 (Jefferson).

B.6 The Applicant obtained 126 Air Force F-16 Class A mishap accident reports for the period from FY 1989 to FY 1998. Cole/Jefferson/Fly Post Tr. 3061, at 10. These accident reports consisted of mishaps involving 121 destroyed aircraft. Id. at 17. Even though the Applicant reviewed 126 Class A mishap reports, five reports were eliminated from consideration on the basis that only crashes involving destroyed aircraft would be considered, a total of 121. Aircraft Crash Report, Tab H at 3-4. One of the crash reports eliminated was the F-16 flight of December 19, 1991, that disappeared after takeoff and was never heard from. Tr. Part 2, at 27-28 (Fly). PFS witness Fly testified that the F-16 was "probably" destroyed but nevertheless was not considered in the 121 crashes reviewed. Id.

****68** B.7 Each of the three Applicant's experts independently assessed each accident report in accordance with established evaluation parameters. Cole/Jefferson/Fly Post Tr. 3061, at 58. This individual review was followed by a joint review that resolved the few differences that resulted from their individual assessments based on their combined professional judgment. Id. at 58-59; Aircraft Crash Report, Tab H at 6-7.

B.8 General Cole, General Jefferson, and Colonel Fly evaluated each destroyed- aircraft accident report to assess and determine: (1) the phase of flight in which the accident occurred, (2) the cause of the accident, (3) whether the pilot had sufficient time and control of the aircraft to be able to avoid a ground site, (4) whether the accident was caused by an event that could have occurred during the operations conducted in Skull Valley (a Skull Valley-type event), and (5) whether the accident occurred under flight conditions representative of the ***164** Sevier B MOA (a Sevier B MOA event). Cole/Jefferson/Fly Post Tr. 3061, at 58. The categorization of the accident reports enabled the expert panel to draw conclusions therefrom. See id. at 58- 59.

B.9 Following this process, the Applicant's expert panel categorized each accident as (a) one that could or could not have occurred in Skull Valley (i.e., "Skull Valley-type events") and (b) one in which the pilot did or did not have control of his aircraft and time to direct it away from a site on the ground (i.e., "able to avoid"). Id. The Applicant's assessment of whether the accident could have occurred in Skull Valley was based on whether the initiating accident event could have occurred in Skull Valley. Aircraft Crash Report, Tab H at 11-12; see id. at 14-16; Tr. at 3957 (Fly). Thus, for example, engine failures, in almost all cases, would be Skull Valley-type events. Aircraft Crash Report, Tab H at 8, 11-12. On the other hand, midair collisions during mock dogfighting would not (since such dogfighting does not take place in Skull Valley). Id. at 8; Tr. at 3856-60 (Fly).

B.10 The Applicant's assessment of whether the pilot was in control and would have time to direct his aircraft away from the facility was based on the specific information in the F-16 accident reports regarding each accident. Cole/Jefferson/Fly Post Tr. 3061, at 59-60; Aircraft

Crash Report, Tab H at 10- 11. An engine failure is by far the most likely cause of an accident in Skull Valley and, in every case of engine failure, the Applicant assessed that the pilot would have control and time to avoid a site on the ground. Cole/Jefferson/Fly Post Tr. 3061, at 17; Tr. at 3770 (Cole).

B.11 The Applicant initially found that sixty-one accidents during the 10-year period were Skull Valley-type events and in fifty-eight of them, or 95%, the pilot retained control of the aircraft with time to direct it away from a site on the ground. Tr. at 13,007 (Jefferson); see Cole/Jefferson/Fly Post Tr. at 3061, at 81, 88; Aircraft Crash Report, Tab H at 14-20. Nevertheless, the Applicant assumed that the fraction of accidents that would leave a pilot in control of the aircraft and able to avoid a site on the ground was only 90%. Cole/Jefferson/Fly Post Tr. at 3061, at 17; Tr. at 3770 (Cole); Tr. at 3214, 13,007 (Jefferson). [FN139] Under the ***165** approach taken by the Applicant, this assumption would make room for as many as three more Skull Valley-type crashes in which the pilot was considered not to be in control without affecting the R1 percentage being advanced.

****69** B.12 The State saw the reports differently. It pointed out that General Jefferson testified that in 42% of the 121 crashes reviewed, the pilot did not have control of the aircraft such that the pilot could avoid the Applicant's site even if he so desired. Tr. at 3817 (Jefferson); PFS Exh. X. Therefore, only 58% of the overall universe of crashes could have resulted in the pilot retaining control of the aircraft.

B.13 The higher percentage (90%) of controllable aircraft used by the Applicant is based on eliminating 60 of the 121 destroyed-aircraft reports which the Applicant "found not to be relevant to Skull Valley." Aircraft Crash Report, Tab H at 8, 15.

B.14 The State asserts that the Applicant excluded many accidents from consideration by incorrectly concluding that the accident could not have occurred in Skull Valley. Horstman Post Tr. 4214, at 31. In this regard, the State contends that the Applicant incorrectly excluded: (1) accidents that occurred at altitudes higher than 5000 feet AGL, (2) accidents that took place while the aircraft was flying under instrument flight rules, (3) accidents caused by midair collisions, (4) accidents caused by G-induced loss of consciousness, (5) accidents caused by bird strikes, (6) accidents caused by lightning strikes, and (7) accidents caused by poor visibility due to cloud cover. Horstman Post Tr. 4214, at 31. During his deposition, the State's witness, Lt. Colonel Horstman, identified six accidents that he contends the Applicant improperly excluded from the Skull Valley-type event category. In his prefiled testimony and at the hearing, the State's witness identified two additional accidents with which he disagrees, for a total of eight accidents. Id.; Tr. 4449-51, 4481-83 (Horstman). Five of the eight accidents were discussed during the hearing, and we turn to them now.

a. High Altitude

B.15 First, the State claims that the Applicant improperly excluded high- altitude accidents, such as the March 16, 1990 accident, from the Skull Valley- type event category, on the basis that they occurred above 5000 feet AGL. Horstman Post Tr. 4214, at 31; Tr. at 4449-51, 4481-83 (Horstman). However, the Applicant asserts that it did not exclude the March 16, 1990 accident

on the basis of altitude; rather, it was excluded from the Sevier B MOA category. Tr. at 13,091-92 (Jefferson). Colonel Fly explained that the accident was excluded based on: (1) ***166** an abnormal combination of airspeed (90 knots) and altitude (nearly 27,000 feet AGL) that would not likely occur in Skull Valley; and (2) the engine that failed was an engine that experienced operational abnormalities when flown at high altitudes and low airspeed and is no longer used in F-16s flown today. Tr. at 13,093-95 (Fly).

B.16 Therefore, the Board finds that the Applicant did not exclude this accident from the broader Skull Valley-type event category on the basis that it occurred at high altitude. Thus, we find that the Applicant's exclusion of this accident was reasonable.

b. Instrument Flight Rules

****70** B.17 The State claims that the Applicant improperly excluded accidents that took place under instrument flight rules from those events that could occur in Skull Valley. Horstman Post Tr. 4214, at 31. When questioned on two separate occasions during the hearing, however, the State's witness could not recall which specific accidents the Applicant had excluded on this basis. Tr. at 4423-24, 8510 (Horstman). The Applicant asserts that it did not exclude any accidents simply because they may have occurred while flying under instrument flight rules. Tr. at 13,091-92 (Jefferson).

B.18 We find that the Applicant did not exclude accidents from the Skull Valley-type event category solely on the basis that they took place while the aircraft was flying under instrument flight rules.

c. Midair Collisions

B.19 The State claims that the Applicant improperly excluded accidents involving midair collisions from those events that could have occurred in Skull Valley. Horstman Post Tr. 4214, at 31. In this regard, Lt. Colonel Horstman testified that the September 16, 1997 accident involved a midair collision that occurred after takeoff and while the pilots were preparing for a night-vision- goggle training mission. Id. He testified that pilots conduct night-vision- goggle training in Skull Valley, and, therefore, a midair collision similar to this accident could occur in Skull Valley. Id. at 32.

B.20 Lt. Colonel Horstman was not aware of any other accidents involving midair collisions that the Applicant improperly excluded. Tr. at 8510 (Horstman). However, to the extent that he took issue with any such evaluation, his disagreement is reflected in Table 1. Tr. at 8510 (Horstman).

B.21 The Applicant reclassified this accident as a Skull Valley-type event accident. Cole/Jefferson/Fly Post Tr. 3061, at 79. Therefore, the State and the Applicant are in accord with respect to the Skull Valley-type event categorization of this accident. The Applicant, however, continues to maintain that the accident ***167** is not a Sevier B MOA event because the accident

took place at 14,000 feet AGL. Id. at 80; see PFS Exh. 195 (accident report). We find that because the accident took place at 14,000 feet AGL, it was properly excluded from the Sevier B MOA event category.

d. G-LOC

B.22 The State also asserts that pilots may suffer loss of consciousness (GLOC) when conducting G-awareness turns in Skull Valley. Horstman Post Tr. 4214, at 17. G-awareness turns can induce loss of consciousness when gravity pulls blood toward the lower extremities, carrying oxygen away from the brain. Tr. at 13,029-30 (Fly).

B.23 The Applicant, however, asserts that G-awareness turns do not present significant risks to pilots. Tr. at 13,030-31 (Fly/Cole).

B.24 The State also asserts that G-induced loss-of-consciousness accidents can occur in Skull Valley due to other maneuvers besides the G-awareness turns. Horstman Post Tr. 4214, at 32. Lt. Colonel Horstman discussed the accident of May 25, 1990, which he asserted was caused by GLOC, in claiming that accidents arising from GLOC could occur in Skull Valley. Id. He pointed to no F-16 accidents caused by GLOC, however, that the Applicant improperly excluded from its analysis. Tr. at 4297-99 (Horstman). [FN140]

****71** B.25 The Applicant argues that neither the evidence in the record nor the official Air Force records support Lt. Colonel Horstman's claim that the May 25, 1990 accident was caused by GLOC. Furthermore, Colonel Fly, who has significant experience instructing pilots on the effects of G-forces, testified that he knew of no one who had suffered GLOC in a G-awareness turn similar to those performed in Skull Valley. Tr. at 13,026-31 (Fly). Nor did the Chief of Safety of Air Combat Command. Tr. at 13,031-32 (Cole).

B.26 We find that the evidence in the record supports a finding that G- awareness turns are not high-risk maneuvers, and that it is unlikely that a pilot will lose consciousness during a G-awareness turn. See Aircraft Crash Report, Tab F. We find that regardless of whether the May 25, 1990 accident was caused by G-induced loss of consciousness, the Applicant included this accident in the Skull Valley-type event category and in the Sevier B MOA category. See Cole/Jefferson/Fly Post Tr. 3061, at 63. Since Lt. Colonel Horstman testified that this was the only accident in which G-induced loss of consciousness was at issue, we find that the Applicant's inclusion of this accident as both a Skull Valley-type ***168** event and a Sevier B MOA event renders the State's concern with respect to this accident irrelevant. Further, we find it highly unlikely that a pilot in Skull Valley would experience G-induced loss of consciousness.

e. Bird Strikes

B.27 The State asserts that the Applicant improperly excluded accidents caused by bird strikes from those accidents which could have occurred in Skull Valley. Horstman Post Tr. 4214, at 31. Lt. Colonel Horstman stated that the F-16 canopy is designed to withstand a bird strike of 4

pounds at 350 knots, but that pilots typically fly at 400 to 450 knots through Skull Valley. Id. at 32. The State's expert testified that the May 13, 1998 accident that involved a mishap caused by birds impacting the aircraft (id.) was the only accident in which the Applicant improperly excluded an accident on the basis of a bird strike. Tr. at 4531-32, 8512 (Horstman).

B.28 Of the arguments offered by the Applicant, we find the absence of flocks of large birds in Skull Valley near the proposed facility and the history of bird strikes in the area to be the most compelling. Cole/Jefferson/Fly Post Tr. 3061, at 87. On the basis of the absence of flocks of large birds in Skull Valley near the proposed facility (Campe/Ghosh Post Tr. 4078, at 13-14) the history of bird strikes in the area (Cole/Jefferson/Fly, Post Tr. 3061, at 87) and the practice of mission planners at Hill AFB to avoid birds if they are reported (Campe/Ghosh Post Tr. 4078, at 13-14), we find that bird strikes are not reasonably likely to occur in Skull Valley and are not a significant contributor to risk. Therefore, we find that the Applicant's exclusion of the May 13, 1998 accident from the Skull Valley-type event category is acceptable.

f. Lightning Strikes

****72** B.29 The State asserts that the Applicant improperly excluded from the Skull Valley-type event category accidents that occurred due to lightning strikes. Horstman Post Tr. 4214, at 31. Lt. Colonel Horstman testified that it is reasonably foreseeable that a pilot will at some time fly in lightning and that he has personally flown in lightning. Id. at 33.

B.30 The Applicant, for its part, asserts that it did not exclude any accidents on the basis that they were caused by lightning strikes. Tr. at 13,092 (Jefferson). In fact, the Applicant notes that the accident of January 15, 1991, was caused by lightning and was included in the Skull Valley-type event category. Tr. at 13,092 (Jefferson); see also PFS Exh. X (Table 1).

B.31 We find the Applicant's characterization of this accident to be acceptable.

***169** g. Cloud Cover

B.32 The State asserts that the Applicant incorrectly excluded accidents caused by poor visibility due to cloud cover. Horstman Post Tr. 4214, at 31. Lt. Colonel Horstman testified, however, that he could not identify any accident reports that were omitted from the Skull Valley-type events category because of poor visibility due to cloud cover. Tr. at 8519 (Horstman). If there were any such accidents, they would be reflected in his markup of Table 1. Tr. at 8519 (Horstman).

B.33 Our analysis of those accident reports in which the State disagrees with the Applicant's assessment did not reveal any accidents excluded on the basis of cloud cover. The role of cloud cover does, however, become important in our discussion of R2 below.

B.34 Of the remaining crash reports considered by PFS to be Skull Valley events, the Applicant determined that fifty-nine represented crashes where the aircraft remained controllable with

sufficient time to avoid a fixed site on the ground. Aircraft Crash Report, Tab H at 20, Table 4. Taking issue with the Applicant's categorization of the crashes, the State points out that in that group of fifty-nine crash reports, five reports show the pilot ejected during an uncontrolled spin or the aircraft was otherwise uncontrollable. PFS Exhs. 113, 118, 124, 145, 147; State Exh. 223 at entries 8, 19, 20, 46, 53. Also within that group of fifty-nine crash reports, argues the State, are eleven reports that show the F-16 was on fire when the pilot ejected. PFS Exhs. 110, 113, 118, 119, 127, 145, 147, 158, 180, 184; Joint Exh. 4; State Exh. 223 at entries 3, 8, 10, 17, 19, 21, 24, 38, 46, 53, 59. The State further argues that the determination of 90% for crashes in which the aircraft is controllable is inconsistent with the evidence that engine failure is the most likely cause of a crash where the pilot retains control and the evidence that only 36% of F-16 Class A accidents are engine failures according to the manufacturer, Lockheed Martin. Aircraft Crash Report at 17b; State Exh. 56; State Findings ¶ 67.

B.35 In response, both the Applicant and the Staff argue that none of the five reports identified by the State represents a situation where the aircraft was uncontrollable. PFS Reply ¶¶ 66-71; Staff Reply ¶¶ 78-84. Both the Applicant and Staff have examined each of the five reports cited by the State and explain in some detail why the aircraft was controllable. See id.

73 B.36 After examining all five reports, we agree with the Applicant and Staff that, although at some point in each of these five accidents the aircraft might have been uncontrolled, in each instance the pilot had control for a sufficient time to take avoidance action. In one instance, the pilot actually turned the aircraft to avoid a building. See PFS Exh. 145. In another, the pilot completed his checklist procedures, as well as turned toward an airbase before being forced to eject. See ***170 PFS Exh. 118. In a third, the pilot had over 4 minutes in which to maneuver the aircraft after the emergency began. See PFS Exh. 124.

B.37 Accordingly, we agree with the Applicant and Staff that the five disputed reports were properly categorized as "in control."

B.38 As to the eleven reports in which the State asserts that fire was involved (four of which overlap with the five reports involving assertedly uncontrolled aircraft), the Applicant disputes the State's characterization of these accidents. PFS Reply ¶ 74. The Applicant described in some detail for each of the eleven reports why it considered the aircraft to still be controllable. PFS Reply ¶¶ 74-87. For its part, the Staff points out that in several of the eleven accidents in which fire was reported, the pilot took action to avoid a ground object. Staff Reply ¶ 85. In that regard, the Staff asserts that not all fires would cause an F-16 to become uncontrollable. Staff Reply ¶ 85.

B.39 We agree with the Applicant and Staff that careful examination of the reports indicates that a plane on fire is not necessarily uncontrollable in the sense being used here. Thus, four of the reports indicate that the pilot had 2 minutes or more in which to steer the plane away from a ground site. See PFS Exhs. 110, 119, 158, 180. Moreover, in several instances the pilot steered away from a specific ground site or a populated area before ejecting. See PFS Exhs. 119, 145, 158. Our examination of the eleven reports allows us to find that the pilot had enough time in control to take avoidance action. Therefore, we find that the Applicant and Staff properly categorized the above accidents as ones in which the pilot was in control for that purpose. In any event, as many as three of the disputed accidents could be recharacterized as "not in control" without affecting the validity of the Applicant's 90% R1 proposal. See Finding B.11, above.

2. Estimate of R2 Value

a. Eight-Factor Assessment of Probability of Pilot Avoidance

B.40 Based on their professional judgment as experienced Air Force pilots, rather than on an examination of the accident reports, the Applicant's panel assessed the value of R2 -- the probability that a pilot in control of his aircraft following an in-flight emergency would actually avoid the site -- to be 95%. Cole/Jefferson/Fly Post Tr. 3061, at 17; Aircraft Crash Report at 18-23; Tr. at 3215-16 (Jefferson). The assessment was based on: (1) the time the pilot would typically have based on Air Force data concerning F-16 performance in the event of an engine failure, i.e., one minute or more; (2) the pilot's ability to fly the aircraft and attempt to restart the engine or otherwise respond to the emergency; (3) the very slight turn required to actually avoid the site; (4) the training that pilots receive to avoid inhabited or built-up areas on the ground; (5) the familiarity of the pilots at Hill AFB with the location of the facility, which will be prominently visible and whose location will be noted, along with other ***171** nuclear facilities, in Defense Department aviation planning guides; (6) the wide open spaces around the facility, to which a pilot could safely direct his aircraft; (7) predominantly good weather and visibility in Skull Valley; and (8) the F-16 flight control computer that will keep the F-16 on a straight course after the pilot ejects. These eight factors are discussed in detail below. [FN141]

****74** B.41 The State asserts that the component value of 95% used by the Applicant is a purely subjective determination made collectively by Applicant's witnesses General Jefferson, General Cole, and Colonel Fly. State Findings ¶ 69. The State points out that none of the Applicant's witnesses who determined the component value of 95% have ever ejected from an F-16. Tr. at 3216 (Jefferson), 3217 (Fly). Neither General Cole nor General Jefferson has ever piloted an F-16. Tr. at 3142 (Cole); Tr. at 3189 (Jefferson). In addition, the determination of 95% was made without performing any statistical calculations, and was made prior to reviewing the F-16 accident reports. Tr. at 13,109-10, 13,121-22 (Jefferson).

B.42 The State further posits that this 95% component represents the percentage of time that a pilot will be successful, during an engine failure emergency, in performing emergency procedures including: (1) attempting to restart the engine, (2) locating the Applicant's site which will be 3.22 miles or more away at the time of ejection, (3) directing the aircraft away from the Applicant's site while also directing the aircraft way from any populated areas, and (4) ejecting at or above the minimum altitude of 2000 feet AGL. See State Findings ¶ 70.

B.43 Although the Applicant's expert panel based the 95% R2 value on eight contributing factors, the State focused its efforts on challenging the Applicant's assessment of three of those factors, apparently based on General Jefferson's statement that the time available, pilot training, and visibility of the PFS facility were the determining factors. See Tr. at 8882 (Jefferson).

(1) TIMING

B.44 The Applicant assessed that in the event of an engine failure, which would be by far the most likely accident leaving the pilot in control of the aircraft, an F-16 pilot transiting Skull Valley would have approximately 1 minute or more to respond to the emergency and potentially avoid a site on the ground before having to eject at the recommended altitude of 2000 feet AGL. Aircraft Crash Report, Tab U at 19c-19e; PFS Findings ¶ 15. All parties agree that in an emergency caused by engine failure leaving the F-16 controllable, the pilot will "zoom" the aircraft, which is a climb to trade speed for altitude, and will discard all fuel tanks, and bombs and other weapons, known as jettison of stores. Horstman Post Tr. 4214, at 15-16; Tr. at 3546-47, 13,080-81 (Fly); ***172** Cole/Jefferson/Fly Post Tr. 3061, at 102; Campe/Ghosh Post Tr. 4078, at 30. Zooming the aircraft provides the pilot with additional time aloft to attempt to restart the engine before the aircraft crashes. Horstman Post Tr. 4214, at 15-16. The zoom is accomplished by raising the nose to establish a 30-degree climb. Tr. at 13,080-81 (Fly). If the pilot had been flying at an altitude of 4000 feet AGL, the zoom would take the F-16 to approximately 7000 or 8000 feet AGL. Tr. at 13,453 (Horstman). In accordance with the F-16 flight manual, upon reaching the airspeed of 250 knots the pilot will end the zoom by "pushing the plane over" and start a descent. Tr. at 13,299-300 (Horstman). The maneuver of pushing the plane over uses some of the F-16's energy and the aircraft slows to approximately 200 knots. Tr. at 13,300- 01 (Horstman).

****75** B.45 Based on data from the F-16 pilot's manual, the Applicant calculated, for example, that a pilot transiting, Skull Valley at 350 knots at 3000 feet AGL would have 1 minute and 16 seconds to perform the zoom and glide maneuver before ejecting at 2000 feet AGL and would have over 2 minutes at 400 knots and 4000 feet AGL. Aircraft Crash Report, Tab U at 3-4. Colonel Bernard confirmed that at 400 knots and 4000 feet AGL, the pilot would have on the order of 2 to 3 minutes to respond to the emergency. Tr. at 3915-16 (Bernard). Graphs from the F-16-1 pilot's manual show that in the range of speeds and altitudes at which F-16s fly in Skull Valley the pilot would always have over 45 seconds to perform the maneuver. Tr. at 3559-69 (Fly), 8662 (Jefferson); see Aircraft Crash Report, Fig. 3 (following page 19c).

B.46 Despite the Applicant's claim of there being sufficient time for a pilot to respond to an emergency situation over Skull Valley, the State argues that in some circumstances, a pilot in an emergency will focus on the task of restarting a failed engine to the exclusion of performing other emergency procedures, including assessing where the aircraft will impact. See Horstman Post Tr. 4214, at 18-19; Tr. at 4030 (Cosby). According to the State, restarting a failed engine, like ejection, would save a pilot's life and avoid the dangers associated with ejection. Horstman Post Tr. 4214, at 19. Thus, there is an incentive for a pilot to restart the engine and avoid ejection. Tr. at 4010 (Cosby). Moreover, the cost of an F-16 is approximately $20 million to $40 million. Tr. at 3339 (Fly). Thus, pilots will take every opportunity to save the aircraft by restarting the engine before ejecting. Tr. at 4010-11 (Cosby).

B.47 Lt. Colonel Horstman interviewed active-duty Air Force pilot Major Tom Smith, who ejected from an F-16 on January 13, 1995. Horstman Post Tr. 4214, at 18 & n.2. Lt. Colonel Horstman and Major Smith were both in the Air Force when Major Smith ejected. Tr. at 8585 (Horstman). Lt. Colonel Horstman was Major Smith's supervisor at the time and had several conversations with Major (then Captain) Smith concerning his emergency and ejection. Tr. at 8585 (Horstman). Lt. Colonel Horstman recounted the conversation as follows:

***173** Following an engine failure, Major Smith zoomed the aircraft, jettisoned stores,

attempted to restart the engine and ejected. Horstman Post Tr. 4214, at 19; PFS Exh. 175. Major Smith said he did not have time to think about where his jettisoned stores would impact or where the F-16 would impact. Horstman Post Tr. 4214, at 19. Major Smith also said his thoughts were focused on his survival, and if he were to again be required to eject given the same circumstances, he would again not consider where the stores or aircraft would impact. Horstman Post Tr. 4214, at 18-19.

The Applicant, however, reviewed the accident report of Major Smith's crash and determined it represented a situation where a pilot would have time to avoid a specific site. Horstman Post Tr. 4214, at 18 n.2; PFS Exh. 100A.

(2) PILOT ABILITY TO RESPOND

****76** B.48 The Applicant asserts that based on the activities that the pilot would have to perform to respond to an engine failure, the pilot would have adequate time during the zoom and glide maneuver to avoid the facility. Aircraft Crash Report at 19c-19d; Tr. at 3546-55 (Fly). The actions required to restart the F-16 engine would take only a fraction of the time available to the pilot before he reached the 2000-feet AGL recommended minimum ejection altitude. Aircraft Crash Report at 19d; see Tr. at 3549-51, 3560-62 (Fly). Moreover, pilots are trained at multitasking, so that they are able to perform emergency procedures while simultaneously flying their aircraft. Tr. at 3994- 96 (Cosby). Furthermore, it would take 45 seconds after the pilot restarted the engine for it to develop usable thrust. Aircraft Crash Report at 19c, Fig. 3; see Tr. at 13,705 (Fly). Thus, according to the Applicant's evidence, at some point in the aircraft's glide before the pilot either resumed flying or ejected, there would be a 45-second period in which the pilot would be able to attend to other matters without interfering with the restarting of the engine. Tr. at 13,704-05 (Fly); see Aircraft Crash Report at 19c.

(3) SLIGHT TURN TO AVOID SITE

B.49 The Applicant further argues that to avoid any ground site visible at 2000 feet, the turn the pilot would have to make would be slight, on the order of 4 degrees (assuming that the pilot turned just before he ejected at 2000 feet AGL), and easily made in the time available to him while he was gliding toward the ground. Aircraft Crash Report at 22-23; Tr. at 3094-96 (Fly), 3910 (Bernard), 4023-25 (Cosby); see Tr. at 8527 (Horstman). The Hill AFB staff corroborated in its meeting with the NRC Staff that such a turn would not be difficult. See Tr. at 4186-88 (Campe). In his accident, Colonel Cosby turned 180 degrees to avoid an apartment complex and then maneuvered his aircraft further to avoid another ***174** aircraft on the ground. Tr. at 3980-81 (Cosby). Colonel Bernard also agreed that in a controllable situation it would "not be difficult at all" to direct an F-16 away from the Applicant's facility prior to ejection. Tr. at 3910 (Bernard).

(4) PILOT TRAINING

B.50 The Applicant posits that pilots would turn to avoid the site because they are trained to avoid inhabited or built-up areas on the ground. Aircraft Crash Report at 19-19a; Tr. at 3898 (Bernard), 3989-93 (Cosby).

(a) Air Force Instruction Manuals

B.51 The Applicant notes that the instruction manual for the first aircraft on which Air Force pilots are trained instructs pilots prior to an emergency ejection to "turn aircraft toward uninhabited area." Aircraft Crash Report, Tab S. In addition, the F-16 manual states that "if time permits" the pilot should "direct the aircraft away from populated areas." [FN142] Colonel Bernard and Colonel Cosby both stated that the objective of that instruction is to minimize damage and risk to people or property on the ground by, for example, directing the aircraft into a river or a lake. Tr. at 3920 (Bernard), 3990-91 (Cosby). Dr. Campe testified that based on the NRC Staff's meeting with the Hill AFB staff, avoidance of built-up areas on the ground if the aircraft was in control was "something that is ... in every pilot's mind, attitude [and] training to consider that." Tr. at 4188 (Campe). Moreover, the fact that the facility will be a storage facility for nuclear material would also likely reinforce the pilot's desire to avoid it. Tr. at 3921 (Bernard).

**77 B.52 Regarding the emergency procedure of ejection, the F-16 flight manual provides the following reference:

Ejection (Time Permitting)

If time permits, descend to avoid the hazards of high altitude ejection. Stow all loose equipment and direct the aircraft away from populated areas. Sit with head against headrest, buttocks against back of seat, and feet on rudder pedals.

1. IFF MASTER knob -- EMER.

2. MASTER ZEROIZE switch (combat status) -- ZEROIZE.

3. Loose equipment and checklist -- Stow.

4. Lapbelt and helmet chin strap -- Tighten.

*175 5. Night vision devices -- Remove (if appropriate).

6. Visor -- Down.

7. Throttle -- IDLE.

Slow to lowest practical airspeed.

8. Assume ejection position.

9. Ejection handle -- Pull.

Aircraft Crash Report at 19a n.16A; PFS Exh. PPP at 3-43.

B.53 The State asserts that there is only one line in the pilot's manual for the F-16 that instructs pilots to direct their aircraft away from populated areas before ejecting, State Findings ¶ 73, and claims that the Air Force only intends for pilots to avoid "a large geographical area, not a specific site or targets on the ground," State Findings ¶ 74. Of the approximately 10,000 pages of directives and procedures for the F-16, the State notes that the only reference to directing the aircraft before ejecting is found embedded in the above provision: If time permits ... direct the aircraft away from populated areas. Tr. at 8551 (Horstman). Except for a similar one-sentence reference in flight manuals for other aircraft, there are no other Air Force documents that refer to training a pilot to avoid populated areas. Tr. at 3251-52 (Jefferson), 13,532 (Horstman).

B.54 The State makes the following arguments about pilots avoiding ground sites. The Air Force does not teach pilots to look for specific sites on the ground in an emergency. Tr. at 8550-51 (Horstman). There is no Air Force training or guidance to avoid a house, a facility, or other specific ground site and pilots do not have the tools for such a task. Tr. at 13,464-65 (Horstman). Directing the aircraft away from a populated area refers to a large geographical area, not a specific site or targets on the ground. Tr. at 13,531- 32 (Horstman). F-16 pilots will make the decision as to whether they can steer away at a distance of at least 3.22 miles and possibly as far away as 5 miles from where the F-16 will impact. Tr. at 13,612-13 (Horstman). The task of directing an F-16 away from a populated area before ejecting requires the pilot to determine if the impact area, 3.22 or more miles in front of the aircraft, is a populated area. Tr. at 13,612-13, 13,624 (Horstman). It is relatively easy to determine if a city is within the crash impact area, because its size makes it easy to locate. Tr. at 13,470-71 (Horstman), 3290 (Fly). Conversely, the State points out that a pilot may not be able to see smaller specific ground sites as well as larger areas. Tr. at 13,470-71 (Horstman). It points out that the Applicant's site covers only 0.13 square mile and consists mostly of open space and concrete casks and does not appear to be a populated area. Aircraft Crash Report, Tab R; Horstman Post Tr. 4214, at 17-18. Lt. Colonel Horstman testified that the fact that the PFSF will be a "facility," as opposed to a "populated area," would make it less likely that a pilot would avoid the site, in that the pilot's manual for the F-16 instructs pilots to turn the aircraft away from ***176** "populated areas" before ejecting. Horstman Post Tr. 4212, at 18; Tr. at 13,532, 13,465 (Horstman).

****78** B.55 To support its position, the State points out that the crash report of July 11, 1996, shows the pilot turned "towards what he perceived to be a less congested area" yet the impact destroyed two houses killing a child and injuring her mother. Joint Exh. 10; State Exh. 223, No. 14. In addition, the crash report of August 31, 1992, shows the pilot turned toward "what appeared to be an uninhabited area" yet impacted 150 yards from two inhabited dwellings. PFS Exh. 140; State Exh. 223, No. 7. These mishap reports, according to the State, demonstrate the level of a pilot's ability to turn away from large populated areas, and the inability to locate and avoid specific ground sites. State Findings ¶ 75.

B.56 The State also argues that the notion of directing the aircraft away from a populated area also includes the notion that a pilot would not direct the aircraft away from one area at the risk of

impacting a more populated area. Tr. at 13,613 (Horstman). The decision to turn away from a populated area requires the pilot to assess the impact area of where the F-16 is pointed and alternative impact areas to turn toward. See Tr. at 13,613 (Horstman). A pilot in Skull Valley would not direct an F-16 toward the Goshute Indian Village in an effort to avoid the Applicant's facility. Tr. at 13,613 (Horstman); State Exh. 222. Lt. Colonel Horstman suggested that a pilot whose crashing aircraft was going to hit the Hoover Dam might not try to avoid it because the dam was not, strictly speaking, a "populated area," despite the fact that damaging the dam could potentially cause great harm to many people. Tr. at 13,559-60 (Horstman).

(b) Situational Awareness

B.57 Air Force pilots are taught three general principles pertaining to in- flight emergencies, which are reinforced throughout their careers: maintain control of the aircraft, analyze the situation and take appropriate actions, and land as soon as conditions permit. Aircraft Crash Report at 19. In addition, Air Force pilots are trained from the beginning of their careers to develop and maintain constant situational and positional awareness, so that regardless of where they are flying and where they are headed, they are cognizant of their surrounding environment. Tr. at 3103-04 (Cole). General Cole described situational awareness as "an active and engaged cognizance" of a pilot's location, direction, airspeed, track, and terrain features, among other things. Tr. at 3591 (Cole). Air Force pilots begin to learn and develop situational awareness from their first flights in pilot training, and pilots continue throughout their careers to improve their situational awareness skills in maintaining it. Tr. at 3591-92 (Cole). Situational awareness is integrated into pilot training through flight simulator exercises in which various emergencies are presented and through actual flight time, check rides, and flight drill instruction. Tr. at 3593-98 (Cole/Fly/Jefferson), 3334-35 (Fly). Situational ***177** awareness is also discussed as part of mission briefings and debriefings. Tr. at 3595 (Fly). Hence, loss of situational awareness is minimized as a result of training.

****79** B.58 PFS argues that the extensive training Air Force pilots receive with respect to the development of situational and positional awareness relates to a pilot's success in avoiding structures on the ground during an emergency. Tr. at 3598-99 (Cole). General Cole explained that while addressing an emergency situation, a pilot will generally be aware of what is in front of and behind the aircraft and will have a sense of the location of a structure on the ground, before a pilot would have to act to avoid it. Tr. at 3599 (Cole). A pilot will know where the aircraft is going to land and will adjust the heading of the aircraft to ensure that the aircraft will not hit a ground structure before the pilot ejects. Tr. at 3103-04 (Cole).

B.59 The State's witness, Lt. Colonel Horstman, agreed that pilots are trained in aspects of situational awareness and are trained to know their location. Tr. 13,334-35 (Horstman). He agreed that pilots have situational and positional awareness when flying and that, generally speaking, a pilot would not look out of the aircraft for the first time at the onset of an emergency to determine the aircraft's location, because the pilot should already be aware of it. Tr. at 8606 (Horstman).

(c) Ejection Training

B.60 The State observes that during Air Force training, responding to engine failures is practiced only on simulators. See State Findings ¶ 76. Air Force training does not include practicing engine failure emergencies where the F-16 engine is failed for training purposes. Tr. at 3555-56 (Fly). If an engine fails, the pilot will for the first time be in that emergency situation. Tr. at 3556 (Fly). Engine failures are practiced only on flight simulators. Tr. at 3333-37 (Fly/Cole). Nor does Air Force training include practicing ejections from an aircraft. Tr. at 3335-36 (Fly). Pulling the ejection handle in a flight simulator merely causes the simulator to go blank and stop. Tr. at 3335 (Fly). Until a pilot actually ejects from an aircraft during an emergency, the pilot has never fully experienced that sensation nor made decisions relating to where the aircraft will impact. Tr. at 3556 (Fly).

B.61 In response, PFS argues that simulator training is thorough and realistic. Tr. at 3333-34 (Fly). The simulator looks like an F-16 cockpit and contains functioning instruments. Tr. at 3333-34 (Fly). It enables a pilot to practice navigation, flying in bad weather, air-to-air combat, and some bombing missions. Tr. at 3334 (Fly). The simulator can also simulate the failure of any of the aircraft's systems. Tr. at 3334 (Fly). "There are literally hundreds of emergencies that the F-16 simulator simulates, and they put the pilot through real-time stresses and radio calls ..., those kinds of extraneous and external inputs to the pilot, so that the ***178** pilot can focus on the task at hand and solve whatever he is presented with. ..." Tr. at 13,260 (Horstman). Thus, PFS asserts, a pilot can practice responding to an engine flameout by going through all of the emergency procedures up to and including pulling the ejection handles if the engine fails to restart. Tr. at 3334, 3810 (Fly). Pilots rehearse emergency procedures extensively and are regularly tested on them in the simulator. Tr. at 3330-31 (Cole), 3811 (Fly), 13260 (Horstman). Colonel Cosby testified that this thorough training enables a pilot to respond automatically or instinctively to emergency situations and that part of the pilot's instinctive response includes the pilot knowing where he is and what he might wish to avoid hitting on the ground. Tr. at 3988-90 (Cosby).

****80** B.62 The Applicant further maintains that Air Force training provides pilots with a sense of what ejection feels like by putting them through a simulated ejection in an ejection seat that actually shoots them into the air. Tr. at 3335-37 (Fly). Simulated ejections are practiced twice per year. Tr. at 4015 (Cosby). Colonel Fly testified that with the combination of training and the simulated ejection, "the Air Force does everything they can to make you as prepared as you can possibly be so that when you're faced with that decision [to eject], you will make the correct one." Tr. at 3338 (Fly). The avoidance of areas on the ground is discussed during emergency procedures training. Tr. at 3810 (Fly).

(d) Emergency Stress and Pilot Error

B.63 The State further argues that pilots are under great physical and emotional stress during inflight emergencies, which causes their performance to deteriorate. Horstman Post Tr. 4214, at 20; Tr. at 3252-54 (Jefferson). A pilot's primary concern upon realizing the aircraft is about to crash is for the pilot's survival, which is dependent on ejection. Horstman Post Tr. 4214, at 17-21. Ejection from an F-16 is a violent and dangerous procedure which can cause severe injury or death. Id. at 17; Tr. at 3900 (Bernard). U.S. Air Force publication Flying Safety reports that

through September 2000, 6.8% of F-16 ejections have resulted in fatal injuries. Flying Safety at 11-13; Tr. 3255, 3270-71 (Jefferson). Colonel Bernard, who ejected from an F-16 during a training mission, testified that the greatest stress levels by a "significant measure" faced by a pilot occur during the moments before ejection. Tr. at 3897-98 (Bernard). Colonel Bernard testified that you have a period of divided attention during an emergency that "completely becomes focused on what you need for your survival." Tr. at 3897-98 (Bernard).

B.64 The Air Force Chief of Safety sends out messages known as ALSAFECOMs to distribute critical safety information to Air Force commands. Horstman Post Tr. 4214, at 20-21. During 1996, the Air Force Chief of Safety sent out ALSAFECOM 002/1996, one of only four ALSAFECOMs sent out that year. Horstman Post Tr. 4214, at 20-21; State Exh. 57, U.S. Air Force, ALSAFECOM ***179** 002/1996 [hereinafter ALSAFECOM 002/1996]. It advised of significant pilot errors in emergency situations, including 73% of ejections in the previous 6 months occurring below the published minimum altitude of 2000 feet due to futile attempts to restart failed engines. Id. at 1. It further advised that incorrect assessment of airborne situations and timely ejections had become a problem, and that erroneous assumptions and poor airmanship flourished in emergency situations. Id. at 2-3. It concluded that crew members confronted with inflight emergency-induced stress may need external intervention to alter inappropriate actions. Id. at 3. The State notes that F-16 manufacturer Lockheed Martin has determined that 52% of Class A F-16 accidents have been caused by pilot error. Horstman Post Tr. 4214, at 20; State Exh. 56.

****81** B.65 As an example of pilot error during an emergency situation, the State points to the testimony of volunteer witness Colonel Michael Cosby, who ejected from an F-16 after his aircraft's engine failed during a 1993 training mission. Tr. at 3978-80 (Cosby). Colonel Cosby testified that he spent too much time and attention trying to restart the failed engine. Tr. at 3980 (Cosby). The board that investigated Colonel Cosby's accident determined that if he had spent less time focusing on restarting the engine, he would probably have avoided the crash and been able to successfully land. Tr. at 4008 (Cosby).

B.66 The State presented the testimony of volunteer witness Colonel Frank Bernard, who ejected from an F-16 after the engine failed during a 1986 training mission. Tr. at 3888-89 (Bernard). Colonel Bernard testified that it was error on his part to use all his time trying to solve his failed engine problem, which drove him to eject at only 170 feet AGL. Tr. at 3895-96 (Bernard). Video recordings are routinely made during F-16 flights. Tr. at 13,133-36 (Horstman). The Air Force used the actual video recording taken from Colonel Bernard's F-16 during his ejection emergency to produce a safety training video for F-16 pilots. Tr. at 13,135-37 (Horstman); see State Exh. 220, Videotape: Late Decision To Eject (U.S. Air Force 1986) [hereinafter Bernard Video]. The video shows a portion of the training mission that is generally representative of flying conditions that normally occur in Skull Valley. Tr. at 13,435-38 (Horstman); see Bernard Video. Following disengagement from the mock battle training, the circumstances represented in the Bernard training video are representative of any F-16 with a failed engine. Tr. 13,690- 91 (Fly); see Bernard Video. Colonel Bernard, a most experienced pilot, ejected only seconds prior to the aircraft impacting the ground. Tr. at 13,435-38 (Horstman). This was Colonel Bernard's second ejection. Tr. at 13,438 (Horstman). The State claims that Colonel Bernard's accident supports its notion that a pilot who suffered an engine failure in Skull Valley would be too distracted to avoid the facility. See State Findings ¶ 81.

B.67 In response, the Applicant argues that, as Colonel Fly explained, "[i]f you had taken Colonel Bernard and put him in a typical Skull Valley position and he had the same engine problem, he would have wound up with much more time ***180** to analyze the situation and to act accordingly." Tr. at 13,692 (Fly). In Skull Valley, a pilot would be at approximately 3000 to 4000 feet AGL and 350 to 400 knots. Cole/Jefferson/Fly Post Tr. 3061, at 14. In contrast, Colonel Bernard did not pull himself away from his combat training mission and began to focus on his emergency until he was at 170 feet AGL. See Bernard Video.

B.68 From reviewing F-16 crash reports for the 10-year period 1989 through 1998, the Applicant determined that fifty-eight reports represented crashes where the aircraft remained controllable with sufficient time to avoid a specific ground site. The State points out, however, that in that group of crash reports, twenty-nine reports (50%) show the pilot ejected below the published minimum altitude of 2000 feet AGL. State Exh. 223.

****82** B.69 The Applicant responds by arguing that merely because the pilot ejected below 2000 feet does not mean that he would not have been able to avoid the facility. PFS Findings ¶¶ 123-124, 162. The Applicant argues that pilots in the reports, including Colonel Cosby, did in fact avoid sites or areas on the ground even though they ejected below 2000 feet. See id. ¶ 123. The Applicant argues that according to the evidence in the record, ejection at below 2000 feet is not related to a pilot's ability to avoid a site on the ground. See id. It also points out that in a number of cases, the pilots specifically delayed their ejection below 2000 feet in order to take additional actions for the express purpose of avoiding sites on the ground and were commended for doing so. Id. ¶ 124. Further, PFS argues, the accident reports refer to the 2000-feet limit as "minimum recommended ejection altitude" and not as "rule" or "regulation." See, e.g., Joint Exh. 1 at 2; Joint Exh. 6 at 4; Joint Exh. 9 at 16; PFS Exh. 205 at 17. The Applicant points out that some pilots have been specifically commended for delaying their ejection below 2000 feet AGL in order to avoid something on the ground. See Joint Exh. 9 at 16; PFS Exh. 205 at 17.

B.70 After reviewing the accident reports offered into evidence by the Applicant, the Board identified forty instances in which pilot error was listed as either the confirmed or suspected cause of an F-16 crash. Relevant excerpts from these forty reports are set forth below:

PFS Exh. 80. Collision with ground. Potential pilot error attributed to two fatalities (one pilot and one civilian) as no equipment failure was found and no ejection was attempted.

PFS Exh. 103. Collision with ground. Mishap pilot "inadvertently pulled his power back to idle," and after "recognizing his error," took corrective actions. The plane impacted the ground with no attempted pilot ejection, but the mishap pilot suffered no serious injury.

PFS Exh. 106. Live bombs dropped. Four "deviations" were cited: (1) mishap pilot "overflew manned sites ... with live ordnance on board and with their Master Arm switch in the 'ARM' position"; (2) mishap pilot "expended six MK- 82 AIR ***181** general purpose bombs on an unauthorized target"; (3) mishap pilot "did not place required navigational data ... on his low level map"; and (4) flight "used non standard radio transmissions." Six live bombs were dropped and detonated near a manned site, and four civilians were affected.

PFS Exh. 107. Midair collision. One pilot fatality and one successful pilot ejection in midair collision of two F-16s. Four "known or suspected deviations" are: (1) "no air-to-air academic are

documented"; (2) one pilot did not meet minimal training requirement; (3) one pilot's video showed "at least four instances, not including the collision, where his aircraft was closer than 1,000 feet to "the other aircraft, where 1,000 feet was established by USAFER 55-79 as minimum separation distance; (4) and one instance of activation of the low speed signal, where "no knock it off or terminate call was given even though safety was compromised."

****83** PFS Exh. 109. Midair collision. One pilot fatality. "All pilots in the squadron did not have the same interpretation of the leader/wingman responsibilities in MCM 3-3 and MCM 3-1," and "[t]here were also differences of opinion on whether the flight member engaging had to specifically call 'engaged' when he was assuming the role of the 'engaged fighter.'"

PFS Exh. 120. Midair collision. One pilot fatality and one safe pilot ejection. Pilot training deficiencies were cited as "demonstrated deficiencies during initial qualification that were documented on the phase grade sheets." Deficiencies were noted in the report.

PFS Exh. 122. Collision with ground. Potential pilot error as no equipment failure was found and there was no attempted ejection. Pilot was fatally injured.

PFS Exh. 130. Crash into sea. Three training deficiencies noted: (1) mishap pilot was "not an experienced pilot in the F-16 as required by AFR 60-1"; (2) "no waiver was approved" for a crew member who was not a rated crew member; and (3) "G-straining maneuvers were not briefed," which was required by AFR 60-1 and PACAFR 55-7.

PFS Exh. 131. Collision with ground. Potential pilot error as there was no attempted ejection. Fatal injury to the pilot.

PFS Exh. 132. Collision with mountain ridge. One cited deviation as mishap actions were "outside of the MOA" while training should be conducted within designated airspace. Two pilot fatalities in this accident.

PFS Exh. 135. Collision with ground. Potential pilot error in that "[t]he mishap pilot and flight lead both believed that sufficient cloud clearance would be available when the attack was initiated." The plane crashed and was destroyed.

PFS Exh. 136. Midair collision. One pilot fatality. Potential pilot error.

PFS Exh. 139. Collision with ground. Pilot fatality because "ejection was initiated out of the design envelope of the ejection system."

***182** PFS Exh. 142. Collision with ground. Pilot using piddle-pack caused the plane to become uncontrollable.

PFS Exh. 149. Landing accident. Cited factors causing accident: (1) had the pilot "adhered to these published altitude restrictions this accident would not have occurred"; (2) pilot "failed to follow T.O.1F-16C-1"; and (3) "pilot distraction."

PFS Exh. 151. Collision with ground. Pilot fatality due to following potential causes: (1) the time allotted for mission brief was "insufficient to adequately cover a detailed game plan"; (2)

pilot training "did not involve high G, visual Air-to-Air maneuvering"; and (3) pilot's "low situational awareness ... placed him in a high task environment."

PFS Exh. 152. Collision with ground. Pilot ejection at 620 feet AGL during a contractor acceptance check flight, leading to fatal injury. "Momentary complacency ... provided the only reasonable explanation for this accident."

****84** PFS Exh. 153. Midair collision. Safe pilot ejection. Pilot "misperception" and "disorientation" were cited.

PFS Exh. 154. Collision during landing. Control tower controller deficiency noted. Pilot "operated his aircraft in violation of Air Force Regulation 60- 16" and pilot's "demonstrated lack of flight discipline" was cited.

PFS Exh. 155. Collision with ground. Potential pilot error due to pilot "delayed his recovery from a near vertical dive." Pilot was fatally injured.

PFS Exh. 159. Midair collision. Pilot's "failure to follow established guidance for required actions" was cited.

PFS Exh. 161. Collision with ground. Pilot fatality. Pilot "misprioritizing his tasks for a very short period of time while maneuvering at low altitude" was cited.

PFS Exh. 165. Collision with ground. Potential pilot errors committed in 360-degree spiral. "Distraction/preoccupation" and "inattention/complacency" were discussed as potential causes.

PFS Exh. 168. Midair collision. Collision between F-16 and C-130 caused 23 fatalities and 100 injuries to Fort Bragg Army personnel who were paratroopers in preparation for a jump. A minor pilot error was cited as "AFR 60-16 [paragraph] 4-4b was not adhered to by the F-16 pilot."

PFS Exh. 169. Collision with ground. Engine failed. Accident investigator found that "accident was the result of pilot error. The mishap pilot failed to follow two of the three basic rules in T.O.1F-16C-1 which apply to all emergencies."

PFS Exh. 171. Crash on takeoff. Accident investigator found that the aircraft "crashed because it was not properly trimmed for takeoff." The most likely reason for incorrect trim was found to be "the pilot's failure to return the TRIM/AP (trim/autopilot) switch to the NORM position during the after start checks and failure to check the trim in the center position prior to take off."

***183** PFS Exh. 172. Collision with ground. Accident investigator found six deviations from directives or publications by mishap crew members or others involved in the mission after bird strike occurred. "For an unknown reason, [pilot] descended through 6000 feet mean sea level, the assigned and published base of the [operating area] and leveled off at approximately 1000 feet above the ground.... There is no evidence to show that.... the designated element lead, made any attempt to prevent or correct the deviation from the assigned airspace."

PFS Exh. 178. Midair collision. Investigator found that cause of accident was "loss of situational awareness in the traffic pattern."

PFS Exh. 187. Collision with ground. Investigator found the pilot "failed to monitor his aircraft's position and flight path relative to the ground .... [T]his mishap was caused by human factors.... [P]reparation [and] experience ... can be overridden by a momentary lapse into 'seat-of-the- pants' flying due to some form of distraction.... [H]uman factors continue to be the ongoing limitation to perfect results."

**85 PFS Exh. 190. Midair collision. Investigator found that pilot failed to maintain sight of lead aircraft and he could no longer ensure safe separation between his aircraft and aircraft 257. Pilot "engaged the auto pilot for the second photo pass, in order to provide ... a more stable platform from which to fly .... [A]uto pilot [tolerances] must be closely monitored."

PFS Exh. 193. Collision with ground. Investigator found that "mishap was caused by human factors." Pilot "was unprepared for the degree of G tolerance reduction following his unloaded extension ....[E]ven with the most thorough preparation and capability, the human factor continues to limit perfect success."

PFS Exh. 195. Midair collision. Investigator found that "[b]y clear and convincing evidence, the midair collision] ... was caused by pilot errors by all three pilots involved." Two pilots "failed to effectively communicate, prioritize tasks, and control aircraft performance parameters to avoid collision. In simpler terms, they lost situational awareness."

PFS Exh. 197. Midair collision. Investigator found that there were numerous deviations from training rules. There was "failure to use proper 'see and avoid' techniques to ensure a clear flight path." Human factors cited include decreased situational awareness secondary to task saturation, task misprioritization, channelized attention, misperception of speed/closure rate.

PFS Exh. 200. Collision with ground. Investigator found that pilot "channelized his attention on some aspect of the attack and descended below the briefed recovery altitude, became spatially disoriented and impacted the terrain."

PFS Exh. 204. Aborted takeoff. Accident investigator found that "pilot failed to execute the abort procedure properly." There was a failure to deploy the SAFE-BAR Arresting System. Had the system been deployed "it would have prevented the mishap aircraft from departing the overrun."

*184 PFS Exh. 206. Collision with ground. Investigator found accident was caused by "G-induced loss of consciousness (GLOC)." The cause of "the GLOC was the mishap pilot's failure to execute a proper AGSM while initiating the conversion turn during the mishap intercept."

PFS Exh. 207. Collision with ground. Investigator found that "this mishap is the result of the combined effects of several errors made by the mishap pilot." Pilot "did not maintain proper spacing from and visual contact with" other aircraft.

PFS Exh. 218. Landing gear collapse on landing. Investigator found that pilot failed "to properly control his descent rate during landing. ... [A]ircraft was descending in a slight left bank at around 23 ft/sec, well above the 10 ft/sec design limit." (reference omitted)

Joint Exh. 8. Collision with ground. Investigation found that "[mishap pilot] failed to recognize ... mechanical malfunction in a timely manner." When engine failed, mishap pilot "did not take command of the flight.... descended rather than maintain his altitude.... did not request assistance.... did not complete all the steps recommended by the flight manual checklist to correct [fuel situation]."

**86 Joint Exh. 10. Collision with ground. Pilot attempted to avoid populated area after engine failed. Ejected at 209 feet; aircraft crashed into populated area destroying a house and killing a child.

We do not suggest any statistically valid inferences can be drawn from the reports just mentioned. But we do find that the reports provide powerful evidence concerning the many ways human error leads to failure. And while the errors recounted therein did not take place during the "ground-site avoidance" phase of flight, they nonetheless demonstrate that errors take place in many other phases of flight. That demonstration provides us good reason not to accept the notion that in the particularly stress-filled phase of flight in which we are interested (and after the accident scenario has been initiated), near-flawless performance in ground-site avoidance will result.

(5) PILOT FAMILIARITY WITH SITE

B.71 The Applicant stresses that pilots flying in Skull Valley will know where the facility is because it will be prominently visible. Lt. Colonel Horstman agreed that it would be one of the largest built-up areas and would have perhaps the tallest structure in Skull Valley and would be of "fairly unique" appearance. Tr. at 13,510-11 (Horstman). The restricted area will have 130-foot light poles around its boundary to provide illumination 24 hours a day. Cole/Jefferson/Fly Post Tr. 3061, at 66 n.80; Aircraft Crash Report at 22. Pilots will see the site as they fly over it from week to week, even as it is being constructed. Tr. at 3600-01 (Fly). Observing their surroundings is something pilots constantly do while they are flying their aircraft. Tr. at 3551-53 (Fly), 3599 (Cole).

*185 B.72 Further, as the Applicant discussed in its proposed findings, in addition to its visibility, because of the nature of the facility, the location of the facility within the middle of the Valley will be well known to the pilots who fly through Skull Valley. PFS Findings ¶ 97. From the time the pilot enters Skull Valley about 25 miles to the north of the facility he will have mountains on both sides and a road down the center of the Valley. See SER at 2- 3 to 2-5. He will also have a flight plan developed, a flight map of the area, and will know his course of flight in relation to these prominent landmarks, including the facility. Tr. at 8417-19 (Horstman), 13,049-52 (Fly) (discussing pilots' use of landmarks and instruments in the event of reduced visibility due to weather).

B.73 In addition to the pilot's own personal awareness and familiarity with the Valley from flying F-16s, the Applicant argues that the site's location will be noted, along with other nuclear facilities, in Defense Department aviation planning guides. Aircraft Crash Report at 90-91; see also Tr. at 3519- 20 (Cole), 13,114 (Fly). The Department of Defense's Area Planning Guide provides guidance to planners of military training routes regarding location and avoidance of

radioactive waste facilities and is updated every 56 days. Campe/Ghosh Post Tr. 4078, at 21.

**87 B.74 Finally, PFS asserts, if pilots at Hill AFB determine to use the Applicant's facility regularly as a primary visual reference point, the facility will be known to those pilots. Cole/Jefferson/Fly Post Tr. 3061, at 42. In that event, pilots would be able to see or at least be aware of the location of the Applicant's facility in Skull Valley. Id. Along with other sensitive areas beneath the airspace of the UTTR, such as the chemical and biological laboratories on Dugway Proving Ground, the facility would be depicted on aviation maps and its location published in Air Force instructions for the UTTR. Tr. at 13,114 (Fly). Pilots also receive orientation with respect to safety hazards when they come to a new base which would make them further aware of the facility, assuming that the Air Force instructs pilots as to the potential hazard of hitting the facility. Tr. at 3781-82 (Cole), 3783 (Fly).

(6) OPEN SPACE SURROUNDING SITE

B.75 In Skull Valley, the Applicant's proposed facility would be the largest structure in the area. Tr. at 3600. Skull Valley itself is sparsely populated and on the Skull Valley Band Reservation, near the proposed facility, there are two tribal homes approximately 2 miles southeast of the proposed site, additional residences about 3.5 miles east-southeast of the site, and off the Reservation, two private farm residences located approximately 2.75 and 4.0 miles northeast of the site. See SER at 2-4. Generally, the area surrounding the proposed facility is characterized by open space and is undeveloped with mostly limited grazing and agricultural uses. See FEIS at 3-41. In addition, the Applicant notes that there *186 are no residences or structures of any kind to the west of the site. Aircraft Crash Report at 22. From these facts, the Applicant claims that a pilot flying down the middle of the Valley in the general direction of the site could divert to the west to avoid crashing into people, but would have to be cognizant of the restricted airspace. Tr. at 13,703-04 (Jefferson). Similarly, says the Applicant, an F-16 following the predominant route east of the site could be somewhat east of the other structures in the general vicinity and could, before ejection, continue the same direction, or make a slight turn toward the Stansbury Mountains, to ensure site avoidance. Tr. 13,700-01 (Fly).

B.76 In rebuttal to the Applicant's claims, the State points out that two F-16 accident reports presented by the Applicant show that a pilot would have difficulty avoiding the facility. See State Findings ¶ 75 (citing accidents of July 11, 1996, and August 31, 1992). The July 11, 1996 accident (in which the aircraft struck a house) occurred after an engine failure during an attempted emergency landing at the Pensacola Regional Airport. See Joint Exh. 10. At the point the pilot realized he could not make it to the runway, "[t]here were houses everywhere he looked below him." Joint Exh. 10 at 5. The pilot nonetheless continued maneuvering the airplane to avoid structures on the ground up to the very last moments possible. In the August 31, 1992 accident, the pilot did not hit anything. The accident report stated that the aircraft impacted approximately 150 yards from two inhabited dwelling structures. PFS Exh. 140 at 4. The land on which the aircraft impacted was a "wooded area," id. at 2, that "contained primarily trees and underbrush," id. at 4.

(7) GOOD WEATHER AND VISIBILITY

**88 B.77 The Applicant argued generally that the lack of cloud cover over Skull Valley and a pilot's ability to maintain positional awareness in cloudy conditions through visual identification of landmarks and the use of navigational tools would assist pilots in avoiding the PFS facility in an emergency ejection situation.

(a) Presence of Cloud Cover

B.78 According to the Applicant, the weather in Skull Valley is generally excellent. PFS Findings ¶ 99. Actual ceiling data based on 30 years of climatological data from Michael AAF show that 70.5% of the time there is no ceiling at any altitude combined with a visibility greater than or equal to 7 miles. Vigeant Post Tr. 3090, at 4. Because Michael AAF is close to the proposed facility site in Skull Valley and because the data were specifically collected by the Air Weather Service to support aviation operations at Dugway Proving Ground, the ceiling and visibility data would be closely representative of that for the facility site. Id. at 6.

*187 B.79 The Applicant also contends that cloud cover in Skull Valley that would affect a pilot's ability to see the facility at the altitudes flown by the F-16s would be very uncommon. The same 30 years of climatological data from Michael AAF shows there is no ceiling below 5000 feet AGL (where the F-16s mostly fly) and 7 or more miles of visibility 91.5% of the time. Cole/Jefferson/Fly Post Tr. 3061, at 53; Vigeant Post Tr. 3090, at 4. Because a ceiling as defined by the FAA is indicative of a pilot's ability to maintain sight of a point on the ground for a sufficient length of time to land an aircraft without using instrument procedures, Tr. at 13,458-59 (Horstman), these data show that more than 90% of the time clouds would not impair a pilot's ability to see and avoid the facility while flying through Skull Valley. Further, specific cloud cover data from Salt Lake City show that 79% of the time there would be no clouds (or fog) below 5000 feet AGL whatsoever. Tr. at 13,061 (Fly); PFS Exh. 245. Applicant witness Vigeant collected surface weather observations from Salt Lake City International Airport for calendar year 2001. See Tr. at 13,055-56 (Vigeant); PFS Exh. 245. The information presented gives the amount of cloud cover at various layers and includes the altitude of each cloud layer. Tr. at 13,056 (Vigeant). The data show that out of 108 observations, only 23 had any clouds reported at altitudes below 5000 feet AGL -- the elevation threshold of the Sevier B MOA. Tr. at 13,059 (Fly); PFS Exh. 245. Thus, in 79% of the time, there were no clouds observed. Tr. at 13,061 (Fly). The data for observations reported at altitudes below 5000 AGL [FN143] are set forth below:

Overcast (100% cloud covered)	9% of the time
Broken (5/8 to 7/8 cloud covered)	3% of the time
Scattered (3/8 to 4/8 cloud covered)	6% of the time
Few (2/8 or less cloud covered)	4% of the time

**89 PFS Exh. 245.

B.80 Based on the data collected by Mr. Vigeant, the State posits that the cloud coverage for

Skull Valley represents a ceiling at 5000 feet 12% of the time. State Findings ¶ 86. The State also asserts that a pilot's view of the Applicant's facility will be obstructed when cloud coverage is 50% or greater and there is a high probability it will be obstructed when the sky is 25% cloud covered. Horstman Post Tr. 4214, at 21-24; Tr. at 8377-84 (Horstman). As a result, it ***188** points out that a pilot will not be able to see the Applicant's facility at least 12% of the time and may not be able to see the facility up to 21% of the time. See State Findings ¶ 86. The State presented its own table, "Air Weather Service -- Climatic Brief," that the State contends shows that there is greater than 50% cloud cover in Skull Valley 46% of the time at or below 12,000 feet AGL. See Horstman Post Tr. 4214, at 22; see also State Exh. 59 (Climatic Brief table).

B.81 In response, the Applicant contends that the State incorrectly interpreted the cloud data contained in the Climatic Brief table. Vigeant Post Tr. 3090, at 7. Mr. Vigeant testified that the Climatic Brief table relied on by the State indicates that there is greater than 5/10 cloud cover 46.3% of the time on an annual basis, but that it does not provide the altitude of the various cloud layers, and it does not state whether the cloud cover constitutes a "ceiling." Id. Ceiling height is the height of the lowest sky cover that results in cumulative opaque sky of more than half. Id. at 8. In contrast, sky cover is the amount of sky covered by clouds -- whether transparent or opaque. Id. Therefore, according to Mr. Vigeant, the Climatic Brief table, in referring to sky cover, does not provide any information regarding the frequency of occurrence or extent to which the sky in Skull Valley would be covered by opaque clouds, Id. at 9. Rather, the cloud cover observations were not made with respect to altitude, but, instead, were made on the basis of total sky coverage expressed in tenths. Thus, 2/10 sky cover at 1000 feet AGL would be reported the same as 2/10 cloud cover at 20,000 feet AGL. Id. at 8.

B.82 For its part, the Staff argues that the data provided by the Applicant provide information regarding the fraction of the sky covered by opaque clouds and the altitude at which those clouds are located and, therefore, is more appropriate for an analysis of whether a pilot flying through Skull Valley would be able to locate visually a ground structure than the information provided by the State in its Climatic Brief table. See Staff Findings ¶ 2.381. Furthermore, the Staff believes the Applicant's ceiling versus visibility chart supports a finding that the annual percentage of occurrence of "no ceiling" at or below 5000 feet AGL, combined with a visibility of greater than or equal to 7 miles, is 91.5%. See Staff Findings ¶ 2.381.

(b) Pilot Ability To Maintain Positional Awareness

i. Pilot Ability To See in Cloud Cover

****90** B.83 The Applicant argues that the presence of clouds, whether they constituted a ceiling or not, would not necessarily obstruct the pilot's view of the facility. That would depend on the relative positions and altitudes of the clouds, the pilot, and the facility. Cole/Jefferson/Fly Post Tr. 3061, at 52-55; Tr. at 13,032-36, 13,038-42, 13,095-96 (Fly). The Applicant's testimony showed in graphic form that where there is a ceiling, a pilot below the ceiling (and in some cases a pilot above) could see the facility with no difficulty. Cole/Jefferson/Fly ***189** Post Tr. 3061, at 53-55; Revised Addendum, Tab FF, Figs. 9-1 to 9-12. In fact, one of the accident reports describes how the pilot purposefully glided down through an overcast cloud layer, spotted farms

on the ground, avoided them, and then ejected. See Tr. at 13,579-80 (Horstman); Joint Exh. 9 at 2, 13-14. Thus, the Applicant argues that even total cloud cover below a pilot might not prevent him from ultimately seeing the facility before he ejected. PFS Findings ¶ 131.

B.84 During the course of the hearing, the Licensing Board was presented with three visual demonstrations regarding the impact of cloud cover on the ability of a pilot to see objects on the ground. See Tr. at 8377-85 (State demonstration); Tr. at 13,033-53 (Applicant demonstration); Tr. at 13,420-29 (second State demonstration). With respect to the first demonstration, Lt. Colonel Horstman placed Scrabble tiles across the top of a tablet of paper to depict clouds. Tr. at 8378 (Horstman). He covered 25% of the tablet with the Scrabble tiles to demonstrate scattered cloud coverage. Tr. at 8379 (Horstman). He testified when looking directly down from the top, a fairly significant portion of the tablet is visible, but when viewing at a 10-degree angle, a small portion is visible. Tr. at 8380 (Horstman). The State argues that because clouds have vertical development and because a pilot's view of the ground is at an angle, a sky that is 25% cloud covered may completely block the pilot's view of the ground. Tr. at 8377-84 (Horstman). It points out that clouds are generally dense enough that they cannot be seen through. See State Findings ¶ 24. Even clouds referred to as "transparent" cannot be seen through by a pilot viewing the ground at an angle. Tr. at 8575-76 (Horstman). The State further argues that a single cloud may be positioned at any given time to preclude a view of the Applicant's site. Revised Addendum, Tab FF.

B.85 The Applicant's witness, Colonel Fly, disagreed that the State's demonstration with the Scrabble tiles accurately replicated what a pilot would see if flying over clouds in Skull Valley. Tr. at 13,032 (Fly). [FN144] He stated that cloud layering is an important consideration in seeing the ground. Tr. at 13,032-33 (Fly). To demonstrate cloud layering, Colonel Fly placed cardboard rectangles on clear plastic columns of varying heights. Tr. at 13,034-35 (Fly). He demonstrated conditions of cloud cover ranging from 25% to 75%. As an airplane moves, due to the different cloud heights, a pilot would be able to see a feature on the ground and would be able to see different parts of roads, buildings, and terrain features coming in and out of the pilot's view. Tr. at 13,036-41 (Fly). These reference features serve to update the pilot as to his physical location. Tr. 13,041 (Fly). The ***190** Applicant argues that cloud cover -- even at 75% -- does not preclude a pilot's general positional awareness of the area. Tr. 13,048 (Fly).

****91** B.86 The State's witness agreed with respect to his demonstration that a pilot would have general situational awareness under conditions of 25% cloud coverage. Tr. at 8417 (Horstman). A pilot would be able to see portions of Skull Valley road and would be able to see portions of a rail line to the proposed facility. Tr. at 8417-18 (Horstman). Thus, Lt. Colonel Horstman agreed that generally speaking, a pilot flying above 25% cloud cover would have an idea of the location of the Applicant's site. Tr. at 8418 (Horstman).

B.87 With respect to the State's second demonstration, Lt. Colonel Horstman placed large styrofoam cups on top of plastic columns to demonstrate that cloud cover can be very difficult to see through. Tr. 13,420-21 (State second demonstration). Even in such a circumstance, however, Lt. Colonel Horstman agreed that a pilot would have a general idea of the location of the Applicant's facility. Tr. at 13,457 (Horstman). He further agreed that if 8/8 cloud cover is present below 5000 feet AGL, the overcast would likely be too thick to fly under, and therefore, pilots would tend to fly above the clouds in the Sevier D MOA. Tr. at 13,456-57 (Horstman).

B.88 General Jefferson noted that training activities would likely not take place if heavy, floor-to-ceiling cloud cover were present, and, therefore, pilots would not be flying under those conditions. Tr. at 13,097-98 (Jefferson).

B.89 Lt. Colonel Horstman acknowledged that cloud cover above the pilot would not affect his ability to see the facility. Tr. at 8374-75, 13,456 (Horstman). The State asserts that a pilot flying beneath cloud cover, however, would not zoom the aircraft into clouds in the event of an emergency, a procedure used to gain more time, but, instead, may be forced to eject immediately depending on the altitude of the aircraft. Horstman Post Tr. 4214, at 21. The State points out that sky conditions above 5000 feet through 14,000 feet in Skull Valley are overcast or broken (5/8 to 100% cloud covered) 23% of the time. PFS Exh. 245.

B.90 Lt. Colonel Horstman also testified, however, that a pilot would be able to zoom up to a point under the clouds. See Tr. 8425 (Horstman). Thus, if the clouds were at 3500 feet AGL, a pilot flying at 2500 feet AGL at 425 knots would zoom to 3400 feet and would have sufficient time to avoid the Applicant's facility. Tr. at 8423, 8426 (Horstman). Further, even if a pilot could not zoom, a pilot may nonetheless have time to avoid the Applicant's facility. In this regard, if cloud cover is present at 3500 feet, a pilot flying at 3000 feet should have approximately 15 seconds to glide from 425 knots to 200 or 225 knots without zooming. Tr. at 8403-04 (Horstman).

B.91 On a related matter, the State asserts that based on the Applicant's cloud layering data, if a pilot zoomed to the top of the Sevier D MOA, a significant amount of clouds would likely be below the aircraft that would impact the visibility of objects on the ground. Tr. at 13,418, 13,434-35 (Horstman).

****92 *191** B.92 In addition to cloud cover, the State asserts that the presence of ground fog may affect the ability of a pilot to avoid the Applicant's facility in an emergency. Horstman Post Tr. 4214, at 24. In this regard, the State claims that Utah often experiences severe ground fog in the wintertime. Horstman Post Tr. 4214, at 24.

B.93 In response, the Applicant argues that ground fog typically occurs in the morning hours and subsequently burns off. Tr. at 13,075 (Vigeant). Further, ground fog is a function of season, such that there are more occurrences of ground fog in the wintertime than in the summertime. Tr. at 13,113-17 (Vigeant). The weather data for Michael Army Airfield show that the frequency of occurrence of ground fog is 2.5% of the observations on an annual basis. Tr. at 13,075 (Vigeant).

B.94 In the event that ground fog is present in Skull Valley, the Applicant points out that it could rise to heights in the tens of feet or the hundreds of feet, depending on the degree of cooling and the availability of moisture. Tr. at 13,111-12 (Vigeant). Thus, a pilot would be able to fly above the fog in the Sevier B and Sevier D MOAs. In such a case, a pilot would be able to maintain situational awareness by reference to the mountains, which would be visible above the fog, and would be able to use the F-16's onboard navigation systems. Tr. at 13,079-80 (Fly).

ii. Ability To Maintain Positional Awareness Through Landmarks

B.95 In addition, the Applicant asserts, even clouds that obstructed a pilot's view of the facility would not deprive him of knowledge of his position relative to the facility. Tr. at 3288-90 (Fly). That knowledge is what the pilot needs to avoid the site. Tr. at 13,711 (Jefferson). He could use landmarks such as Skull Valley Road, the Applicant's railroad, and the Stansbury and Cedar Mountains to see where he was relative to the Applicant's site. Tr. at 13,038-41, 13,044-52 (Fly). Colonel Fly performed a demonstration at the hearing in which he showed that even with as much as 75% cloud cover, a pilot could see landmarks that would enable him to determine his position relative to the location of the facility. Tr. at 13,044-48 (Fly). Thus, the Applicant argues, pilots would be aware of the relative position of the PFS facility during an emergency due to the pilot's positional awareness maintained during the flight prior to an emergency or prior to a decision to eject. Cole/Jefferson/Fly Post Tr. 3061, at 53.

B.96 The State's witness, Lt. Colonel Horstman, asserts that use of the Stansbury or Cedar Mountains as reference points is unlikely to assist pilots in avoiding the Applicant's facility. Horstman Post Tr. 4214, at 25. In this regard, the State claims: (1) that it is improbable that a pilot could determine the location of the Applicant's facility in Skull Valley by reference to the mountain ranges and that, even if the location could be initially estimated, the location of the facility ***192** relative to the aircraft would be in constant change; (2) that a pilot would not attempt to head toward the mountains during an emergency because they are not safe places to eject; and (3) that the mountains themselves may be obscured by clouds and unavailable as visual reference points. Horstman Post Tr. 4214, at 25.

****93** B.97 PFS witness Colonel Fly testified that a pilot would not necessarily have to be able to see the ground in order to avoid a site on the ground. Tr. at 3288-89 (Fly). Thus, the Applicant asserts, if a pilot can see a terrain feature, such as a mountain peak, the pilot will be generally aware that if he points the aircraft toward the mountain range, he will be clear of what he wants to avoid. Tr. at 3289-90 (Fly). With respect to Skull Valley, Colonel Fly testified that in cloud cover, the mountains in the vicinity of Skull Valley would give a "good general feel" for where the Applicant's facility was located and would be available as a guide even if the aircraft is operating under a completely solid undercast. Tr. at 3601 (Fly). Moreover, in order to use the mountains as a steering reference, according to the Applicant, a pilot would only need to make a small turn toward them. Tr. at 13,701-02 (Fly). Turning a few degrees toward either the Stansbury or Cedar Mountain ranges would be sufficient to miss the Applicant's site. Tr. at 13,700-02 (Fly).

B.98 With respect to Lt. Colonel Horstman's assertion that a pilot would not attempt to head toward the mountains during an emergency because they are not safe places to eject, PFS counters that a pilot would be able to use the mountains as a general situational awareness aiming point and would be able to eject in Skull Valley shortly after placing the aircraft on a glide path that would direct it into the mountains. See Tr. at 13,701 (Fly) (a pilot would use the mountains for positional awareness in order to avoid a ground site). Lt. Colonel Horstman agreed that if a pilot was pointing the aircraft at the mountains prior to ejection, it would be possible for the pilot to eject before the aircraft reached the side of the mountain and that the pilot would not have to wait until directly over the mountain peaks to eject. Tr. at 13,508 (Horstman).

B.99 With respect to the State's assertion that the mountains themselves may be obscured by clouds and unavailable as visual reference points, the Applicant notes that the evidence regarding clouds in Skull Valley indicates that such an occurrence in which all mountain ranges

as well as the facility site would be obscured by clouds would be rare. See Revised Addendum, Tab FF. See also PFS Exh. W (describing the UTTR as having "excellent" weather and visibility). As described in more detail below, however, the Applicant points out that pilots flying under such conditions would rely on navigational aids to maintain positional awareness.

***193** iii. Ability To Maintain Positional Awareness Through Navigational Tools

B.100 In addition to landmarks, the pilot would have available his navigational instruments, map, and flight plan to assist in determining his position relative to the location of the facility. Tr. at 13,049-52 (Fly). [FN145] According to the Applicant, even above a complete undercast, as he flew down the Valley the pilot would be using instruments and his map and could refer to features like the mountain ranges, if visible, to maintain awareness of his position. Tr. at 3288-90, 13,052-53, 13,079-80 (Fly); Tr. at 8479-80 (Horstman). These onboard navigation aids are: the Inertial Navigation System (INS); the Tactical Air Navigation System (TACAN); the Horizontal Situational Indicator (HSI); and, for those planes so equipped, the Global Positioning System (GPS). Cole/Jefferson/Fly Post Tr. 3061, at 51. During typical missions, pilots will use both visual references and onboard navigation systems together to maintain positional awareness. Revised Addendum, Tab FF at 28.

****94** B.101 Inside the cockpit, the different instruments are physically mounted in a box, the glare shield. Tr. at 3114 (Fly). The heads-up display (HUD) is mounted on top of the glare shield and consists of a thick piece of glass. Underneath the HUD, a projector generates symbology -- electronic green markings and images -- up from the bottom of the glare shield onto the HUD. A pilot can see through the symbology and glass HUD and out of the aircraft. Tr. at 3114 (Fly). The target detection (TD) box is a green square that is projected onto the HUD and surrounds the selected steer point, a selected set of latitude and longitude coordinates. Tr. at 3114-15 (Fly). See Revised Addendum, Tab FF at 28. The TD box assists the pilot in finding the next geographical point on the planned route of flight for navigational purposes. Tr. at 3115 (Fly). Each steer point is programmed into the onboard INS, and the pilot selects which steer points he wants to use during a flight. Tr. at 3115, 13,049 (Fly) (steer points determined as part of mission planning). The INS can be used to navigate to or from the steer point or can be used to maintain awareness of the location of the steer point. Revised Addendum, Tab FF at 28. Colonel Fly noted that a pilot in Skull Valley would have a steer point programmed into the INS somewhere in the vicinity of the narrow neck of Skull Valley and would be able to figure out bearing and distance with respect to that point. Tr. at 3602 (Fly).

B.102 The F-16 is also equipped with the TACAN, which provides bearing and distance information from a selected ground station. Revised Addendum, Tab FF at 28. TACAN detects radio signals transmitted from different radio stations around the country, such as from Hill AFB, and will provide the pilot with the distance of the aircraft to the transmitting ground station. Tr. at 3289 (Fly). Thus, a ***194** pilot may know at any given time his position relative to Hill AFB. See Tr. at 3289 (Fly). In addition, some models of the F-16 are equipped with a GPS receiver, which uses the satellite navigation constellation to maintain positional awareness and makes the INS more precise. Revised Addendum, Tab FF at 28. The F-16 is also equipped with an onboard HSI, which displays distance and bearing to selected navigational steer points. Tr. at 13,050-51 (Fly). A pilot can use this equipment to maintain a ground track of the flight.

Cole/Jefferson/Fly Post Tr. 3061, at 51; Campe/Ghosh Post Tr. 4078, at 23. As Colonel Fly explained, the HSI would enable a pilot to determine the aircraft's location relative to a visible course line that connects the various steer points. Tr. at 13,050-51 (Fly).

B.103 In any event, the Applicant points out that the route of flight would be thoroughly planned beforehand with turn points along the way that the pilot could use as a reference to determine his position. Tr. at 13,049-51 (Fly).

B.104 The State argues that a pilot cannot rely on navigation instruments to locate the Applicant's facility during an emergency. Horstman Post Tr. 4214, at 24. In this regard, the State asserts that during an engine failure, the precision of the navigation system is reduced, and the instruments will work on and off for short periods of time as the electrical system switches to the backup systems. Id. Lt. Colonel Horstman testified that once the emergency power unit (EPU) comes up to speed, it takes more time to power the bus, which is "not instantaneous." Tr. at 8484 (Horstman). He also stated that once the HUD returns, some of the information available to pilots does not come back. Id. He agreed, however, that the HUD would continue to display the steer points. Id. at 8486.

**95 B.105 The Applicant counters that the HUD shuts down when the main generator shuts down and comes back as soon as the standby power system comes on line. Tr. at 3118-19 (Fly). The time in which the HUD is off during this time is approximately 2 seconds, which is "a very short period of time." Tr. at 3124, 3590 (Fly). The F-16 operating manual states that the emergency power unit is designated to operate automatically for main and standby generator failure "or if the engine is shut down in flight." Technical Order 1F-16C-1, at 1-94 (PFS Exh. OOO). Further "[a]fter receiving any start command, the EPU requires approximately 2 seconds to come up to speed." Id. Colonel Fly also testified that the INS would still show the relative bearing and the distance to the selected turn point in the event of an engine failure. Tr. at 13,053-54 (Fly).

B.106 The Applicant maintains that the area around the facility is wide open so the pilot would not have to have a highly precise picture of its location in order to avoid it. Tr. at 13,711 (Jefferson) As discussed above, the only other buildings present near the facility are the Goshute village, about 3.75 miles east of the site, and two ranches, located 2.75 and 4.0 miles northeast of the site, and Tekoi (no longer in operation) 2 miles to the southeast. There are no structures of any kind to the west of the site. Aircraft Crash Report at 21-22.

*195 (c) Pilot Ability To See Site During Emergency Procedures

B.107 In addition to cloud cover potentially limiting a pilot's ability to see the PFS facility, the State asserts that during an emergency zoom, a pilot's vision will be partially blocked so that he is unable to clearly see the facility. State Findings ¶ 96. The State asserts that a pilot flying straight and level in an F-16 can see only 11 degrees below the horizon before the nose of the aircraft obstructs the pilot's view. See State Findings ¶ 91. Therefore, a pilot flying through Skull Valley at 425 knots and 4000 feet AGL would not be able to see the ground for a distance of over 4 miles in front of the aircraft. Tr. at 13,639-40 (Fly). Assuming a Skull Valley emergency caused by an engine failure, the State asserts that the task of a pilot includes the following

events:

B.108 Upon realizing the engine has failed, a pilot will zoom the aircraft, trading speed for altitude to prolong the time aloft before crashing. Horstman Post Tr. 4214, ¶ 61. During the zoom, the aircraft nose will be pointed 30 degrees nose high, blocking the view of the ground in front of the aircraft. Tr. at 13,080-81 (Fly). If the pilot had been flying at an altitude of 4000 feet AGL, the State estimates the zoom would take the F-16 to approximately 7000 or 8000 feet AGL. Tr. at 13,453 (Horstman). In accordance with the F-16 flight manual, as the State points out, upon reaching the airspeed of 250 knots the pilot will end the zoom by "pushing the plane over" and start a descent. Tr. at 13,299-300 (Horstman). The maneuver of pushing the plane over uses some of the F-16's energy and the aircraft slows to approximately 200 knots. Tr. at 13,300-01 (Horstman).

****96** B.109 The State estimates that the F-16 will then begin a glide at the speed of 200 knots with approximately a 6-degree angle of descent. Tr. at 13,301 (Horstman); see also Tr. at 13,641-42 (Fly). If the emergency occurred in the general area of Skull Valley, the State asserts the pilot would then turn the aircraft toward Michael Army Airfield, the designated emergency airfield and attempt to restart the engine during the glide. Tr. at 8576-79, 8601-05, 8625-27 (Horstman). It points out that during the glide descending at 6 degrees, the pilot's view will be obscured in front of the aircraft for a distance of approximately 5500 feet for every 1000 feet of altitude. See State Findings ¶ 94. According to the State, as the aircraft continues on this glide path, the pilot will not be able to see ground terrain closer than 22,000 feet (4.16 miles), in front of the aircraft at the altitude of 4000 feet AGL, nor closer than 13,750 feet in front of the aircraft at an altitude 2500 feet AGL. Tr. at 13,639-42 (Fly).

B.110 The State asserts that upon reaching the altitude of 2500 feet AGL, the pilot will slow the F-16 to the slowest possible speed in preparation for ejection. See State Findings ¶ 95. According to the State's witness, slowing the F-16 for ejection is done by raising the nose of the aircraft up to as much as 20 degrees above the horizon, at which point the nose of the aircraft will block the pilot's view of the ground in front of the aircraft for 10 miles. Tr. at 13,303 (Horstman). ***196** The F-16 will remain at as much as 20 degrees nose high until the pilot ejects. Tr. at 13,303 (Horstman). As a result, the State calculates that at the minimum ejection altitude of 2000 AGL, the F-16 will be 3.22 miles from the crash impact site. Tr. at 13,612-13, 13,624 (Horstman).

B.111 The State further argues that after the pilot ejects, assuming the aircraft was correctly aimed, the aircraft would have to travel for over 3 miles without changing direction in order to crash at the selected site. However, if the pilot ejects at a slight bank, the aircraft's computer will hold that bank which will generate a turn in the F-16's heading. Tr. at 8525- 26 (Horstman). Even if the aircraft is not initially in bank, an F-16 gliding from 4000 feet AGL may roll and bank, causing it to deviate 10 to 20 degrees from its initial heading. Tr. at 4016-17 (Cosby). Simple trigonometry shows that an F-16 aimed at a ground site from 3.2 miles away that deviated off course by 10 degrees would miss its target by over one-half mile. In such a case, an aircraft aimed to crash one-half mile away from the Applicant's site may in fact hit the site.

B.112 The Applicant disagrees with the State's claim that during the zoom and glide maneuver that a pilot would execute in response to an engine failure in Skull Valley, his view of the ground in front of the aircraft would be "substantially impaired." PFS Reply ¶ 144. First, PFS argues, the

pilot would know where he was relative to the facility immediately prior to suffering the engine failure. Tr. at 13,053-54 (Fly). Second, during the entire glide descent, the pilot will be able to see the ground in front of the aircraft sufficiently far ahead to see where the aircraft would hit if the pilot did not turn it. Tr. at 13,642-44 (Fly). Furthermore, the pilot has a larger field of view just to each side of the nose of the aircraft. Tr. at 13,640-41 (Fly). Thus, the pilot's view of sites on the ground that the aircraft might hit would not be obstructed.

**97 B.113 PFS also contends that there is no requirement for a pilot to raise the nose of the aircraft 20 degrees above the horizon prior to ejecting. PFS Reply ¶ 145. According to the Applicant, the ejection procedures in the pilots' operation manual make no mention of raising the nose above the horizon. PFS Reply ¶ 145. The prescribed emergency procedure tells the pilot to eject at the "lowest practical airspeed." PFS Exh. PPP at 3-42, 3-43. Finally, a pilot would turn to avoid the facility before he ejected, so even if he were to raise the nose of the aircraft, by the time he was doing so, he would no longer be pointed at the facility. Tr. at 3921 (Bernard), 3776-78 (Cole/Fly/Jefferson), 4026-27 (Cosby).

(8) FLIGHT CONTROLS

B.114 According to the Applicant, avoidance of the site would also be facilitated by the F-16 flight control computer, which keeps the F-16 on a straight *197 course after the pilot ejects. [FN146] Aircraft Crash Report at 21; Tr. at 3507 (Jefferson), 3996-98; see Tr. at 4016-17 (Cosby). The computer will attempt to keep the aircraft flying at a constant altitude by increasing the angle of attack of the aircraft as it decelerates. Once the aircraft reaches a programmed angle of attack, the computer will hold that attitude and heading as the aircraft descends while maintaining that angle of attack. Aircraft Crash Report at 21. The aircraft will most likely impact the ground at a velocity between 170 and 210 knots at a point along the straight- ahead flight path from the point of pilot ejection. Aircraft Crash Report at 21; Tr. at 3096-99 (Fly). The aircraft may roll slightly about its longitudinal axis after the pilot ejects, but the flight path along the ground would remain basically unchanged. Tr. at 4019-20, 4025-26, 4029-30 (Cosby). This would be the case even with the aircraft canopy gone after the pilot ejects. Tr. at 3527 (Fly).

(9) APPLICANT'S CONCLUSION

B.115 Based on the above eight factors, the Applicant's expert panel concluded that "a pilot who remained in control of the aircraft after the event precipitating the crash would invariably take action to have the crashing F-16 miss the site." Aircraft Crash Report at 23; see Cole/Jefferson/Fly Post Tr. 3061, at 17. They found further support for this conclusion in the "F-16 accident investigation reports, which show that pilots do, when relevant, maneuver [the] aircraft to avoid sites on the ground." Nevertheless, to account for possible unforeseen circumstances they determined that a pilot in control of a crashing aircraft would be able to direct the aircraft away from the facility not all the time, but only 95% of the time. Cole/Jefferson/Fly Post Tr. 3061, at 17.

b. Evaluation of Accident Reports for Probability of Pilot Avoidance

(1) APPLICANT'S METHODOLOGY

B.116 As discussed above, based upon its eight-factor evaluation of the time and circumstances involving likely emergencies that might occur while transiting Skull Valley, the Applicant's expert panel determined that "a pilot who remained in control of the aircraft after the event precipitating the crash would invariably take action to have the crashing F-16 miss the site." Aircraft Crash Report at 23; see Cole/Jefferson/Fly Post Tr. 3061, at 17. In addition, the Applicant's expert panel relied upon the accident reports for confirmation of their professional assessment. Cole/Jefferson/Fly Post Tr. 3061, at 17. The Applicant asserts that the accident reports showed that pilots in control of a crashing aircraft do in ***198** fact take necessary action to avoid sites on the ground after an accident-initiating event. Id. In addition, it points out that the accident reports showed no cases in which a pilot failed to take steps to avoid or minimize damage to facilities or populated areas on the ground. Id. Based on their review of the accident reports, the Applicant's panel believed that the percentage of pilots in control who would avoid the facility could reasonably be set at 100%. Id. Nevertheless, to account for possible unforeseen circumstances, they determined that a pilot in control of a crashing aircraft would be able to direct the aircraft away from the facility only 95% of the time. Id.

****98** B.117 In response to questions from the Board, the Applicant's expert panel undertook a more formal evaluation of the accident reports for information concerning pilot avoidance. Tr. at 8662-63 (Jefferson). The evaluation focused on the F-16 accident reports for the fifty-eight accidents that the expert panel initially determined were Skull Valley-type events in which the pilot retained control of the aircraft. See PFS Exh. 100A. Because many of the accidents occurred in military training areas with little or no civilian population, many of the accident reports do not contain any discussion of pilot avoidance because of the lack of populated or built-up areas that would require avoidance. Tr. at 13,107 (Jefferson). Therefore, in addition to direct evidence of steps a pilot may have taken or not taken to avoid populated or built-up areas, the Applicant's expert panel also looked at a pilot's maneuvering of the aircraft as indicating that he had situational awareness and knew where he needed to go, as well as the absence of actual damage on the ground caused by the impact as indicating that the pilot did not fail to take action to avoid a site or structure on the ground. See, e.g., Tr. at 13,106-07, 13,117 (Jefferson); Tr. at 13,099-103 (Jefferson/Fly).

B.118 The Applicant's expert panel conceded that its evaluation of the accident reports was not a statistically based evaluation. Tr. at 13,109-10, 13, 121-22 (Jefferson). Rather, it was a qualitative evaluation of information in the reports relevant to the issue of pilot avoidance. Tr. at 13,118-24 (Jefferson/Cole). The Applicant argues that what is highly significant in this respect is that the reports show no instance in which a pilot failed to take steps to avoid or minimize damage to facilities or populated areas on the ground. PFS Findings ¶ 145.

B.119 The expert panel's evaluation of the fifty-nine Skull Valley events in which the pilot retained control of the aircraft showed seventeen instances where specific actions were taken by the pilot to avoid areas or structures on the ground after an accident-initiating event. Tr. at 8662-63 (Jefferson). In addition, the Applicant points out that the accident reports showed

twenty-nine cases in which the pilot turned toward an emergency airfield or took some other action indicating that he had situational awareness and knew where he needed to go. Id. Finally, the remaining thirteen accident reports showed no cases where the pilot had the opportunity to avoid a facility or populated area on the ground but failed to do ***199** so; in other words those reports showed no harm to people or structures on the ground. Id. [FN147]

B.120 The Applicant asserts that the accident reports clearly confirm a key fact that all pilots have testified to in this proceeding -- that time and circumstances permitting, a pilot will avoid populated and built-up areas. PFS Findings ¶ 147. For example, a number of the reports show that the mishap pilot maneuvered the aircraft in order to avoid populated areas or particular structures and built-up areas that were directly in their flight path. Id. The clearest example of this is the accident report involving Colonel Cosby as amplified by his personal testimony. The accident report succinctly states that: "Noticing a residential area in [his] flight path, [Colonel Cosby] made a 2-G left turn ...." PFS Exh. 79, Bates No. 57619. The Board heard Colonel Cosby's testimony in particular that he saw an apartment complex in front of him and made a hard 180-degree turn to the left in order to avoid it. Tr. at 3980-81 (Cosby). The Applicant argues that a 180-degree turn reversing direction is clearly much more than would be required for a pilot to turn and avoid the facility. PFS Findings ¶ 147. In addition, as Colonel Cosby was attempting to land he saw another plane on the taxiway on which he was trying to land and again maneuvered his aircraft ("put[ting] the airplane off in the infield") to avoid the plane. Tr. at 3980-81 (Cosby).

****99** B.121 The Applicant argues that in addition to the reports stating explicitly that the pilot avoided an area on the ground, twenty-nine other reports showed cases in which the pilot turned toward an emergency airfield or took some other action indicating that he had situational awareness and knew where he needed to go. Tr. at 8663 (Jefferson). Those cases show that the pilots knew where they were and acted accordingly in the event of an emergency, whether turning toward an emergency airfield, away from a populated area, or both. Tr. at 13,102 (Fly). In the June 7, 1996 accident, the report specifically states that the pilot made an "instinctive" turn back toward his home base when the incident began. Joint Exh. 9 at 2. In the April 18, 1991 accident, "[t]he mishap pilot immediately zoomed the aircraft, turned toward home base and initiated engine airstart procedures." PFS Exh. 127, Bates No. 57137. In the September 11, 1993 accident, "During a pull up after the third bombing pass, Bronco 3 experienced a momentary airframe vibration which stopped, then reappeared moments later on the base turn. [He] terminated the bomb pass and began a climb towards the emergency divert field." PFS Exh. 158 at 1. According to PFS, these are just a few examples in the reports ***200** that clearly show that the pilots have an awareness of where they are and what needs to be done in the event of an emergency.

B.122 Finally, the Applicant points out that, although the remaining thirteen accident reports did not state whether the pilot maneuvered, they reported no harm to people or structures on the ground, i.e., they showed no cases where the pilot had the opportunity to avoid a facility or populated area on the ground but failed to do so. See Tr. at 8663 (Jefferson); see also PFS Exh. 100A. [FN148] While this last group of reports contains less explicit information than the first two, the Applicant says the point they stand for is important. Arguing that if the probability of failure is defined as one minus the probability of success, the Applicant posits that because the reports show no cases of failure to avoid, they support a finding that the probability of successful avoidance is 100%. Tr. at 13,117 (Jefferson); Aircraft Crash Report, Tab H at 28 n.22.

B.123 The Applicant also indicates that the accident reports highlight the assistance provided the accident pilot by his wingman (or in one case, air traffic control) in terms of directing the aircraft away from structures and facilities on the ground and other aspects of responding to the emergency. PFS Findings ¶ 154. Colonel Fly testified that he would expect other flight members to alert a pilot of an aircraft with a problem to the location of the facility or any other area to avoid. Tr. at 13,658-59 (Fly). His testimony is supported by the accident reports describing flight members (and in one case, air traffic control) helping pilots respond to their emergencies and avoid areas on the ground. [FN149] Therefore, because F-16s typically transit Skull Valley in flights of two or four aircraft, there is additional reason to believe that a pilot would be able to avoid the facility in the event of an accident.

(2) STATE CHALLENGE

****100** B.124 With respect to the Applicant's review of 126 U.S. Air Force F- 16 mishap reports for the 10-year period 1989 through 1998 and the 58 reports identified in PFS Exh. 100A, the State argues that even before reviewing the reports, the Applicant had already concluded that 95% of pilots would be able to avoid the Applicant's site, Tr. at 3967 (Jefferson), and that the reports were reviewed and PFS Exh. 100A was prepared to justify the 95% component of the "R" factor. Tr. at 13,100 (Jefferson).

***201** B.125 The State further challenges the use of the reports on the basis that Air Force mishap reports are not prepared for the purpose of determining if the pilot avoided a ground site or could be counted on to avoid a ground site, a fact that the Applicant acknowledges. Tr. at 13,118 (Jefferson). Air Force regulations requiring when and how mishap reports are prepared do not include guidance on the subject of the pilot's avoidance of a ground site. Tr. at 13,119 (Jefferson); State Exh. 60, Ch. 8.

B.126 The same fifty-eight crashes shown in PFS Exh. 100A as examples of where "the pilot retained control and had enough time to avoid a specific site" were reviewed extensively by Lt. Colonel Horstman. Tr. at 13,362-66 (Horstman). Contrary to the Applicant's findings, Lt. Colonel Horstman's review of those fifty-eight crashes shows that in no case did a pilot identify a specific ground site from the minimum ejection altitude of 2000 feet and take some maneuver to avoid it. State Exh. 223, [FN150] Tr. at 13,370-92, 13,407-10, 13,445-47 (Horstman). According to the State, the pilot task contemplated by the Applicant's avoidance factor, the identification of a ground site from a distance of 3.22 miles or more, and turning away from that sight did not happen a single time during the 10-year period reviewed by the Applicant. Id.; State Exh. 223.

As may be seen from the above, the Applicant made a commendable attempt to demonstrate that there were no insurmountable obstacles to pilots succeeding in the site avoidance behavior upon which the Applicant's case depends. But the Applicant's showing could not overcome the State's countering showing that, first, in some circumstances obstacles would exist, and that second -- and more important -- accident experience, recognized in Air Force directives and memorialized in crash reports, establishes beyond doubt that human beings, under stress, fail even though the conditions for success exist.

Accordingly, we cannot find otherwise than that the Applicant's claim of near certain success in

human performance under stress-filled conditions was simply not proven. As we said at the outset of this Subpart, we find that in light of the whole of the evidence the State presented -- covering a number of different problem areas and pointing to Air Force acknowledgment of pilot error -- the Applicant failed to carry its burden on its assertion that pilots would, before ejecting, almost invariably (95% of the time) act affirmatively to guide their aircraft away from striking the PFS facility in the event of an impending crash. In short, in view of the totality of the evidence presented by the parties, the Applicant has not sustained its claim that pilots will successfully avoid the site in virtually every instance.

***202** C.Four-Factor Formula

****101** In this final Subpart, we address the many disputes among the parties as to the values that should be used for the standard factors that make up the classic NUREG-0800 formula. Again, a central message is that for three of those factors, the data that exist are largely not directly on point, and the values for the factors have to be derived indirectly from such data. Many of the disputes, then, turn on what is the most appropriate way to conduct those derivations.

1. Background

C.1 In accordance with the review guidelines described in NUREG-0800 § 3.1.5.6, "Aircraft Hazards," the Staff reviews all potential aircraft activity in the vicinity of a nuclear facility, such as a reactor or an away-from- reactor spent fuel storage site. Campe/Ghosh Post Tr. 4078, at 7. This review includes the consideration of general, commercial, and military aviation. Campe/Ghosh Post Tr. 4078, at 7. The review covers specific aviation aspects such as nearby airways and airports, taking into account aircraft types, air traffic density, and specific airway and airport characteristics. Id.

***203** 2. Formula

C.2 The formula for calculating aircraft crash probability for nuclear facilities is

$P = C \times N \times A/w$

where P is the annual probability of an aircraft crash and the four factors represent, respectively the Crash rate (per mile), the Number of flights (per year), the Area of the facility (in square miles), and the width of the airway (in miles). There is no dispute among the parties -- apart from that over the R factor -- that this formula is an appropriate method for calculating the aircraft crash hazard for the proposed facility. The governing Commission criterion, established in this case, allows a facility like this one to be licensed if the calculated probability of an aircraft crash on the site is less than one in a million (1 x 10-6) annually.

3. Basic Disagreements

C.3 The State disputes the numerical values the Applicant and the Staff would assign to three of the four factors required by the NUREG-0800 equation. The disputed factors are crash rate (C); number of aircraft (N); and width of airway (w). According to the State, both the Applicant and Staff have selected values for these parameters that are incorrect and result in estimates of annual crash probability on the PFS site that are low.

****102** C.4 There is no dispute among the parties regarding the fourth factor, which specifies the effective area of the PFS site. All parties accept the area determined by the Applicant (1.337 square miles) as the appropriate value. The Board has reviewed that determination and we accept it as reasonable.

4. Input Values

a. Crash Rate per Mile (C)

C.5 The Applicant believes the crash rate of F-16s to be 2.736 x 10-8 per mile for normal in-flight mode. Cole/Jefferson/Fly Post Tr. 3061, at 16. In deriving this number, the Applicant took an average of the crash rates for the F-16 in normal in-flight operations over the 10-year period from FY 1989 to FY 1998. Id.

C.6 The Applicant derived its F-16 crash rate by combining the data obtained from a DOE study with the mishap rates obtained from the Air Force. Campe/Ghosh Post Tr. 4078, at 11. The DOE study is entitled, "Data Development Technical Support Document for the Aircraft Crash Risk Analysis Methodology (ACRAM) Standard," Kimura et al. (1996) (ACRAM Study). The ACRAM Study provides F-16 crash rate data for the period from 1975 through ***204** 1993. ACRAM Study at 4-1. See Campe/Ghosh Post Tr. 4078, at 11. The ACRAM Study categorizes the crash rate data according to four modes of flight -- takeoff, landing, normal in-flight, and special operation. ACRAM Study at 4-4. After reviewing the four different modes of flight, the Applicant concluded that normal in-flight mode was the category that best represented the conditions in which F-16s transit Skull Valley. Campe/Ghosh Post Tr. 4078, at 11-12. Normal in-flight includes "climb to cruise, cruise between an originating airfield and an operations area, if applicable, and cruise descent portions" of flight. ACRAM Study at 4- 5. According to the ACRAM Study, the per-mile crash rate for F-16 normal in- flight is 3.86 x 10-6. ACRAM Study, Table 4.8.

C.7 Because the ACRAM Study did not contain crash rate data for the years after 1993, the Applicant turned to data obtained from the Air Force to provide crash rate data for the second half of its 10-year period. See Aircraft Crash Report at 8-11; SER at 15-52. The Air Force maintains mishap rates categorized in terms of the number of crashes per 100,000 hours of flight for each type of aircraft. SER at 15-52. The Applicant used the Air Force mishap rates for 1994 to 1998 to update the data for the ACRAM Study in order to create a complete data set for the 10-year period from 1989 to 1998. Aircraft Crash Report at 9.

C.8 Because the NUREG-0800 formula requires an in-flight crash rate per mile and the Air Force mishap data are expressed per 100,000 hours of flight, the Air Force data must be converted to a crash rate per mile to be used in the formula. PFS used the data set forth in the ACRAM to obtain an average flight speed to be used for this conversion. Aircraft Crash Report, Tabs C, D. The ACRAM document contains mishap data and the estimated mileage and number of flight hours for F-16s during years 1975 through 1993. Aircraft Crash Report at 10, Tabs C, D. Using these ACRAM data, PFS divided the total miles by the total hours to obtain an average flight speed of 471.85 miles per hour flown by F-16s during years 1975 through 1993. Aircraft Crash Report, Tab D.

****103** C.9 The Air Force mishap data are also not separated into the various phases of flight, i.e., takeoff, landing, special operations, and normal flight. Therefore, the Applicant was forced to further manipulate the Air Force data to ensure that only "normal flight" data were used in its

crash rate calculation. To do so, the Applicant estimated the percentage of all mishaps occurring during "normal flight" and applied that percentage to the Air Force data. Aircraft Crash Report at 11-14, Tab D. The Applicant based its estimate on the ACRAM data that contain both Class A and Class B mishaps from 1975 through 1993, separated into the four phases of flight: takeoff, landing, normal flight, and special operations. Aircraft Crash Report, Tabs C, D. The Applicant divided the number of mishaps shown in the ACRAM data for "normal flight" by the total mishaps for all F-16 flights, obtaining 15.09% as the percentage of F-16 mishaps occurring in "normal flight" during years 1975 through 1993. Aircraft Crash Report, Tabs C, D. Similarly, the Applicant estimated the flight miles occurring during normal flight by dividing ***205** the number of "normal flight" F-16 miles shown in the ACRAM data by the total F-16 flight miles, obtaining 47.18% of flight miles occurring during the "normal" phase of flight. Aircraft Crash Report, Tabs C, D at 1.

C.10 The Applicant used the average speed of 471.8 miles per hour, 15.09% as the percentage of mishaps occurring during "normal flight," and 47.18% of all flight miles occurring in the "normal" phase to derive a "normal flight" crash rate per mile from the Air Force mishap data. Aircraft Crash Report, Tabs C, D at 2. The Applicant calculated a crash rate using Air Force F-16 mishap data for the 10-year period 1989 through 1998, obtaining a crash rate of 2.736 x 10-8 per mile. Id. at 11, Tab D. The Applicant chose this particular 10-year period because, given the downward trend in crash rate demonstrated by the data, it believed that the data for this time period best represented the actual crash rate. Id. at 11.

C.11 The State argues that the mishap data for the 10-year period used by the Applicant produces the lowest 10-year average crash rate in the history of the F-16. Resnikoff Post Tr. 8698, at 15. Further the State points out that the years 1995 through 2001 show an increasing trend in F-16 crash rates. See State Findings ¶ 34 (citing State Exh. 155). In that regard, the State insists that no objective basis is given by the Applicant as to why the years 1989 to 1998 were chosen as the basis for a crash rate; rather, the decision was admittedly subjective. Thus, the State insists that it is neither reasonable nor conservative to base the F-16 crash rate on data from the 10-year period 1989 through 1998. See State Findings ¶ 34.

C.12 According to the State, the annual crash rate for the F-16 has varied substantially from 1975 through 2001. The State believes that the initial years of service through 1983 show a period of comparatively high accident rates. Furthermore, the State contends that every fighter aircraft the Air Force has ever had shows the phenomenon of higher crash rates in initial years. Moreover, the State also asserts that the Applicant's Aircraft Crash Report shows higher crash rates for single-engine fighter aircraft even after they have been in service for 100,000 hours. See id. ¶ 35. The F-16 is expected to be replaced in 2010, and the replacement aircraft is expected to also have a higher startup crash rate. Tr. at 3371-72 (Cole), 3367-68 (Jefferson). During the most recent 7 years for which data are available, the State argues that there is an increasing trend in F-16 crash rates. See State Findings ¶ 35 (citing State Exh. 155; Tr. at 8944-45 (Campe); Resnikoff Post Tr. 8698, at 11-12). According to the State's experts such a trend is common, because crash rates for fighter aircraft are typically higher at the beginning and at the end of an aircraft's service life. Thus, the State argues that using the mishap data for all available years that an aircraft has been in service is the best predictor of the aircraft's future crash rate. Horstman Post Tr. 4214, at 13-14. The State argues that even in the case of an apparent trend of decreasing crash rates, which is not the case here, it would not be reasonable to limit the database, and all years of data should be used. See State Findings ¶ 35. In that ***206** regard, the State points out

that the database used for the ACRAM technical support document used all years of crash history and did not attempt to select or omit certain years of crash history for the F-16 or other aircraft. Resnikoff Post Tr. 8698, at 9. Thus, the State insists that the most realistic estimate of future F-16 crash rates is obtained by using the entire F-16 crash history for all years available. See State Findings ¶ 35.

****104** C.13 Using the average flight speed of 471.85 miles per hour, the ratio of 15.09% mishaps occurring in "normal flight" and the ratio 47.18% of miles flown in "normal" phase of flight, but using the Air Force F-16 Class A and B mishap data for years 1975 through 2000, the State derives a crash per mile for normal flight of 3.39 x 10-8. Resnikoff Post Tr. 8698, at 15; State Exh. 76. Furthermore, the State notes that by adding the F-16 Class A and B mishap data for 2001 shown on State Exh. 154, i.e., 22 mishaps and 337,315 flight hours, to those same calculations increases the crash rate per mile for normal flight to 3.44 x 10-8. Therefore, the State argues that at a minimum using a value for C, in-flight crash rate per mile for aircraft using airway, of less than 3.44 x 10-8 crashes per mile is not realistic. See State Findings ¶ 36.

C.14 The State also attacks the Applicant's decision to include only the normal flight phase of flight in its crash rate calculation. The State begins by claiming that during the years 1975-1993, the time period of the ACRAM data, a greater percentage of Class B mishaps (which are not actual aircraft crashes) occurred in flight phases other than the normal phase of flight (i.e., takeoff, landing, or special operations). The State calculates a fraction of destroyed aircraft accidents in the normal phase of flight for the period FY 1989 to FY 1998 of 22.3%, using PFS's assessment in Tab H of the Aircraft Report of the number of F-16s that were destroyed during the normal phase from FY 1989 to FY 1998. The State compares that fraction (22.3%) to the fraction of total F-16 mishaps (Class A and Class B) occurring in the normal phase of flight from 1975 to 1993 as assessed in the ACRAM Study (15.09%) and concludes that in the period considered by the ACRAM Study a greater fraction of Class B mishaps occurred in phases other than the normal phase of flight. See State Findings ¶ 30.

C.15 Furthermore, the State argues that the problems with the Applicant's crash rate are compounded by its use of the ratio of 15.09% of all Class A and B mishaps to determine the number of mishaps occurring in "normal" flight. Aircraft Crash Report, Tab D. According to the State, this ratio of 15.09% was derived from ACRAM data which divided mishaps into the four phases of flight without indicating whether a mishap was a Class A or B mishap. Id., Tabs C, D. The State contends that a second ratio for normal flight mishaps was obtained when the Applicant analyzed 121 destroyed F-16 crashes during the 10-year period 1989 through 1998, and determined that 27 of those crashes (22.3%) occurred in the "normal" phase of flight. Resnikoff Post Tr. 8698, at 15 (citing Aircraft Crash Report, Tab H at 12). Because of the unknown distribution of Class ***207** A and B mishaps between the various phases of flight in the ACRAM Study, and because of its comparatively older data, the State argues that the ratio indicating that 22.3% of all destroyed aircraft are destroyed in the normal flight phase, when applied to the number of total destroyed F-16s, is the best evidence on which to base an estimate of F-16 mishaps occurring in the "normal" flight phase. See State Findings ¶ 37.

****105** C.16 Therefore, using the average flight speed of 471.85 miles per hour, the ratio of 22.3% for destroyed F-16s occurring in "normal flight," and 47.18% of all flight miles occurring in the "normal" phase of flight, the State has determined the crash rate per mile for normal flight based on lifetime F-16 mishap data [FN151] is 4.10 x 10-8. This value was obtained as follows:

6,644,260 hours x 471.85 = 3.135 x 109 miles,

3.135 x 109 miles x 47.18% = 1.479 x 109 miles in normal flight,

272 destroyed alrcraft x 22.3% = 60.66 destroyed F-16 mishaps during normal flight,

60.66 mishaps/1.479 x 109 "normal" flight miles = 4.10 x 10-8 crashes per mile.

Thus, the State insists that the realistic crash rate for the F-16 to be used as the value for C, the "inflight crash rate per mile for aircraft using airway," is 4.10 x 10-8. See State Findings ¶ 38.

C.17 We do not accept the State's crash rate. It is higher than the F-16 lifetime crash rate for normal operations of 3.86 x 10-8 per mile through 1993 set forth in the DOE ACRAM Study, which both PFS's expert panel and Dr. Resnikoff used as the starting point for their calculations. State Exh. 51, Table 4.8; see Aircraft Crash Report, Tab D; Resnikoff Post Tr. 8698, at 14-15. Further, both the Applicant's expert panel and Lt. Colonel Horstman agree that the overall crash rate for the F-16 was higher in its initial years than now, as one would expect, but that the crash rate has been lower and approximately level for the last 15 years or so. See Cole/Jefferson/Fly Post Tr. 3061, at 27- 31; PFS Exh Q; Tr. at 4376-77 (Horstman). Therefore, even assuming the use of a lifetime rate were appropriate, the current lifetime rate should be lower than that calculated based on the data through 1993, not higher as the State now argues for the first time.

C.18 We find the State's claim regarding the distribution of Class B mishaps is unsupported for two reasons. First, the ACRAM data do not indicate what fractions of Class A mishaps, Class B mishaps, and destroyed aircraft accidents (which are a subset of Class A mishaps) occurred in each phase of flight. The ACRAM Study provides a breakdown only of total mishaps by phase of flight. ***208** See Aircraft Report Tab C, Table 4.8. Thus, ACRAM does not state that a higher fraction of Class B mishaps occurred in phases of flight other than the normal phase. Second, the State is comparing ACRAM data for the period 1975 to 1993 to PFS's assessment of destroyed aircraft for the period FY 1989 to FY 1998. Since ACRAM looked at Class A mishaps and Class B mishaps together and the Applicant's assessment looked only at destroyed aircraft, a comparison of ACRAM data to the Applicant's assessment does not show whether or how the fractions of Class A mishaps, Class B mishaps, and destroyed aircraft accidents occurring in each phase of flight changed between the period ACRAM considered and the period PFS considered.

****106** C.19 Further, we find no support for the State's reliance upon the ratio for destroyed aircraft used by the Applicant in Tab H of the Aircraft Crash Report (22.3%) to derive what it believes is a conservative crash rate. The State's approach is incorrect because the Applicant's assessment of the phase of flight of the accidents in Tab H of the Aircraft Report was not intended for the calculation of a crash rate. The Tab H calculations were intended for the specific purpose of assessing pilot avoidance in accidents that could possibly occur in Skull Valley. To be conservative, the Applicant for this purpose included some borderline accidents as being in the normal phase of flight (e.g., the accident of May 25, 1990), which increased the number of normal-phase accidents at the expense of the other categories. If the Applicant's assessment were used to calculate a crash rate, this conservatism would cause the normal-phase rate to increase and the rates for special operations and takeoff and landing to decrease. The ACRAM Study, on the other hand, was focused on accident rates in all phases of flight. It could not skew crash rates

toward (or away from) the normal phase because the study results might be used to calculate special operations rates or takeoff and landing rates, depending on the scenario or the facilities for which risk was being calculated. Therefore, the ACRAM fraction of mishaps occurring in the normal phase of flight is appropriate to use here. See Aircraft Crash Report, Tab H.

C.20 In sum, we find the State's new crash rate, of 4.10 x 10-8, to be inappropriate for the following reasons. First, as noted above, this is higher than the lifetime crash rate for the normal phase of flight as of 1993 of 3.86 x 10-8, which is illogical for the reasons explained. Second, as also discussed above, when it calculated the fraction of F-16s destroyed in the normal phase of flight from FY 1989 to FY 1998 (22.3%), the State included accidents that could not have occurred in Skull Valley.

C.21 Further, we find the State's suggestion that the Applicant had chosen the "lowest" 10-year crash rate ever for the F-16, e.g., Tr. at 8843-44 (Soper), as a basis for its crash rate to be unfounded. A careful review of the data demonstrates that inclusion of the crash rate data for subsequent years (FY 1999 to FY 2001) would have practically no effect on the crash rate. Tr. at 3726-33 (Jefferson); PFS Exh. UUU. Focusing just on Class A mishaps, as of FY 1998, the 10-year ***209** average crash rate was 3.54 mishaps per 100,000 flight hours. The 10-year Class A mishap rate went up slightly to 3.67 and 3.62 for the 10 years ending with FY 1999 and FY 2000, respectively. However, for FY 2001, the 10-year Class A mishap rate fell to 3.53, slightly below that for the 10-year period used by the Applicant. Cole/Jefferson/Fly Post Tr. 3061, at 27. Similarly, the most recent 10-year crash rate for destroyed aircraft (3.37 per 100,000 flight hours) is slightly below that for the 10-year period used by the Applicant (3.46 per 100,000 flight hours), PFS Exh. UUU. Taking an average for the last 13 years, the rates for both Class A mishaps and destroyed aircraft are within 2% of the rates for the 10-year period used by the Applicant. PFS Exh. UUU. Thus, the inclusion of more recent data (created after the Applicant computed its crash rate) would have little or no impact on the analysis.

****107** C.22 The State claimed that the crash rate relevant to Skull Valley will go up in the future because the F-16 crash rate is going up due to the "bathtub effect" related to the aging of the aircraft. See Resnikoff Post Tr. 8698, at 9; Tr. at 8788 (Resnikoff). While State witness Dr. Resnikoff claimed that the F-16 was exhibiting the "bathtub effect" and that its crash rates were going up, it was shown on cross-examination and in the NRC Staff's rebuttal testimony that Dr. Resnikoff chose a period of analysis in a highly selective manner that improperly found an upward trend in rates. See Tr. at 8750-77, 8782-88, 8806-13, 8817-18 (Resnikoff); Tr. at 8886-92, 8899-8903 (Campe/Ghosh). Furthermore, even Lt. Colonel Horstman admitted that accident rates appeared to have been level over time since the mid-1980s and that the F-16 was not currently exhibiting an end-of-life bathtub effect. Tr. at 4376-77 (Horstman); State Exh. 52.

C.23 In fact, careful examination of F-16 crash rates, in particular that of the F-16A, which is the first of the F-16 models to be retired from service, as well as the crash rates of other recently retired fighter aircraft at the ends of their service lives, shows no end-of-life bathtub effect. The crash rates have remained the same near end of life or decreased with time. Tr. at 3376-77 (Jefferson); Cole/Jefferson/Fly Post Tr. 3061, at 28-31; PFS Exhs. Q, R, S, T, U, V.

C.24 Particularly instructive is the end-of-life crash rate for the F-16A. The F-16A was the first model of the F-16. Most of them have now been retired. Over the past 5 years, the 5-year and 10-year average accident rates for the F-16A have remained flat. Cole/Jefferson/Fly Post Tr.

3061, at 28-29; PFS Exh. R. Thus, the F-16A is not exhibiting a bathtub effect and there is no reason to believe that other models of the F-16 will exhibit a bathtub effect. Cole/Jefferson/Fly Post Tr. 3061, at 29.

C.25 The State's experts also claimed that the crash rate for the aircraft that will replace the F-16 in the future, most likely the F-35 Joint Strike Fighter ("JSF"), will be higher in the beginning of its lifetime. Thus, Lt. Colonel Horstman argued for the use of the lifetime crash rate of the F-16, including the early years when the crash rate was very high, as a surrogate for the presumed ***210** high early crash rate for the JSF. Horstman Post Tr. 4214, at 14. However, the Applicant's expert panel convincingly explained why the JSF's crash rate, assuming it were to come to Hill AFB, would be significantly lower than the crash rate of the F-16 early in its lifetime.

C.26 First, over the history of the Air Force, the aggregate crash rate has steadily decreased over time. Tr. at 8656 (Fly); PFS Exh. 82. For example, Air Force-wide destroyed aircraft rates in 1998 were one-fourth of what they were 35 years ago. See PFS Exh. 82. Lt. Colonel Horstman acknowledged in this respect that "typically every few years" the Air Force crash rate goes down because "they build better planes." Tr. at 4398-99 (Horstman). In addition, better pilot selection and training, better maintenance practices and procedures, and better analytical tools and better technology are further factors that have resulted in the continual reduction of military aircraft crash rates over time. Cole/Jefferson/Fly Post Tr. 3061, at 32.

****108** C.27 Second, approximately 35 years will elapse from the introduction of the F-16 in 1975 to the planned introduction of the JSF in 2010. The increased skill and technology in designing better aircraft, the improved maintenance practices and procedures, and the better pilot selection and training over these 35 years should result in a lower crash rate for the JSF than for the F-16. Tr. at 3369 (Jefferson); Tr. at 3370-71, 3377-78 (Cole); Tr. at 4398-4401 (Horstman). This expectation is strongly supported by the history of single engine jet fighter aircraft, which shows that initial crash rates for single-engine jet fighters have steadily decreased over time. Tr. at 3370-71 (Cole).

C.28 Third, it would be particularly inappropriate to use the lifetime crash rate average for the F-16, including the early years when the crash rate was very high, as a surrogate for the presumed high early crash rate for the JSF, because the F-16 was originally a technology demonstration program, which led to higher initial crash rates than one would expect from a more traditionally managed program like the JSF. Tr. at 8657 (Fly).

C.29 Fourth, Hill AFB would not receive the first JSF aircraft, which would be expected to experience the somewhat higher initial crash rates of a new aircraft. The Marine Corps will receive the JSF before the Air Force, and the first Air Force JSFs will likely be deployed elsewhere than at Hill AFB. Tr. at 8656-57 (Fly); see Tr. at 3372 (Cole). Furthermore, initial crash rates are based on fewer accidents and lower numbers of flying hours, both of which would translate into lower numbers of flights through Skull Valley. Cole/Jefferson/Fly Post Tr. 3061, at 32.

C.30 We are relatively confident in relying on existing F-16 crash rates because long-term trends are indicating a downward trend and no break-in flights will take place in Skull Valley, with other branches of the service to take delivery before the Air Force does. In any event, we note that use of the lifetime crash rate average for the F-16, excluding the early years when the

break-in crash rate was ***211** very high, would yield a value reasonably consistent with the 10-year crash rate the Applicant put forward.

b. Number of Flights (N)

C.31 The dispute between the parties about the proper value for N, the "number of flights per year along the airway," involves two principal issues: (1) whether, as the State says, F-16s that fly through Sevier D should also be included in the value for N; and (2) whether, as the Applicant says, a 2-year average for the number of F-16s traversing Skull Valley should be used for N, as opposed to using only the most recent year's data, as the State would do.

C.32 The Applicant projected the future number of flights per year along the airway, N, to be 5870 flights. That number is derived from an average of the annual number of F-16 sorties through the Sevier B MOA for FY 1999 and FY 2000, increased proportionately for additional aircraft stationed at Hill AFB beginning in FY 2001. See Cole/Jefferson/Fly Post Tr. 3061, at 18.

****109** C.33 The State and the Staff, however, have obtained a different result by utilizing the most recent sortie data from FY 2000 only, as well as using all of the flights occurring in both Sevier B and D, which is how the data are reported by the Air Force.

C.34 The Applicant used Sevier B MOA usage reports because, according to the Air Force, they are representative of the number of F-16 flights through Skull Valley. Revised Addendum at 2-5 & n.7. Based on these usage reports, the Applicant contends that in FY 1999, 4250 F-16s transited Skull Valley and in FY 2000, 5757 F-16s transited Skull Valley. Cole/Jefferson/Fly Post Tr. 3061, at 18. This is a 2-year average of approximately 5000 flights annually. Id.

C.35 The Applicant claims that the number of F-16 flights through Skull Valley in FY 1999 and FY 2000 reflects current Air Force operations and the normal fluctuations in the number of sorties flown annually. Cole/Jefferson/Fly Post Tr. 3061, at 18-20. It points out that there are several reasons for the higher number of Skull Valley sorties in FY 2000. First, the Air Force experienced fewer overseas deployments of aircraft (which take them away from their home bases) in FY 2000. The Air Force formally adopted the Air Expeditionary Force ("AEF") concept, which began a new policy for overseas and other deployments of Air Force units away from their home bases, and initially implemented it in October 1999 (FY 2000). Id. The AEF's purpose is to make more equal and regular the ongoing deployment of Air Force units from their home bases of operations which reduces the amount of time spent away from the home base of operations, Id. at 19. The net effect relevant here was to generally increase the amount of training time available for units at their home bases when they are not deployed relative to what they had prior to FY 2000. PFS Findings -- 56. In addition, the Applicant notes that fewer aircraft were deployed overseas in FY 2000 because deployments ***212** to areas like Bosnia, Kosovo, and the Persian Gulf tapered off toward the end of FY 1999. Cole/Jefferson/Fly Post Tr. 3061, at 19. Thus, the Applicant argues that the average sortie counts for FY 1999 and FY 2000 provide a reasonable baseline for estimating future sortie counts in Skull Valley. Id. at 20.

C.36 To project the future number of annual flights, the Applicant used the average of the FY 1999 and FY 2000 sortie counts of 5000, increased proportionately to 5870 flights to reflect the

authorized increase in the number of F-16s at Hill AFB in FY 2001. The combined number of F-16 aircraft (active plus reserve) assigned to Hill AFB has increased in FY 2001 from sixty-nine to eighty-one, for an increase of 17.4%. Id. at 20-21. Assuming the same Skull Valley sortie rates per F-16 as determined above, the twelve additional F-16s would also increase the number of F-16 sorties through Skull Valley by 17.4%. Id.

C.37 The Applicant asserts that FY 2001 data on the number of flights through Skull Valley support the foregoing approach for projecting future sortie counts. According to the Sevier B MOA usage report for FY 2001, 5046 flights transited Skull Valley. Tr. at 13,017-19 (Cole). If that total were adjusted to account for the effect of the additional F-16s at Hill being there the entire year (as opposed to the half year they were present), the total would have been 5435. Tr. at 13,019-20 (Jefferson). This is below the Applicant's projection of 5870. Tr. at 13,017 (Cole), 13,020 (Jefferson). The Applicant argues that the unreasonableness of using the atypically high sortie rate of FY 2000 as the basis for future projections is demonstrated by the FY 2001 sortie count which was somewhat below the average of the FY 1999 and FY 2000 sortie counts. Tr. at 13,020-21 (Jefferson).

****110** C.38 The Applicant also argues that it would be unreasonable to use the combined Sevier B and Sevier D sortie counts as the basis for future projections as argued by Lt. Colonel Horstman. As discussed above, the Air Force has stated that the Sevier B sortie count is representative of the traffic through Skull Valley. The Sevier D MOA airspace does lie directly above Sevier B. Because the Sevier B and Sevier D MOAs extend to the far southern edge of the UTTR, nearly 100 miles from the facility, however, both Sevier B and D MOA sortie counts include aircraft entering the UTTR from the south, such as bombers and aircraft conducting cruise missile tests, that never enter Skull Valley. Revised Addendum at 4; Tr. at 3355-56 (Jefferson). The Sevier D counts are small, approximately 5.7% of the Sevier B counts. Revised Addendum at 4. Thus, the Applicant asserts that taking Sevier B to be representative of Skull Valley accounts for the small number of aircraft that use the Sevier MOAs but never enter Skull Valley. See PFS Finding ¶ 65.

C.39 The State disagrees with the Applicant's analysis. See State Finding ¶ 49. It points out that the Air Force does not keep records showing specifically the number of F-16 flights in Skull Valley, but does report the usage of Sevier ***213** B and Sevier D MOAs for all aircraft in those MOAs, most of which are F-16s transiting Skull Valley. Revised Addendum at 3-4, Tab HH at 2. It points out that only F-16 aircraft are required to transit Skull Valley. Aircraft Crash Report at 8 n.7. In addition, some F-16 flights through Skull Valley are not reported on the usage reports for Sevier B and D MOAs because the flights are above both MOAs. See Horstman Post Tr. 4214, at 11-12.

C.40 In FY 2000, the total number of flights reported in the Air Force usage reports for Sevier B and D MOAs was 5997. Applicant Exh. O at 4. In addition, twelve additional F-16s were assigned to Hill AFB in April of 2001, raising the total number of F-16s stationed at Hill AFB from sixty-nine to eighty-one, an increase of 17.4%. Cole/Jefferson/Fly Post Tr. 3061, at 18-20; Horstman Post Tr. 4214, at 12. The State argues that it is reasonable to assume that the number of F-16 flights transiting Skull Valley would increase by this same percentage. The number of flights in Sevier B and D MOAs for FY 2000, 5997, increased by 17.4% representing the additional F-16s assigned to Hill AFB in 2001, gives a total of approximately 7040 estimated annual F-16 flights through Skull Valley. Both the State and the Staff have in this manner

estimated the future number of flights through Skull Valley to be approximately 7040. Campe/Ghosh Post Tr. 4078, at 10; Horstman Post Tr. 4214, at 12.

C.41 The State highlights the fact that the Applicant's estimate of 5870 future flights is based only on Sevier B MOA usage reports. See State Findings ¶ 50. The Applicant excluded flight counts from Sevier D usage reports on the basis that they may contain flights other than Skull Valley flights and may therefore "overcount" the number of F-16 flights through Skull Valley. Tr. at 3356-57. The State argues, however, that the Air Force has informed the Applicant that the majority of flights going through Sevier D MOA are F-16s transiting Skull Valley. See State Findings ¶ 50.

****111** C.42 The Staff estimated the value for N by using the Air Force upper- bound data -- the 2000 data for the combined flights in the Sevier B and D MOAs (5997) -- and increased it by 17.4% to account for the additional F-16 assignments at Hill AFB. Campe/Ghosh Post Tr. 4078, at 10. Thus, the Staff, taking the same approach as the State, estimated the annual number of flights to be 7041. Campe/Ghosh Post Tr. 4078, at 10.

C.43 We find the State and the Staff estimate of 7040 future flights per year over Skull Valley to be a reasonable estimate for the value of N in the NUREG- 0800 calculation. First, the number of flights occurring in Sevier B and D is more representative of the number of F-16 sorties and, to the extent it might overcount the true number of flights, it is consistent with the NUREG-0800 demand for conservatism. Second, we find the use of FY 2000 to be a better indicator of the present situation for flight numbers over Skull Valley, which data were also used by the Staff in arriving at its estimate of 7040 annual flights. ***214** Adhering to the NUREG-0800 admonition to employ conservative values, the Board agrees with the appropriateness of that number.

C.44 The Staff reduced that value for N, however, to account for those aircraft in formation flights that it says do not pose a threat to the Applicant's facility. Campe/Ghosh Post Tr. 4078, at 10-11. The Staff recognized that F-16 aircraft transiting Skull Valley fly in either a two-ship or a four- ship formation. Campe/Ghosh Post Tr. 4078, at 11. (Solo flights occur occasionally, for example, when a pilot's departure on a sortie is delayed.) In terms of aircraft flight path distribution, the Staff considered a four-ship formation as two formations of two aircraft each -- one formation flying a few miles behind the first, with either a left or a right offset. There is approximately a 9000-foot lateral separation between the leader and the wingman in a two-ship formation. Id. Consequently, according to the Staff, at least one of the aircraft in a two-ship formation will not be in a position from which it can strike the Applicant's facility in the event of a crash. Id. See also State Exh. 48 (depicting F-16s in formation on cross section of MOA).

C.45 Therefore, the Staff considered that approximately half of the flights have a negligible potential for striking the Applicant's facility. This was not reflected in the Applicant's analysis, but was accounted for by the Staff in the SER by reducing the number of flights by a factor of 2. SER at 15-67 & n.2; Campe/Ghosh Post Tr. 4078, at 11. The Staff argues that this approach adequately accounts for the fact that flights in Skull Valley take place in formations of two or four ships and that half of those aircraft are far enough east so as not to pose a hazard to the Applicant's facility. Thus, the number of flights, 7041, divided by 2, or 3520 flights, is the Staff's estimate for N. See Staff Findings ¶ 2.119.

****112** C.46 We disagree with the Staff's analysis that divided the number of flights through

Skull Valley in half. The Staff reasons that only one of the ships could fly directly over the Applicant's site and be in a position to strike the Applicant's site, and accordingly divided the number of flights to reflect this reduced risk. Campe/Ghosh Post Tr. 4078, at 10-11. For the reasons set out in the Narrative portion of this opinion, we find, however, that this is mathematically and logically inappropriate -- if half the aircraft are to be disregarded, so must the portion of the airway in which they are flying. Thus, the Board finds the number of flights cannot be reduced on this reasoning, and selects 7040 as the appropriate number for N.

c. Effective Area of Facility (A)

C.47 The Applicant asserts that the effective area of that portion of the facility where the storage casks will be located (including the Canister Transfer Building) is 0.1337 square mile. This calculation took into account the flight characteristics and dimensions of the F-16 and the angle at which it might approach the facility, and assumes a facility at full capacity with 4000 spent fuel storage casks on ***215** site. Cole/Jefferson/Fly Post Tr. 3090, at 16. This effective area accounts for the possibility that an aircraft impacting in front of the facility could skid into it and the possibility that an aircraft that would otherwise impact just beyond the facility would hit an elevated structure at the facility. See PFS Findings ¶ 38. The State does not contest the effective area put forward by the Applicant. See State Findings ¶ 52. We find that the value for A, effective area, has reasonably been calculated by the Applicant to be 0.1337 square mile. The Board has reviewed this analysis and finds it reasonable.

d. Width of Airway (w)

C.48 The major dispute among the parties regarding this factor of the NUREG- 0800 equation centers on where pilots actually fly in taking F-16 aircraft down Skull Valley. The dispute arises because of the physical contours of the Valley and the location of artificial delineations of the airspace. Below we describe the geographical relationship between these features, and why the parties differ in their calculations of the Skull Valley airway width.

C.49 Skull Valley is located between two mountain ranges, the Stansbury Mountains to the east, and the Cedar Mountains to the west. On the west side, Air Force Restricted Airspace intrudes into the Valley. Because of the configuration of the Mountains, Skull Valley varies in width -- it is approximately 17 miles at the northern tip but narrows to 7 miles at the southern tip. SER at 15-62.

C.50 The Applicant took the position that the width available to pilots flying in Skull Valley is the actual width from the edge of the restricted airspace intruding in the west to the Mountains on the east, that being 10 miles at the point where the facility is proposed to be built. The Staff agrees with that argument. The State, on the other hand, believes that pilots fly only in a narrower effective area that takes account of the need to observe certain buffer zones. The State asserts that, when all adjustments of this nature are taken into account, this distance is 5 miles near the proposed position of the facility.

**113 C.51 We have previously described the way airspace is divided into "Military Operating Areas" (MOAs). Approximately 96% of the F-16 flights through Skull Valley are in Sevier B MOA. Resnikoff Post Tr. 8698, at 15; Tr. at 3396 (Jefferson). F-16s may fly through any part of Sevier B MOA but commonly fly at 3000 to 4000 feet AGL. Aircraft Crash Report at 5; Tr. at 3396- 97 (Cole). F-16s fly through Skull Valley in two-ship or four-ship formations. Horstman Post Tr. 4214, at 5-6. According to the Air Force, it would be an exception for a solo flight to transit Skull Valley. Campe/Ghosh Post Tr. 4078, at 11.

C.52 In a two-ship formation of F-16s, the wingman would fly 1.5 to 2 miles abreast of the flight leader at a position 0 to 10 degrees aft of the leader. In a four-ship formation of F-16s, a wingman would similarly fly 1.5 to 2 miles abreast of the flight leader. Those two aircraft (lead and wingman) comprise the ***216** "lead element." Two additional aircraft with spacing similar to that of the lead element would follow 2 to 15 miles behind. One of the aircraft in the back element will be located somewhere between the horizontal spacing of the lead element. A four-ship formation thus may vary from just over 1.5 to just under 4 miles in horizontal width and over 2 to 15 miles long. Horstman Post Tr. 4214, at 6.

C.53 A cross section of Sevier B MOA, looking north from the latitude of the proposed site, is shown in Aircraft Crash Report, Figure 1. Tr. at 3395-3401 (Jefferson). The site is identified as "PFSF" and located at "0" on the "statute miles" scale along the bottom of Figure 1. The Applicant's site is located at 4500 feet mean sea level as indicated by the scale along the right side of Figure 1, which is also ground level or 0 AGL. Tr. at 3405 (Jefferson). The Sevier B MOA is bounded on the west by a restricted area located 2 miles to the west of the Applicant's site. Tr. at 3400 (Jefferson). The blacked-out area on Figure 1 labeled "GROUND" represents mountainside terrain of the Stansbury Mountains, which prevents aircraft from flying to the eastern boundary of the MOA. Tr. at 3401 (Jefferson). State Exh. 156B shows Figure 1 with the airspace between 3000 and 4000 feet AGL shaded. See State Exh. 156B.

C.54 F-16 flights transiting Skull Valley maintain a "buffer" distance of 1 mile or more from the western boundary of Sevier B MOA to prevent straying into restricted airspace west of the MOA. Horstman Post Tr. 4214, at 7. Aircraft must avoid flying in this restricted area or the pilot may incur very serious sanctions. Tr. at 3407 (Jefferson). Colonel Bernard, a former F-16 pilot with experience in flying through Skull Valley, testified when flying in Skull Valley he would maintain a comfortable (buffer) distance of 2 to 3 miles from the restricted airspace at the western boundary of the Sevier B MOA. Tr. at 3924 (Bernard). The Applicant's witness Colonel Fly testified that most flights are down the middle to the eastern side of Skull Valley because of the restricted airspace to the west. Tr. at 3415-16 (Fly). Colonel Fly further testified that he generally flew well clear of a 1-mile buffer zone from the restricted airspace west of Sevier B MOA. Tr. at 3424 (Fly). In light of this information, the State asserts that F-16 pilots maintain a distance of at least 1 mile from the western boundary of Sevier B MOA at the latitude of the Applicant's site to prevent entering restricted airspace. See State Findings ¶ 43.

**114 C.55 The State argues that F-16 formations generally fly down the middle of Skull Valley with part of the formation over or near the Applicant's site. Horstman Post Tr. 4214, at 6. The formation leader will select a flight path to allow the furthest-west aircraft to maintain a distance of at least 1 mile from the western boundary of Sevier B MOA, beyond which is restricted airspace. Id. at 7. The flight leader will also select a flight path to allow the furthest-east aircraft to maintain a sufficient distance from the Stansbury Mountains, generally 2 miles, placing the

furthest-east aircraft at least 5 miles from the eastern border of Sevier B MOA. Id. The width of the Sevier B MOA that is actually used by F-16 formations would thus extend from 1 mile east of the western MOA boundary to ***217** 5 miles west of the eastern MOA boundary, or a width of approximately 6 miles. Id. at 6.

C.56 Within this 6-mile width of usable airspace, F-16s fly in two- or four- ship formations which are from 1.5 to just under 4 miles wide. Id. at 7. With one ship in the formation flying at either the eastern or western edge of the usable airspace, the remaining ships in the formation would be inward from the edges. Id. Accordingly, the majority of F-16 flights in Skull Valley, argues the State, would therefore be within a corridor less than 5 miles wide within the 6-mile width of usable airspace. Id. The usable 6-mile airspace and formations positioned at the outer edges of that airspace are shown on State Exh. 48. Id.; State Exh. 48.

C.57 The Applicant asserts, however, that the Air Force has consistently advised that the predominant or preferred route of flight for F-16s transiting Skull Valley is approximately 5 miles to the east of the proposed facility site. See PFS Findings ¶ 42 (citing Cole/Jefferson/Fly Post Tr. 3061, at 16; Tr. at 3397 (Cole)). This stated preference is consistent with Colonel Fly's testimony that he typically flew about 4 miles east of the site in a south- southeasterly direction. Tr. at 3415-24 (Fly). This preferred route is said to be a logical result of the natural configuration of the MOA and the restricted airspace to its west which serve to naturally funnel the F-16 traffic in Skull Valley toward the eastern side of the Valley and the narrow 7-mile-wide neck in the MOA southeast of the facility site. Cole/Jefferson/Fly Post Tr. 3061, at 16; PFS Exh. P.

C.58 The Applicant asserts that it assumed for purpose of its calculations that the Sevier B MOA could be treated like an airway and that the F-16s were evenly distributed across the width of the Sevier B MOA, from the Stansbury Mountains in the east to the edge of restricted airspace in the west. See PFS Findings ¶ 43. The width, w, of this hypothetical airway was chosen to be 10 miles based on the useable airspace in the Sevier B MOA through which the F-16s could fly at the latitude of the facility. Cole/Jefferson/Fly Post Tr. 3061, at 16.

****115** C.59 For F-16s flying above the Sevier B MOA (i.e., above 9000 feet MSL/4400 feet AGL), the width of the useable airspace would be the full 12 miles. See Tr. at 3795 (Jefferson). The Applicant therefore asserts that using an airway width of 10 miles for the purpose of analysis is conservative. Tr. at 3443-52 (Jefferson).

C.60 The determination of the width of the airway to be used in calculating probability of aircraft crashes at the Applicant's site turns on the evidence of the type and flight patterns flown by F-16s stationed at Hill AFB. No evidence was presented as to the type of training missions, flight altitudes, or routes that will be flown by the replacement aircraft. The Board has been presented with no reason to find that the width of the airway would change for a replacement aircraft.

C.61 We base our finding as to this issue on where pilots fly as a routine practice, which establishes the effective width of the airway. We agree with the State's assertion that F-16s transiting Skull Valley observe buffer zones on both ***218** sides of the MOA such that aircraft would stay 1 mile east of the restricted area to the west of the facility and up to 3 miles west of the Stansbury Mountains or the MOA's boundary to the east. Horstman Testimony at 6- 7; Tr. at 8571, 8613-14 (Horstman). We find the State's position to be persuasive because State Exhibit

148B demonstrates that even though Applicant's 10-mile distance is theoretically possible at 3000 to 4000 feet AGL, pilots are more likely to be conservative and thus allow for as great a buffer zone on the Stansbury side and the UTTR side as possible. But the State's proposed 5-mile distance is too narrow -- the evidence demonstrates that 6 miles is the appropriate width of the airway as it is used in practice.

5. Calculated Probability

C.62 As we found in the narrative portion of our decision, the probability of an F-16 impacting the facility is 4.29 x 10-6 (see p. 122, above.) Consequently, the Applicant's proposal fails to meet the acceptance criterion the Commission articulated in CLI-01-22.

6. Other Skull Valley Operations

a. Moser Recovery Route

C.63 Most aircraft returning to Hill AFB from the UTTR South exit the northern portion of the range and proceed north or fly over the Great Salt Lake. SER at 15-80. Some aircraft returning to Hill AFB from the UTTR South, however, may use the Moser Recovery Route (MRR). Cole/Jefferson/Fly Post Tr. 3061, at 11. The MRR runs from the southwest to the northeast to the north, and passes approximately 2 to 3 miles north of the Applicant's site. SER at 15-80. The MRR is only used during inclement weather conditions or at night under specific wind conditions. See Cole/Jefferson/Fly Post Tr. 3061, at 11.

C.64 The Applicant estimates that approximately 5% of the F-16 flights on the UTTR return to Hill AFB via the MRR. Id. at 97. This estimate is supported by conversations between General Cole and the Vice Commander of the 388th FW at Hill AFB, and an air traffic controller in the Salt Lake City Air Traffic Control Center. Tr. at 3456-58 (Cole). Thus, based on FY 1998 UTTR sortie data, the Applicant estimated 286 flights used the MRR in FY 1998. Cole/Jefferson/Fly Post Tr. 3061, at 97. The Applicant defined the MRR as having an airway width, w, of 11.5 miles (equal to the width of military airway IR-420). Id. The other factors the Applicant used in its calculation were the same as those used to calculate the hazard to the facility from F-16s transiting Skull Valley: the crash rate, C, was equal to 2.736 x 10-8 per mile; the effective area of the site, A, was 0.1337 square mile; and 14.5% of the calculated crashes would impact the site ***219** because the pilot could not direct the aircraft away from the facility (the R factor). Id.

****116** C.65 Because the Air Force does not keep precise data as to the number of flights per year that occur on the MRR, all parties had to look elsewhere to derive estimates of annual MRR flights. Tr. at 3455-59 (Cole); see Cole/Jefferson/Fly Post Tr. 3061, at 96-97. In order to estimate the number of flights, the Applicant assumed that the sortie rates on the UTTR, and thus the number of flights on the MRR, increased proportionally to the number of F-16 sorties through Skull Valley. Cole/Jefferson/Fly Post Tr. 3061, at 97. According to the Air Force, 5726 F-16 sorties were flown in the UTTR South Area, most of which flew from Hill AFB. Using the 5%

MRR usage factor, the Applicant calculated that approximately 286 F-16s used the MRR for return flights in FY 1998. Id. The Applicant then increased the number of FY 1998 Moser flights proportionally to account for the higher Skull Valley sortie counts in FY 1999 and FY 2000 as well as the sorties that would be flown in the future by the additional F-16s assigned to Hill AFB. Id. So for the value of N, the Applicant used 336 in the NUREG-0800 equation. See Revised Addendum at 20; Cole/Jefferson/Fly Post Tr. 3061, at 97. Thus, the Applicant calculated the crash impact probability to be 2.0 x 10-8 per year. Id.

C.66 The Staff prepared an independent estimate of the number of flights on the MRR using actual FY 2000 UTTR sortie data, rather than Skull Valley flight information used by the Applicant. Campe/Ghosh Post Tr. 4078, at 39; SER at 15- 81. The Staff found that the UTTR South flight count, rather than the Skull Valley flight count, is more appropriate for estimating the annual number of F- 16s flying through the MRR. The Staff also adjusted the FY 2000 data to account for an additional twelve F-16s to be stationed at Hill AFB. Campe/Ghosh Post Tr. 4078, at 39. The Staff estimated the number of flights on the MRR to be 5% of 7059, [FN152] or 353. SER at 15-80 to 15-82; Staff Findings ¶ 2.529. Using a modified number for pilot avoidance, the Staff calculated the crash impact probability to the Applicant's facility to be 2.5 x 10-8 per year. Campe/Ghosh Post Tr. 4078, at 40; SER at 15-82.

C.67 The State asserts, however, that the number of F-16s using the MRR is likely to be substantially higher than either the Applicant or the Staff estimates. State Findings ¶ 10. In calculating the number for N, the State asserts that the Applicant should have assumed that one-third of all flights on the UTTR returned to Hill AFB via the MRR because in the future, up to one- third of the flights on the UTTR may be conducted at night. Resnikoff Post Tr. 8698, at 16; Horstman Post Tr. 4214, at 30. The State's theory of increased use of the MRR was based ***220** on the assumption that all flights at night would use the Moser Route, purportedly due to the 388th FW's use of night vision goggles in training. Horstman Post Tr. 4214, at 30. The State relies on an Air Force document that states that night-vision-goggle training will increase and that of the total sorties flown in MOAs, approximately one-third will be night sorties. State Exh. 64 at 4.

****117** C.68 The State does not dispute that the MRR is used only at night, during marginal weather conditions, and when runway 32 at Hill AFB is the active runway. See State Findings ¶ 107. The Aircraft Crash Report states that "[b]ecause pilots train on the UTTR mostly during daytime and in good weather and because aircraft landing at Hill usually use runway 14 ... due to the wind patterns at Hill, it agrees that the Moser recovery is seldom used." Aircraft Crash Report at 48a. It points out that subsequent to preparation of the Applicant's Crash Report, however, the Air Force announced on July 18, 2001, that night-vision-goggle training would increase and stated that of the total training flights in MOAs, "approximately one third will be night sorties." State Exh. 64 at 4; Horstman Post Tr. 4214, at 30; State Findings ¶ 107. From this, the State argues that a realistic number of flights using the MRR could be as high as 33% of the flights returning to Hill AFB from the UTTR South Area. Horstman Post Tr. 4214, at 30. The State also asserts that there will be some 10,410 aircraft per year using the UTTR in the future. State Findings ¶ 110.

C.69 In FY 1998 there were 5726 sorties flown in the UTTR South range. Cole/Jefferson/Fly Post Tr. 3061, at 97. The State argues that, to account for the increase in sorties of F-16s and the increase in aircraft assigned to Hill AFB since 1998, the 5726 flights in the UTTR in 1998

should be increased by the ratio of Skull Valley sorties occurring in 1998 to those occurring in 2001. Taking the number of sorties occurring in Skull Valley in 1998, which was determined to be 3871, and increasing this number proportionally to the number of sorties occurring in 2001, which was determined to be 7040, the State estimated that approximately 10,410 sorties would occur on the UTTR South Area in 2001. Resnikoff Post Tr. 8698, at 16. As the State sees it, as many as 33% of these flights, or 3436 flights, might therefore return to Hill AFB on the MRR. Id. Using a crash rate, C, for F-16s of 4.10 x 10-8, the number of flights, N, of 3,436, the area, A, of 0.1337 square mile, and the width, w, as 11.5 miles, the State calculated the crash impact probability to be 1.64 x 10-6 per year. See State Findings ¶ 111.

C.70 The Applicant points out that the State's estimate of annual flights on the MRR, which is 33% of the total returning flights, is not consistent with the actual number of flights, recorded in the UTTR South. In this regard, General Jefferson noted that the State is assuming approximately 10,410 flights in the UTTR South. Tr. 8864-65 (Jefferson). But there have been less than 10,000 flights annually on the UTTR South since 1998. Tr. 8865-66 (Jefferson). General Jefferson testified that if he were to increase those F-16 sorties for the UTTR ***221** South by 17% to account for additional F-16s coming to Hill AFB in 2001, they would still be significantly less than 10,000. See Tr. at 8866 (Jefferson).

****118** C.71 On the basis of complications associated with the use of the MRR that make it undesirable as an air corridor, the discussions the Applicant and the Staff had with Air Force personnel, and the comparison of the State's assumed total number of flights to the number of flights that actually occurred in the UTTR, we find that even with an increase in night sorties, much closer to 5% of flights returning from the UTTR South to Hill AFB will use the MRR than to 33%.

C.72 We disagree with the State's methods and assumptions regarding the determination of the number of sorties for the MRR. In estimating the MRR use factor, the State assumed that a 33% increase in night training would lead to a 33% increase in the use of the MRR. The State's reliance on the Air Force document for its assumption was flawed because the Air Force statement is of a contingent nature: use of the MRR is contingent upon certain wind conditions being present. As stated by the Air Force, there is no expected increase overall in MRR usage from night training. Campe/Ghosh Post Tr. 4078, at 39; Cole/Jefferson/Fly Post Tr. 3061, at 98 & n.168. Hence, we find the State's estimate of a 33% increase in MRR flights to be not well supported.

C.73 In addition, we disagree with the analysis undertaken by the State regarding the number of flights, approximately 10,410 per year, which reflected an extrapolation of fluctuations of use of the UTTR indicating an upward trend of flights using the MRR. The data, however, do not show an unambiguous increasing trend before 2001, but rather seem to have fluctuated from year to year without showing any trend. Hence, we find the State's analysis of crash probability from flights on the MRR to be not well founded insofar as its estimates of future flights on the UTTR and its estimate of flights using the MRR in the future are concerned. We find that the Staff estimate of crash probability of 1.6 x 10-7 (without taking credit for pilot avoidance) per year is reasonable, as well as the Applicant's slightly lower estimate, for the reasons expressed in their analyses.

C.74 The Board reiterates that all numerical values derived by the parties are indirect estimates

of aircraft counts using the MRR because of the unavailability of data from the Air Force. Even with this analytical uncertainty, however, we are able to find that there is only a minor risk to the facility from aircraft traversing the MRR because of the margin between the values we accept and the Commission's cumulative standard hazard of 1 x 10-6 annually.

b. Aircraft on IR-420

C.75 Michael Army Airfield is located on Dugway Proving Ground, 17 miles south-southwest of the facility. Cole/Jefferson/Fly Post Tr. 3061, at 98. IR- 420 is a military airway that runs from northeast to southwest and ends about ***222** 7 miles north of the facility site, at the northern edge of the Sevier B MOA (i.e., IR-420 runs from the edge of Sevier B to the northeast). Id. Aircraft flying to and from Michael AAF from the northeast, including aircraft flying to and from Hill AFB, may fly in the direction of IR-420 and pass within a few miles of the facility site. The majority of the flights to and from Michael AAF are F-16s from Hill AFB conducting training. Those aircraft using IR-420 are accounted for in Applicant's's Skull Valley-transiting F-16 calculation. [FN153] Id. Most of the remainder of the aircraft flying to and from Michael AAF are cargo aircraft such as the C-5, C-17, C-141, C-130, and the smaller C-21 and C-12. Id. at 98-99.

****119** C.76 The Applicant used the same method to calculate the hazard to the facility from F-16s to estimate the probability of an aircraft impacting the facility from aircraft flying to and from Michael AAF (i.e., P = C x N x A/w). Id. at 99. The State did not submit testimony on the hazard posed by aircraft flying to and from Michael AAF in the direction of IR-420. See Horstman Post Tr. 4214; Resnikoff Post Tr. 8698. NUREG-0800 provides an in-flight crash rate of 4 x 10-10 per mile for large commercial aircraft, which is appropriate to apply to the types of large cargo aircraft flying to and from Michael AAF. The Applicant estimated a maximum of approximately 414 annual flights by aircraft other than F-16s at this airfield. [FN154] Using the effective area of the facility in a manner similar to that for F-16s, the Applicant calculated an upper bound on the probability of an aircraft impacting the facility to be 3.0 x 10-9 per year. Cole/Jefferson/Fly Post Tr. 3061, at 99.

C.77 The State did not challenge the Applicant's probability calculation related to aircraft traversing IR-420 to MAA. See State Findings. Similarly, the Staff does not dispute the estimate of risk. See Campe/Ghosh Post Tr. 4078, at 41. We find that the parties are in accord with respect to the estimation of the hazard posed to the Applicant's facility by aircraft flying on IR-420. See Cole/Jefferson/Fly Post Tr. 3061, at 99; State Exh. 81; Campe/Ghosh Post Tr. 4078, at 41. Inasmuch as no dispute exists with respect to the estimate of the risk posed to the facility from flights transiting IR-420, we find 3.0 x 10-9 per year to be a reasonable estimate of the annual probability of impact to the Applicant's facility.

***223** c. Training on the UTTR

C.78 Aircraft on the UTTR South Area perform a variety of activities, including air-to-air combat training, air-to-ground attack training, air- refueling training, and transportation to and

from Michael AAF (which is located beneath UTTR airspace). Cole/Jefferson/Fly Post Tr. 3061, at 90-91. We determined on summary, disposition that aircraft conducting air-to-ground attack training and weapons testing using air-delivered ordnance and aircraft conducting air refueling training would pose no significant hazard to the facility. See LBP-01-19, 53 NRC at 446. The hazards posed by aircraft flying to and from Michael Army Airfield on Dugway have been discussed previously. Thus, the only activity we assess here is air-to-air combat training on the UTTR.

C.79 We find that aircraft conducting air-to-air combat training on the UTTR pose a negligible hazard to the facility. This is primarily because the activity on the UTTR occurs too far away from the facility to pose a hazard. The facility is located 2 miles east of the eastern boundary of the UTTR restricted airspace. The aggressive maneuvering that takes place in air-to-air combat training occurs toward the center of the restricted area range, typically more than 10 miles inside range boundaries. On the basis of where F- 16s fly on the UTTR, the Applicant assumed a 3-mile buffer zone just inside the UTTR restricted area as a practical limit as to how far aircraft will fly from the edge of the UTTR restricted area. Thus, the facility is located 5 miles east of the closest point at which an event leading to a crash would be expected to occur and a crashing aircraft on the UTTR would not be able to reach the facility before impacting the ground if it were out of control. Cole/Jefferson/Fly Post Tr. 3061, at 91-92.

****120** C.80 The assumed 3-mile buffer is reasonable because it reflects what actually takes place on the range and corresponds to the practical limit that pilots observe while flying training exercises on the UTTR. Aggressive maneuvering during simulated air-to-air engagements at visual or beyond visual ranges, tends to take place toward the center of the restricted areas. Furthermore, the Cedar Mountains provide a clear visual indication to pilots of the eastern edge of the restricted area and Clover Control provides warnings to pilots as they approach within 5 miles of the edge of the restricted area to prevent them from straying outside. Id.

C.81 Accidents on the UTTR that did not leave the pilot in control of the aircraft would not pose a hazard to the facility. Review of the F-16 crash reports for accidents occurring during special in-flight operations (i.e., operations involving aggressive maneuvers on a training range) in which the pilot does not maintain control of the aircraft (e.g., a midair collision or G- induced loss of consciousness) indicates that most such accidents would occur toward the center of the restricted ranges. It is most likely such crashing aircraft would travel less than 5 miles horizontally before impacting the ground. Even in the event of G-induced loss ***224** of consciousness, which is the type of accident that would not leave the pilot in control but would cause the aircraft to travel the greatest distance before hitting the ground, the aircraft would travel no more than about 5 miles. Id. at 92-93.

C.82 For accidents in which a pilot does maintain control, the aircraft would be 5 or more miles from the facility site when the accident occurred by virtue of the 2 miles that the facility is from the eastern boundary of the UTTR airspace and the 3-mile buffer observed while operating in restricted airspace. The UTTR is a large, safe area to receive a crashing aircraft in an emergency. Moreover, Michael AAF, on the east side of the UTTR, would be available for the pilot to make an emergency landing if possible. Therefore, it would be unreasonable to postulate that a pilot in control of a crashing aircraft in such circumstances would glide over the Cedar Mountains, and off the restricted range toward Skull Valley, the facility, and other inhabited structures located there. Id. at 93-94.

C.83 Using the NUREG-0800 formula, the Applicant calculated the risk to the facility to be less than 1.0 x 10-8 year. We note that the Applicant has used an "R" factor to reduce the probability of crashes from combat training on the reasoning that "invariably the pilot would steer the aircraft away" from the Applicant's facility. Id. at 94-95. But given the flight conditions and operations in the UTTR, the R1 component would be less than in Skull Valley, and there is no more reason to credit the R2 component than there was in Skull Valley. Accordingly, the Board finds that it is not realistic or conservative to allow a reduction in this crash probability based on a pilot's ability to avoid the Applicant's site.

****121** C.84 The Staff agreed with the Applicant's assessment that a 5-mile cutoff radius is reasonable for an F-16. On the primary basis of the 5-mile glide distance, the Applicant and the Staff concluded that the annual probability of an onsite crash is negligible, i.e., less than 1 x 10-8 per year. Campe/Ghosh Post Tr. 4078, at 37.

C.85 We do not agree with the State's calculation for risk. State witness Dr. Resnikoff asserted that aircraft on the UTTR would pose a hazard to the facility by assuming that a crashing aircraft could fly 10 miles before impacting the ground. State Exh. 78; Tr. at 8792-94 (Resnikoff). Using this figure, the State calculated the hazard to the facility to be 2.74 x 10-7 per year. Resnikoff Post Tr. 8698, at 18.

C.86 The only support for Dr. Resnikoff's assertion was a previous assessment the Applicant had performed, before it had obtained the information from the accident reports, in which the Applicant had conservatively assumed that a crashing aircraft could fly a maximum of 10 miles before impacting the ground. Tr. at 8798-99 (Resnikoff). Thus, the only basis for Dr. Resnikoff's assumption has been superseded and there is no reason to credit his claim.

C.87 We agree that a 5-mile glide is a more appropriate distance for an F-16, and thus agree with the probability calculations arrived at by the Applicant and ***225** Staff. In any event, the crash probability related to aircraft traversing the UTTR is insignificant to the overall cumulative hazard calculation.

d. Military Ordnance

(1) DIRECT IMPACT OF F-16 CARRYING ORDNANCE

C.88 We have explained in the Narrative portion of this opinion why this accident scenario can be readily disregarded.

(2) DIRECT IMPACT OF JETTISONED ORDNANCE

C.89 Based on data from Hill AFB regarding ordnance usage by F-16s in FY 1999 and FY 2000, approximately 2% of the F-16s transiting Skull Valley carry jettisonable ordnance. [FN155] Cole/Jefferson/Fly Post Tr. 3061, at 12; Campe/Ghosh Post Tr. 4078, at 32. In the event

of an incident leading to a crash in which the pilot would have time to respond before ejecting from the aircraft (e.g., an engine failure), one of the pilot's first actions would be to jettison any ordnance carried by the aircraft. Cole/Jefferson/Fly Post Tr. 3061, at 102. The potential hazard posed to the facility by jettisoned military ordnance is very small because of the small number of aircraft carrying ordnance, the rarity of aircraft jettisoning ordnance, and the small probability that ordnance jettisoned somewhere along the route would hit the facility. Id. at 102-03. Using the NUREG-0800 formula, the Applicant estimated the probability that ordnance would impact the facility to be 3.2 x 10-8 per year. Id.

C.90 The Applicant generally followed the same approach that it used in calculating the hazard to the facility for F-16s transiting Skull Valley as follows:

****122** C.91 The Applicant claims the number of aircraft carrying live or inert ordnance through Skull Valley per year, N, would be 150. Id. This is based on the average number of F-16s carrying ordnance through Skull Valley for FY 1999 and FY 2000 (2.556% of the total number of Skull Valley sorties), increased by 17.4% to account for the additional aircraft based at Hill AFB in FY 2001. Id. at 102. The Applicant based its estimate on the two most recent years, the same years it used to estimate the Skull Valley sortie count. Id.

• The crash rate for the F-16s, C, was taken to be 2.736 x 10-8 per mile. Cole/Jefferson/Fly Post Tr. 3061, at 103.

***226** • The pilot was assumed to jettison ordnance in 90% of all crashes, the fraction of the crashes, e, assumed to be attributable to engine failure or some other event leaving him in control of the aircraft (in crashes attributable to other causes it was assumed that the pilot would eject quickly and would not jettison ordnance). Cole/Jefferson/Fly Post Tr. 3061, at 103; Campe/Ghosh Post Tr. 4078, at 31. Even though some accident reports reflect that pilots will take steps to avoid jettisoning ordnance near built- up or populated areas, the Applicant conservatively assumed no "R" factor to account for such avoidance. Revised Addendum at 30-31. [FN156]

• Skull Valley was treated as an airway with a width, w, of 10 miles. Cole/ Jefferson/Fly Post Tr. 3061, at 103; Campe/Ghosh Post Tr. 4078, at 33.

• The area of the facility, from the perspective of ordnance jettisoned from an aircraft flying from north to south over the site, A, was taken to be the product of the width and the depth of the cask storage area (assuming a full facility with 4,000 casks) plus the product of the width and depth of the Canister transfer building, in that pieces of ordnance are small relative to an aircraft and impact the ground at a steep angle. Cole/Jefferson/Fly Post Tr. 3061, at 103. [FN157] Thus, the area of the facility was calculated to be 0.08763 square miles. Cole/Jefferson/Fly Post Tr. 3061, at 103.

Based on these input values the Applicant calculated the hazard to the facility from jettisoned ordnance to be 3.2 x 10-8 per year. Id. at 103.

C.92 The Board notes that the Applicant used a modified NUREG-0800 formula to calculate the probability as shown by:

P = N x C x e x A/w

Id. The Applicant has included an additional factor, "e," which reduces the probability of ordnance impacts by assuming that the pilot would jettison ordnance in only 90% of crashes. Id. at 102-03. The Applicant assumed the pilot would eject quickly in the other 10% of crashes without time to jettison ordnance, Id. at 103.

***227** C.93 The Board finds the Applicant's overall approach to be logical. As explained below, however, the Board finds that the input values for N and w should be modified.

****123** C.94 The State claimed that the Applicant should have assumed that the fraction of sorties in Skull Valley carrying jettisonable ordnance would be no less than it was in FY 1998 increased by the increase in sorties since FY 1998, rather than what it was in FY 1999 and FY 2000. Horstman Post Tr. 4214, at 29. The FY 1998 fraction was higher than the FY 1999 and FY 2000 fractions. [FN158] Lieutenant Colonel Horstman asserted that lower ordnance usage in FY 2000 was due to some of the F-16s at Hill AFB having been deployed to the Caribbean for drug interdiction missions. Horstman Post Tr. 4214, at 29. The deployment to the Caribbean was, however, much smaller than other past deployments and the training of the F-16s is not based on one particular deployment. Tr. at 13,090- 91 (Fly). Moreover, the State did not account at all for the FY 1999 ordnance usage, which was almost identical to the usage in FY 2000. Revised Addendum, Tab HH at 14. Requirements for F-16 ordnance usage in training are established by Air Force regulations and each unit's designated operational capability. Tr. at 13,082-84 (Fly). Those requirements do not change frequently. Tr. at 13,086- 87 (Fly). Furthermore, the Air Force Safety Agency has stated that ordnance expenditures are not expected to increase in the future. Tr. at 13,087-88 (Cole).

C.95 The State asserts that F-16s transiting Skull Valley may carry up to six ordnance per flight and an F-16 may carry two MK-84 2000-pound bombs per flight Horstman Post Tr. 4214, at 27. After a pilot zooms the aircraft in an emergency, the pilot will release the bombs and fuel tanks from the aircraft, a procedure known as "jettison all stores." Id. at 28. The State asserts that typically a pilot will take no action to select where the ordnance will impact. This is because the immediate jettison of all stores may be necessary to control the aircraft, and also because the pilot's attention may be focused on tasks relating to the pilot's survival, such as restarting a failed engine or ejecting. Id.

C.96 In FY 1998, the 388th fighter wing carried ordnance on 678 sorties. Revised Addendum, Tab HH at 13. That number was reduced to 151 sorties with ordnance in FY 1999 and 128 sorties with ordnance in FY 2000. Id. at 13-14. The 419th FW at Hill AFB also carries ordnance but no records showing ordnance carried by the 419th are available. Id. at 12 n.27. The Applicant

Horstman Post Tr. 4214, at 28; Tr. at 3494 (Jefferson). On February 1, 2001, 388th FW Operations Group Commander Colonel Coots advised that current training needs require more sorties to carry ordnance than the training conducted in FY 2000. Horstman Post Tr. 4214, at 29. The Applicant does not know the reason for the decline in the number of sorties carrying ordnance from FY 1998 to FY 2000. Tr. at 3500 (Jefferson). Hill AFB is capable of flying 678 sorties with ordnance through Skull Valley in a single year. Tr. at 3499 (Jefferson). The State argues that it is unrealistic and not conservative to assume that future flights will carry less ordnance than flights in FY 1998 data in calculating the number of sorties carrying ordnance. State Findings ¶ 63. Using FY 1998 data, the State calculates that 21.2% (866/4086) of Skull Valley flights carried ordnance in 1998. Id. ¶ 117.

C.98 The Applicant reasons that most of the ordnance is delivered to the UTTR South Area, and not all flights to the UTTR South Area will transit Skull Valley. Aircraft Crash Report at 81. The Applicant therefore determines the percentage of all flights carrying ordnance by dividing the number of sorties carrying ordnance by the number of UTTR South Area sorties, rather than Skull Valley sorties. Aircraft Crash Report at 81-82. There were 5726 F-16 sorties in the UTTR South Area in FY 1998. Aircraft Crash Report at 82. Using the reasoning adopted by the Applicant, 15.1% (866/5726) of all flights, including those through Skull Valley, carried ordnance in 1998.

C.99 Using the State's crash rate, C, for F-16s of 4.10 x 10-8, taking 21.2% of 7040 as the number of flights, N, or 1492, the area, A, of 0.12519 square mile, including an assumed skid area for ordnance, [FN160] and its asserted width, w, of 5 miles, [FN161] the State's calculated annual probability of impact from jettisoned ordnance is 1.53 x 10-6 per year. State Findings ¶ 120.

C.100 Given the wide range of claims by the Applicant and the State about the number N, and given only 3 years of data were available (FY 1998, 1999, and 2000), it is reasonable to use the average of the 3-year data to estimate the ***229** percentage of all flights carrying ordnance. This approach provides (866 + 193 + 164)/(4086 + 4586 + 5997) = 0.08337, the proportion of all flights carrying ordnance. Multiplying 7040 (the number of flights the Board has found) by that percentage, yields an estimate for N of 587, or about 40% of the value the State would assign. We have already indicated our findings on the other factors. Thus, based on the above inputs, we calculate the probability of jettisoned ordnance directly impacting the PFS facility as follows:

P = C x N x e x A / w

****125** = 2.736 x 10-8/mile x 587 x 0.90 x 0.08763 sq. mile / 6 miles

= 2.11 x 10-7 per year

Although meeting the Commission's governing criterion, this probability is high enough to warrant inclusion in the cumulative risk.

(3) NEARBY EXPLOSION

C.101 The Applicant also addressed the potential hazard to the facility posed by jettisoned live ordnance that might land near the facility (without hitting it) and explode on impact, as well as the hazard posed by a potential explosion of live ordnance carried aboard a crashing aircraft that might impact the ground near the facility (also without hitting it) and found both to be insignificant. See Cole/Jefferson/Fly Post Tr. 3061, at 104-06. The State submitted no testimony on these potential hazards.

C.102 The U.S. Air Force has specifically stated that "[n]o aircraft flying over Skull Valley are allowed to have their armament switches in a release capable mode. All switches are 'SAFE' until inside DOD land boundaries." Id. at 101-02. The Air Force has also stated that "[t]he UTTR has not experienced an unanticipated munitions release outside of designated launch/drop/shoot boxes." Id. at 102. Consequently, the likelihood or probability of an inadvertent weapons release from F-16s flying over Skull Valley impacting or affecting the facility is very small.

C.103 As stated above, Air Force pilots do not arm the live ordnance they are carrying while transiting Skull Valley near the facility. Furthermore, the likelihood that unarmed live ordnance would explode when impacting the ground after being jettisoned is "remote" and the Air Force has no records of such incidents in the last 10 years, Id. at 104; see also Tr. at 8444 (Horstman). Thus, it is highly unlikely that jettisoned live ordnance or live ordnance carried aboard a crashing aircraft that did not directly impact the facility would damage the facility.

C.104 Nevertheless, the Applicant conservatively assumed that ordnance jettisoned from or carried aboard a crashing aircraft would have a 1% chance of ***230** exploding and calculated the hazard that potentially exploding ordnance landing nearby the PFSF would pose to the facility. Cole/Jefferson/Fly Post Tr. 3061, at 105-06. The Applicant assumed that a storage cask or the Canister Transfer Building could be damaged if a bomb exploded close enough to exceed their explosive overpressure limits. Johns Post Tr. 3205, at 5-6; Aircraft Crash Report at 83b. The Applicant conservatively assumed that each F-16 carrying ordnance through Skull Valley was carrying a 2000-pound bomb, the largest single piece of ordnance they carry. Cole/Jefferson/Fly Post Tr. 3061, at 105. The Applicant then calculated the probability that the jettisoned ordnance would land close enough to explode and damage the facility, or an F- 16, would crash near the facility without jettisoning the ordnance, using a method similar to what it used to calculate the probability that an F-16 would crash and hit the facility, Id. The Applicant concluded that there would be an annual probability of less than 1 x 10-10 per year that the facility would be damaged by a nearby explosion of ordnance. Id. at 105-06. Again, the State did not challenge the impact of nearby exploding ordnance, and in addition, the Staff found the Applicant's assessment to be reasonable. Staff Findings ¶ 2.517.

(4) CONCLUSION

****126** C.105 We find that the Applicant used logical methodology to calculate the hazard to the facility posed by ordnance. As noted above, the Applicant's assessment of the crash impact hazard posed by F-16 transits of Skull Valley is based on reasonable data and analysis in three of the four respective ways ordnance can impact the facility. The Board has determined, based on its own analysis, that a higher hazard probability is more appropriate for the hazard posed by jettisoned ordnance. But the Board's estimate of 2.1 x 10-7/year (relative to the Applicant's value

of 3.2 x 10-8/year) is still within the Commission's 1 x 10-6 acceptance criterion. The State did not challenge the Applicant's assessment of the hazard posed by potential nearby explosions of ordnance.

C.106 In summary, we find that the risk posed to the facility from jettisoned ordnance is within the acceptance criterion of 1 x 10-6/year stated in CLI-01- 22. This risk level, however, adds to the already excessive risk posed by F-16s transiting Skull Valley.

III. CONCLUSIONS OF LAW

The Licensing Board has considered all of the material presented by the parties on contention Utah K/Confederated Tribes B (Inadequate Consideration of Credible Accidents). Based upon a review of the entire evidentiary record in this proceeding and the proposed findings of fact and conclusions of law submitted by the parties, and in accordance with the views set forth in Parts I and ***231** II above -- which we believe are supported by a preponderance of the reliable, material, and probative evidence in the record -- the Board has decided the matters in controversy concerning this contention and reaches the following legal conclusions:

1. Pursuant to 10 C.F.R. §§ 72.90, 72.94, and 72.98, proposed sites for an ISFSI must be examined with respect to the frequency and severity of external man-induced events that could affect the safe operation of the ISFSI. The facility must be designed to accommodate the effects of credible accidents and must include them in the design bases of the facility. See 10 C.F.R. § 72.122(b)(1). The Commission previously approved an annual probability of occurrence criterion of 1 x 10-6 for determining whether aircraft crash accidents must be included in the design bases of an ISFSI. See CLI-01-22, 54 NRC 255, 263 (2001).

2. The Applicant has not demonstrated, as required by that Commission decision, that the cumulative probability of a civilian or military aircraft (including jettisoned ordnance) crashing at or affecting the PFS facility is within the acceptance criterion of 1 x 10-6 per year. Specifically, PFS has not provided reasonable assurance that F-16 aircraft crash accidents do not pose a significant threat to the facility. Consequently, the PFS application for a Part 72 license to construct and operate an independent spent fuel storage facility in the Skull Valley cannot be granted at this juncture.

****127** For the reasons set forth in this opinion, it is this 10th day of March 2003, ORDERED that:

1. Contention Utah K/Confederated Tribes B (Inadequate Consideration of Credible Accidents) is RESOLVED in favor of Intervenor State of Utah relative to the issue of the hazard of F-16s transiting Skull Valley, as it impacts on the cumulative hazard to the PFS facility from aircraft accidents and ordnance.

2. In accordance with 10 C.F.R. § 2.730(f), the Licensing Board's rulings in Part I above, as supported by the Detailed Analysis of the Record and Findings of Fact in Part II above, and the brief Conclusions of Law in Part III above, are REFERRED to the Commission for its consideration and further action, as appropriate.

3. In accordance with Subpart I.E above, Applicant PFS, Intervenor State of Utah, and the NRC Staff shall FILE within 20 days a joint report outlining their positions regarding further proceedings on the issue of the consequences of an F-16 accident at the Skull Valley facility.

4. In the absence of Commission acceptance of our referral of this ruling under ordering paragraph two above, and upon a determination by Applicant PFS (as may be expressed in the report submitted under ordering paragraph three above) not to proceed further relative to the issue of the consequences of an F-16 accident at the Skull Valley facility, pursuant to 10 C.F.R. § 2.760(a), this Partial ***232** Initial Decision will constitute the FINAL ACTION of the Commission within forty (40) days of its date unless a petition for review is filed in accordance with 10 C.F.R. § 2.786, or the Commission directs otherwise.

5. Any party wishing to file a petition for review on the grounds specified in 10 C.F.R, § 2.786(b)(4) must do so within fifteen (15) days after service of this decision, which shall be considered to have been served by regular mail for the purpose of calculating that petition filing date.

THE ATOMIC SAFETY AND LICENSING BOARD

Michael C. Farrar

Chairman

ADMINISTRATIVE JUDGE

Jerry R. Kline

ADMINISTRATIVE JUDGE

Peter S. Lam

ADMINISTRATIVE JUDGE

FN1. This leaves open two matters tried before this Board: (1) whether PFS has established that its proposed facility satisfies the NRC's seismic safety criteria; and (2) whether the rail spur proposed for transporting spent fuel casks from the main line down Skull Valley is routed as well from an environmental standpoint as the alternatives, including those SUWA suggested, and does not run afoul of wilderness management constraints. We are not yet ready to rule on those two items, having chosen to give priority to completing the matter decided today. Drafting the decisions on those matters is well along, however, and we expect to issue them in the next few weeks. See also notes 6 & 13, below, to the same effect on matters before another Board.

FN2. We explain this concept in more detail in Subpart E, below. 77

FN3. As explained at greater length later (see note 11, below), limited appearance statements are not evidence upon which the merits of a decision can be based. Our only purpose in referring to the Air Force filing -- which may be viewed electronically on the NRC ADAMS site (Accession # ML021160024) -- is as a possible indicator of the future course of the proceeding.

FN4. As the parties are aware, the issue being decided today involves only the risk of accidental aircraft crashes. The risk from intentional aircraft attacks and other potential terrorist activities is not before us in this proceeding, but is being considered by the Commission in a much broader context, not only in this case but across the entire regulatory landscape. See, e.g., CLI-01-26, 54 NRC 376 (2001), and CLI-02-25, 56 NRC 340 and related cases (Dec. 18, 2002). In CLI-02-25, the Commission considered, at our request, the question whether NEPA requires the NRC to address in licensing decisions the impact of terrorism as seen in the light of the September 11, 2001 attacks. In ruling that the impacts of a potential terrorism attack need not be considered by licensing boards as part of the NRC's environmental review in particular adjudications, the Commission noted that it is itself in the process of more broadly reviewing the potential effects of suicidal aircraft crashes on NRC-regulated facilities. See CLI-02-25, 56 NRC at 356. Nothing now before us indicates whether any studies that may have been performed to aid the Commission in evaluating the consequences of aircraft-related terrorism would shed light upon the consequences of the aircraft-related accidents that we have been considering and which could now become the subject of further proceedings herein.

FN5. See 62 Fed. Reg. 41,099 (1997).

FN6. That 2002 trial initially included a fourth issue, involving hydrological concerns, that was settled in mid-hearing. A previous trial, conducted some time earlier by our predecessor Board (see note 13, below), involved issues relating to the facility's emergency planning arrangements and the Applicant's financial qualifications, matters that that Board has either since resolved and or will resolve shortly (see also note 1, above).

FN7. The Commission urges that, in a typical case, a decision be rendered within 60 days of the filing of the final briefs. Statement of Policy on Conduct of Adjudicatory Proceedings, CLI-98-12, 48 NRC 18, 21 (1998). Just as the trial necessarily took much longer than counsel had predicted (before they each disclosed the large number of witnesses being put forward), the decisionmaking process has taken longer here, for reasons adverted to in our unpublished Orders of December 11, 2002, and January 23, 2003. In that regard, the lengthy decision-writing process on this issue was aided immeasurably by the extraordinarily thorough and well-crafted papers filed by all three parties.

FN8. The Band would derive substantial income from making its Reservation available to the Applicant for the facility. (The disputes among various Band members over the nature of that arrangement, and the distribution of funds thereunder, do not fall within our jurisdiction to resolve. See CLI-02-20, 56 NRC 147 (2002), reversing LBP-02-8, 55 NRC 171 (2002).)

FN9. See, e.g., Skull Valley Band of Goshute Indians v. Leavitt, 215 F. Supp. 2d 1232 (D. Utah 2002).

FN10. See 66 Fed. Reg. 67,335 (2001). For purposes of completeness in this procedural history, we have noted herein how the existence of the two Boards came about. Generally, however, unless the context demands otherwise or we so indicate, references in this decision to "this Board" or "the Licensing Board" are not intended to distinguish between rulings made by the original Board and by this second Board, for there has been no lack of continuity in our respective roles.

FN11. "Limited appearance" sessions are conducted in order to allow members of the public who, although unable to undertake the task of becoming a full party to the proceeding and participating in the creation of the evidentiary record, nonetheless would like to make their views known. Those views, which are made part of the agency's official docket, are not evidence upon which a Board decision can be based but, to the extent relevant to the issues being heard, can serve to trigger inquiry by the Board or presentations by the parties. As part of that process, and because of its relevance to an aspect of our decision (see Subpart E, below), we address in the text the concern expressed about the Staff's role.

FN12. In this regard, an applicant is theoretically free during that review process to reject a Staff determination that its presentation is not acceptable and to request a hearing of its own to challenge adverse Staff decisions. See, e.g., Ohio Edison Co. (Perry Nuclear Power Plant, Unit 1), LBP-92-32, 36 NRC 269 (1992); Consumers Power Co. (Midland Plant, Units 1 and 2), LBP-85-2, 21 NRC 24, 46 (1985); Kerr-McGee Chemical Corp. (West Chicago Rare Earths Facility), LBP-84-42, 20 NRC 1296, 1306 (1984). Historically, however, applicants have usually elected not to make such challenges on safety matters in original licensing actions, but instead have found it more prudent to accept the Staff's critique and to make the suggested corrections.

FN13. Specifically, as noted earlier (see note 6), that Board conducted a hearing in mid-2000 on the merits of several contentions involving financial assurance and emergency planning. A partial initial decision was issued on the latter. LBP-00-35, 52 NRC 364 (2000), petition for review denied, CLI-01-9, 53 NRC 232 (2001). The financial assurance matters are still under advisement but will be decided no later than the rest of the matters before this Board.

FN14. We need not recite here the Board's many prior decisions on the initial admissibility of contentions (referred to in the text above) or on summary disposition of previously admitted contentions (see next paragraph of text). We do note that some 120 contentions were covered.

FN15. As just noted, we need not detail those here, for each was the subject of a published Board opinion. To the extent that any of the Board's prehearing rulings were not ripe for appeal to (or for review by) the Commission at the time, they will become ripe when a partial initial decision

to which they relate is issued, or (if unrelated to any earlier decision) when our last initial decision is issued. CLI-00-24, 52 NRC 351, 353-54 (2000).

FN16. A variant of the State's contention was filed by Intervenors Confederated Tribes (who opposed the project but did not participate actively at the trial) and Castle Rock Land and Livestock Co. and Skull Valley Co. (representing neighboring landowners who withdrew before trial). The contentions were all consolidated and revised to read as follows: "The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the [proposed facility] and the intermodal transfer site, including the cumulative effects of the nearby hazardous waste and military testing facilities in the vicinity and the effects of wildfires." LBP-98-7, 47 NRC 142, 253, aff'd on other grounds, CLI-98-13, 48 NRC 26 (1998).

FN17. See also our decisions in LBP-99-34, 50 NRC 168 (1999), LBP-99-35, 50 NRC 180 (1999), and LBP-99-39, 50 NRC 232 (1999), all of which led to the contention's eventually being limited to and reframed as: "The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the [proposed facility], including the cumulative effects of military testing facilities in the vicinity." LBP-99-39, 50 NRC at 240.

FN18. In that decision, we ruled on whether or not a genuine dispute of material fact existed regarding several categories of events that the State asserted in its amended contention were "credible accident scenarios." These categories involved assertions that the facility would be at risk from (a) the use of military ordnance at Dugway Proving Ground; (b) the testing of cruise missiles on the UTTR; and (c) the potential for a variety of aircraft accidents.

FNIn the first two instances, we granted the Applicant's motion to dismiss and thus eliminated the need for further litigation on those issues. With respect to the first, the use of ordnance at Dugway, we found that no genuine dispute of material fact existed because the State no longer contested the Applicant's evaluation of munitions hazards. LBP-01-19, 53 NRC at 424. As to the second, we found that cruise missile testing did not present a genuine dispute of material fact because even in situations where cruise missiles have crashed, the State could not point to any circumstances in which the missiles had strayed more than 1 mile from the original flight path, a distance that would not bring the proposed site within range. Id. at 427-29.

FNThe third category, aircraft crash hazards, presented several issues about which we found a genuine dispute of material fact to exist; those are the issues on which we went to trial and with which we deal herein. But we also held that other aspects of the State's assertions -- regarding the hazards of commercial aircraft flying to and from Salt Lake City International Airport and of other general aviation activity -- presented no genuine dispute of material fact. Id. at 451, 452. In making that ruling, we found that the State's expert witness had not provided any concrete scientific analysis to controvert the Applicant's submissions, and thus resolved the matter in the Applicant's favor. Id.

FN19. In NRC parlance, the proposed interim storage facility is called an Independent Spent Fuel Storage Installation, or ISFSI. See 10 C.F.R. § 72.3.

FN20. Given the conclusions we reach later in this opinion (see Subpart E, below), it is important to observe that the Commission's discussion of hypothetical "consequences" -- in the context of setting a probability criterion -- was of a general, comparative character and does not provide any insight into the specific, precise level of consequences that might result if a spent fuel cask accident indeed did take place. See also the notation in CLI- 01-22 of the views of Commissioner Dicus, 54 NRC at 265-66.

FN21. The pleadings that had been filed when the Commission made the above ruling had placed almost exclusive emphasis, as to F-16s, on the probability, not the consequences, of an aircraft hitting the facility. For example, the Commission's opinion referred to the Applicant's having indicated that "various accident scenarios [were] extremely unlikely" and that "in some cases ... even if the posited accident did occur, no radioactive materials would be released." CLI-01-22, 54 NRC at 258 (emphasis added). That "in some cases" reference was to general aviation aircraft, not to F-16s, as may be seen by examination of the material cited.

FN22. It appeared at that time that, had the Commission ruled that the stricter "one in ten million" criterion should apply, the Applicant would have conceded that the accidents we discuss herein would be deemed credible and thus that they must be designed against. See LBP-01-19, 53 NRC at 431. Instead, the Commission's adoption of the less stringent standard left it open to the Applicant to argue that those accidents were not credible, with the result that their specific consequences would not have to be considered. The impact this had on how the case later developed is reflected in Subpart E, below.

FN23. As defined, R represents the probability that a crashing F-16 will hit the site by the pilot's not avoiding it before ejecting. As will be explained in more detail, R is a function of the product of two components -- which we call R1 and R2 (as they were sometimes referred to during the hearing and in the parties' proposed findings (see, e.g., Staff Findings ¶ 2.165)) -- that measure conditions leading to accident avoidance. Accordingly, R is best described as follows: R = 1 - (R1 x R2). On occasion at the hearing, however, the product of the two components was itself loosely referred to as "R," and the Transcript must be read accordingly.

FN24. PFS Exh. RRR, U.S. Nuclear Regulatory Commission, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-0800 (Rev. 2, July 1981).

FN25. See note 23, above. R1 and R2 as we use them should not be confused with the R1 and R2 that were used in earlier documents to represent different concepts that led to the same value for R through a different set of calculations (see, e.g., PFS Exh. N, Aircraft Crash Impact Hazard at the Private Fuel Storage Facility (Rev. 4, Aug. 2000) at 7-8 [hereinafter Aircraft Crash Report]). Although the mathematical calculational process relating to the R factor can be approached in

different fashions to reach the same result (compare id. with note 23, above), in all such approaches the key issues concern the accuracy of the 90% "in control" and 95% "will avoid" component values upon which the Applicant relies to reach its 85.5% crash reduction rate (and its complement, the 14.5% crash likelihood).

FN26. At this juncture, we should expand on our previous mention (pp. 78-79, above) of the interrelationship between this Part I Narrative Opinion, explaining our reasoning, and the more detailed supporting material, reviewing and evaluating the evidence, that appears in Part II. In terms of cross- references, particularly with respect to Subparts B and C of both parts, it is our intention -- whether or not a particular thought in the Narrative is accompanied by a specific reference to the detailed findings -- to place reliance on the portion of the detailed findings that supports the narrative thought.

FNAs a general matter throughout the remainder of this decision, if we cite to a Proposed Finding submitted by one of the parties, rather than to the evidentiary record, it is because (1) we are merely stating that party's position; (2) the matter under discussion is noncontroversial; and/or (3) we intend to incorporate by reference the record citations included in the Proposed Finding. On a related topic, if through inadvertence there appears to be a discontinuity between our written text and our record references, the text is to be deemed to reflect our views more accurately.

FN27. See State of Utah's Proposed Findings of Fact and Conclusions of Law Regarding Contention Utah K/Confederated Tribes B (Aug. 30, 2000) ¶ 57 [hereinafter State Findings].

FN28. To understand NRC adjudications in terms of matters like that just discussed in the text, it is important to distinguish among the roles, duties, and responsibilities of, respectively, the Commission(ers), the Staff, and the licensing boards. To that end, we take some care in all our writings to distinguish among those entities; when, instead, the context calls for us to speak of the agency as a whole, we use the term "NRC."

FNTo begin with, it is the five presidentially appointed and Senate-confirmed Commissioners who, empowered and directed by the governing statutes (like the Atomic Energy Act and the National Environmental Policy Act), set licensing requirements by issuing regulations on safety and environmental matters. Those regulations are binding on the NRC Staff and on licensing boards.

FNIn the course of applying and enforcing agency regulations, the NRC Staff may provide guidance to the regulated community. Boards -- being entirely independent of the Staff -- are not bound, however, to follow such guidance; they are bound only by the Commission's regulations and its adjudicatory precedents (which it issues in the course of conducting judicial-style review of our decisions, much as a higher court reviews a lower court's decisions).

FN29. We do not find this view to be in any way inconsistent with Dr. Campe's also having indicated that he had not previously been presented with such a concept. See p. 91, above.

FN30. Our detailed findings of fact in Part II, below, reflect the witnesses' qualifications and our findings that they did qualify as experts. See pp. 149- 52.

FN31. See Applicant's Proposed Findings of Fact and Conclusions of Law on Contention Utah K/Confederated Tribes B (Aug. 30, 2000) at 19-20 [hereinafter PFS Findings].

FN32. Later, the Applicant conceded that one additional accident could have occurred in Skull-Valley-type conditions. See Cole/Jefferson/Fly Post Tr. 3090, at 78-81. Treating that aircraft as having been in control before the pilot ejected, the proportion of "in control" crashes became 59 of 62, marginally increasing the resulting 95% value.

FN33. See NRC Staff's Proposed Findings of Fact and Conclusions of Law Concerning Contention Utah K/Confederated Tribes B (Inadequate Consideration of Credible Accidents) ¶ 2.283 (Aug. 30, 2002) [hereinafter Staff Findings].

FN34. The relevant F-16 manual urges a pilot preparing to eject to carry out a number of tasks, including -- time permitting -- guiding the plane away from "populated areas." At the hearing, some discussion took place, as a general matter, about what this term means and what type of action is contemplated, as well as how the instruction should be interpreted in the specific circumstance involving spent nuclear fuel casks (and perhaps other areas to avoid). Although those discussions about "populated areas" were not entirely illuminating, we explain later (see note 67, below) why we do not rest our decision on any interpretation of that concept.

FN35. The questions the Board posed to the Applicant sought an explanation as to how the estimated 95% probability of a pilot successfully avoiding a land target was derived from 15 out of 126 accident reports. See Tr. at 3663 (Lam). On its face, 15 successful events out of a total of 126 events yields only a 12% probability of success. See Tr. at 3668 (Lam). The Applicant's position was, however, that it had not placed principal reliance on the accident reports in determining the 95% success probability estimate. See Tr. at 3215-16 (Jefferson).

FN36. Following the admission into evidence of the initially proffered 15 accident reports, see Tr. at 3740-45, there was later discussion (recounted at Tr. at 8673-78) about whether all 126 accident reports needed to be before us for a sound decision to be made on the R1 and R2 components. To afford the State an opportunity to analyze and to respond to the additional reports, the hearing was recessed (to consider other issues already scheduled) and reconvened at a later point. See Tr. at 8677-78.

FN37. See NRC Staff's Proposed Findings in Reply to the State of Utah's Proposed Findings Concerning Contention Utah K/Confederated Tribes B (Inadequate Consideration of Credible Accidents) ¶ 89 (Oct. 7, 2002) [hereinafter Staff Reply].

FN38. More specifically, the Staff examined a "failure to avoid" probability range from 1% to 20%, which it referred to as a "20 times increase." See Staff Exh. C, Consolidated Safety Evaluation Report Concerning the Proposed Private Fuel Storage Facility (Mar. 2002) at 15-58 [hereinafter SER]. Had that range been expressed in terms of the R2 "avoid" component, the range would, of course, have been from 99% to 80%. We discuss later (see note 66) the appropriateness of representing that range as a "20 times increase," and then asserting therefrom that the 95% base value is not highly sensitive.

FN39. See State of Utah's Reply to the Proposed Findings of Fact and Conclusions of Law of the Applicant and the NRC Staff on Contention Utah K/Confederated Tribes B (Oct. 7, 2002) at 5 (quoting Tr. at 13,103 (Jefferson)) [hereinafter State Reply].

FN40. See State Reply at 35; State Exh. 60, U.S. Air Force, AF Instruction 51- 503, Aircraft, Missile, Nuclear, and Space Accident Investigations (Apr. 5, 2000) [hereinafter AFI 51-503].

FN41. The above analysis also explains the difference between the Applicant's R1 evaluation and the apparently significantly different evaluation by the F-16 manufacturer. Lockheed Martin's 36% engine-failure analysis covered all accidents, regardless of where they occurred, while the Applicant's 90% focused only on accidents occurring in normal flight, thereby eliminating from consideration those occurring on takeoff or landing or in special flight conditions, each of which implicates many other types of crash causes.

FN42. As has been seen (pp. 95-96, above), the Applicant put forward eight factors to support its pilot avoidance claim. But upon inquiry from the Board, the Applicant's witness agreed that the three factors just mentioned in the text were the primary ones.

FN43. See PFS Exh. YYY (pilot died avoiding a school); PFS Exh. ZZZ (pilot intending emergency landing on parade ground died avoiding marchers); Tr. at 3763-65.

FN44. See State Findings ¶ 104; see also individual accident reports that mention this concept: PFS Exhs. 187, 193, 197, and 200.

FN45. As indicated earlier (see note 34), because it is not necessary to our decision, we do not decide some key questions about the intent and scope of the F-16 Training Manual's instruction to "avoid populated areas." Thus, although we lay out some of the questions below (see note 67), we assume for purposes of this decision that pilots would for one reason or another treat the

spent fuel casks the same as "populated areas."

FN46. In this regard, none of the Applicant's expert panel, well qualified though they might be in other respects, had ever ejected from a plane. See Tr. at 3216-17 (Jefferson/Cole/Fly). Faced with conflicting hearsay testimony about the thoughts of pilots who had ejected, the Board suggested obtaining direct, live testimony from pilots who had undergone that testing experience. See Horstman Post Tr. 4214, at 18-19; Tr. at 3222-24 (Jefferson/Fly). As will be seen, evidence provided by one -- Colonel Frank Bernard -- was particularly instructive on the key question underlined in the preceding paragraph.

FN47. We provide, in the opening and closing paragraphs of Subpart B of Part II, below, additional thinking on the way in which the State's evidence predominates.

FN48. Colonel Bernard, who ejected from an F-16 during a training mission and whose testimony we draw upon in other respects below, testified that the greatest stress levels by a "significant measure" faced by a pilot occur during the moments before ejection. Tr. at 3897-98 (Bernard). He pointed out that there is a period of divided attention during an emergency that "completely becomes focused on what you need for your survival." Id.

FN49. See Tr. at 13,302-07 (Horstman); Horstman Post Tr. 4214, at 24.

FN50. See Horstman Post Tr. 4214, at 21-24; Tr. at 8377-84, 13,416-24 (Horstman).

FN51. The Applicant's witnesses stressed throughout the hearing the importance they placed on Air Force pilots' developing and maintaining constant situational and positional awareness, so that regardless of where they are flying and where they are headed, they are cognizant of their surrounding environment. See Part II, below, pp. 176-77.

FN52. See Horstman Post Tr. 4214, at 15-16, 18-19; see also Tr. at 3979-80, 4007-11, 4010-11 (Cosby), 3338-40 (Cole/Fly). In this regard, although pilots practice starting a failed engine on a simulator, an engine is never deliberately failed in flight as a training maneuver (unlike the training given to civilian pilots of small aircraft). See Tr. at 3333-37 (Cole/Fly).

FN53. See Horstman Post Tr. 4214, at 19. Although ejection has saved many pilots' lives, it is far from a risk-free maneuver -- for there is significant threat of various injuries, including life-threatening ones, from ejecting from an aircraft even during ideal conditions (on this score, the State offered evidence concerning pilot fatalities and significant injuries from F-16 ejections). See State Exh. 151, Lt. Col. George D'Amore & Lt. Col. Tom Luna, USAF II Ejections and You, the Aircrew, U.S. Air Force Flying Safety, Sept. 2001, at 11-13; Tr. at 3901 (Bernard); see also Tr. at 3145 (Cole), 3270-71, 3303-04 (Jefferson), 3273-74 (Fly/Cole). Of

course, actual ejection is never practiced (simulators can allow a pilot to practice all the steps preceding ejection and to experience being shot 12 to 15 feet up a set of anchored rails). See Tr. at 3335-36 (Cole/Fly). Accordingly, there is no way -- other than through an actual previous ejection -- to experience the full stress of the ejection phenomenon before it takes place in an actual emergency situation that is already stress-filled. See Tr. at 3333-37 (Cole/Fly).

FN54. See PFS Exh. PPP, U.S. Air Force, Technical Order 1F-16C-1, at 3-42 [hereinafter Manual].

FN55. The Applicant's reliance on pilot training and commitment to carry the day is perhaps facially analogous to the rationale underlying the Commission's "realism rule," which presumes that in an emergency, trained professionals -- state and local emergency response officials -- will act as they are expected to do by responding with their "best effort" in the event of a nuclear power plant accident. Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), CLI-86-13, 24 NRC 22, 31 (1986); see also 10 C.F.R. § 50.47(c)(1)((iii)(B). The Applicant here did not expressly rely on that rule and in any event, as we explain below, it cannot be used to bolster predictions about the future behavior of Air Force pilots flying through Skull Valley, whose commitment is not in doubt.

FNConsistent with the analyses of the former NRC Appeal Board and the United States Court of Appeals for the First Circuit regarding the realism presumption, it is apparent this precept applies only to the macrolevel policy decision made by an official about whether governmental agencies will respond at all to an emergency, rather than to the countless microlevel, action- oriented decisions made by individual actors on how to carry out their specific tasks as the actual crisis unfolds. See Massachusetts v. United States, 856 F.2d 378, 383 (1st Cir. 1988) (recognizing that realism rule is directed toward response on the state and local government level, rather than responses on an individual actor level); Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-937, 32 NRC 135, 148-49 (1990) (realism role is directed solely toward "those persons in leadership positions (such as governors, mayors, civil defense directors, and state police superintendents) whose regular duties include the initiation of measures to protect the public health and safety in the event of an emergency that puts the populace at risk"); see also Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-89-32, 30 NRC 375, 600 (1989) (calling a municipality's declaration that it would not be able to implement an emergency plan a "political decision").

FNIn our view, these cases establish that the critical factor in determining whether the realism presumption applies is the nature of the decisions in question. For policy decisions, the realism rule in effect says the relevant official will respond regardless of any prior stated lack of commitment to do so. For military pilots, in contrast, there is no doubt as to their commitment. Instead, the types of choices they make in attempting to address an emergency (e.g., changing direction, adjusting altitude) are very action-specific decisions not at all akin to the broad policy decisions -- such as those made by a mayor to dispatch police and fire departments to the scene of an emergency -- to which the realism rule is applicable.

FN56. See State Exh. 220, Videotape: Late Decision to Eject (U.S. Air Force 1986) [hereinafter Bernard Video].

FN57. The Applicant would have us disregard Colonel Bernard's experience because the problem took place in, and was caused by, conditions not akin to those encountered in Skull Valley. See Tr. at 13.692 (Fly). That premise is true, but does not take away from the lesson we draw from his experience -- pilots make mistakes, and the Air Force recognizes it. See, e.g., ALSAFECOM 002/1996. There is no basis for us to find that -- although they make mistakes in other phases of flight, in other locations -- they would almost never make a mistake while having the opportunity, under the stress of impending ejection, to avoid the PFS site.

FN58. In so finding, we do not doubt the sincerity of the beliefs of the Applicant's expert panel, who -- after lengthy and distinguished Air Force careers -- were seen clearly to take pride in the capabilities of their pilots, the training given them, and the commitment and dedication they exhibit. But the existence of those experiential filters through which the experts view the matter cannot be allowed to obscure the evidence -- i.e., that as superb as they and their training are, pilots make mistakes, and the Air Force recognizes it.

FN59. We think four of those reports (PFS Exh. 187, 193, 197, and 200) warrant particular notice because of the emphasis they place on human factors. Those reports call attention to such things as "a momentary lapse into 'seat-of-the- pants' flying due to some form of distraction" and note that "the human factor continues to be the ongoing limitation to perfect results" (Exh. 187); observe that "even with the most thorough preparation and capability, the human factor continues to limit perfect success." (PFS Exh. 193); cite "failure to use proper 'see and avoid' techniques to ensure a clear flight path," and human factors, including decreased situational awareness secondary to motivation to succeed, task saturation in association with the stress performance curve, task misprioritization, channelized attention, and misperception of speed/closure rate (PFS Exh. 197); refer to how pilot "channelized his attention on some aspect of the attack and descended below the briefed recovery altitude, became spatially disoriented and impacted the terrain" (PFS Exh. 200). Again, we are not saying these particular accidents could happen in Skull Valley conditions; at the risk of repetition, these reports illustrate that pilots do not always perform as they were trained to do, i.e., they make mistakes under stress. And, as Colonel Bernard emphasized, the preejection situation is the most stressful encountered during training.

FN60. In making this finding, we recognize that the Applicant's witness panel made clear from the outset that, in advocating their R2 value, they placed principal reliance on their expert opinion, not on the accident reports. Tr. at 3215, 3967, 13,100 (Jefferson).

FN61. As has been seen, compelling evidence exists to defeat the Applicant's R2 claim. Having come to that conclusion, we make the passing observation that it is also significant that only a few of the accident reports contain any direct evidence on the question of likely avoidance behavior of pilots in emergency situations. Instead, the Applicant's witnesses relied on inferences

drawn from the accident reports to conclude that the pilots acted consistently with the witnesses' own selected acceptance criteria. For example, although the reports contain little reliable, direct information on whether pilots took any deliberate evasive action in an emergency, the Applicant would have us infer that nearly all had the opportunity to so act and then did so. Yet the other reports, as it turned out, were ambiguous or silent on the point -- and this is not helpful where near certainty is the target. As the Board continues to see it, all that was shown was what happened in 15 out of 121 cases -- a far lower percentage than that proposed for R2. And examination of the rest of the reports has revealed, as we outlined above, a large number of pilot errors -- where "near certain" flawless performance is the thesis being advanced.

FN62. We stress that in not crediting pilot performance in the manner the Applicant has urged, we in no way mean to impugn either pilots' commitment to making their best efforts to follow their training, or the skills they bring to the service they provide this country. And we recognize that, for purposes of pilots' combat endeavors, the country must count on them to perform as trained, for there is no other choice in that regard. For purposes of nuclear safety regulation, however, there are other choices, including designing the proposed facility so that -- even if pilots, over whom the NRC has no regulatory jurisdiction, do not perform to near perfection once a stress-filled accident sequence is initiated -- the public will not be harmed by the consequences of a "credible accident."

FN63. What might have been probative were data recording and evaluating what pilots do in emergency circumstances, so that rigorous answers could be obtained to the question being considered. As is not uncommon in statistical analysis, the failure to take this approach introduces subtle error and analytical bias, precisely because the protocol followed might be unconsciously designed to produce just what it did produce, i.e., to confirm what amounted to a vote of the experts as to how Air Force pilots will behave, based on their character and training. This, however, does not carry the burden of proof the Applicant must bear in this nuclear licensing proceeding.

FN64. It should be added that the Applicant falls short in its attempt to support the R2 component through the United Kingdom's Atomic Energy Authority assessment. See PFS Exh. TTT, United Kingdom Atomic Energy Authority, A Method for the Site-Specific Assessment of Aircraft Crash Hazards (1987) [hereinafter UK Study]. The UK Study, which provides a basis for excluding from hazard calculations crashes in which the pilot is in control of an aircraft just before impact based on observations about pilot avoidance, concludes that pilots might avoid ground sites about 50% of the time. See UK Study at 8. It is, according to the Applicant, consistent with the F-16 accident reports and the testimony of the pilots in this proceeding who agreed that when time and circumstances permit, a pilot will attempt to avoid a facility. PFS Findings ¶¶ 21-22. In the Board's judgment, however, this UK Study -- evaluating disproportionately different crash rates in urban and rural areas -- is based on too crude an analysis to benefit us.

FN65. This case demonstrates that relying almost solely on subjective expert opinion for the development of scientific or engineering parameters can have significant disadvantages. When

such parameters are obtained by objective measurement, their validity can be checked through systematic inquiry into the methodology of their development. When, however, there are no reliable objective measurements available to establish the parameter in question (such as the R2 value here), there must be a significant concern that the opinions expressed, though truthful from the expert's perspective, suffer from having overlooked, or discounted inordinately, material from other wholly valid perspectives, resulting in seriously skewed conclusions.

FN66. In deciding this aspect of the case, we were not aided by the Staff's sensitivity analysis (discussed in note 38). As explained there, the Staff claimed that it had tested the effect of variation (in the "failure to avoid" rate) on the value of R2 over a twentyfold range (1% to 20%) of pilot nonavoidance and found only a small impact on the resulting crash probability. This impressive claim invites ready acceptance. But a look at the complementary value reveals that the "successful avoidance" rate varies only from 80% to 99%. This is, of course, not a twentyfold variance, and the whole matter has far less significance than we were led to believe.

FNAt best, then, we found in the Staff's sensitivity analysis nothing positive upon which to draw. Compare Subpart E, below, pp. 139-41, where we comment on the importance to the process of the Staff's independent review of an applicant's proposals.

FN67. In reaching this conclusion, we have assumed that pilots whose mission involved flying down Skull Valley would, for one reason or another, view spent fuel casks on the site as the functional equivalent of a "populated area" that should be avoided, time permitting. For example, whether or not the Manual was intended to be read with that definition, a mission commander could simply provide pilots that instruction.

FNHaving said that, we do note -- without relying on it to justify our decision -- that it is unclear how fine-tuned the "populated area" directive is intended to be. Even if it were reinterpreted or understood to include, broadly, something on the order of "areas that it would be better in all the circumstances not to hit," there is evidence that it simply refers to generally directing the aircraft away from a large geographic area, not from a specific site. Tr. at 13,531-32 (Horstman). In this regard, we were told that the Air Force does not teach pilots to look for specific sites on the ground in an emergency, Tr. at 8550-51 (Horstman), and that there is no Air Force training or guidance to avoid a house, a facility, or other specific ground site and pilots do not have the tools for such a task. Tr. at 13,464-65 (Horstman). It is, then, not clear that a pilot is even expected to take precise action to avoid one particular habitation or site rather than another.

FNGiven the altitude at which ejections are supposed to take place and the distance the aircraft will thus glide before crashing, "avoidance" action may be only general in nature. To be sure, the lower the altitude before ejection, the more precise choices there may appear to be. But then there is less time and more stress. In recognition of this, the Manual's directive is prefaced with "if time permits."

FN68. As indicated earlier, flights down Skull Valley are not risk-free, but they are significantly less intense than the high-stress, aggressive maneuvers involved in combat and similar exercises that take place over the UTTR. See Aircraft Crash Report, Tab H at 8.

FN69. The UTTR, located in Utah's West Desert, is comprised of both an on- ground training range and a larger training airspace. Its land area lies on either side of Interstate 80, which runs east-west and effectively splits the UTTR into (1) a north area located on the western shore of the Great Salt Lake, and (2) a south area located west of the Cedar Mountains.

FN70. In the UTTR's restricted airspace, pilots conduct a variety of activities with their aircraft, including air-to-air combat training, air-to-ground attack training, air refueling training, and transportation to and from Michael Army Airfield. Cole/Jefferson/Fly Post Tr. 3061, at 17.

FN71. An MOA is airspace of defined dimensions allocated to the military to separate or segregate certain military operations from other flight operations. The PFS site lies below the Sevier B and D MOAs, 18 miles east of the UTTR South Area's eastern land boundary (which lies to the west of the Cedar Mountains) and 2 miles east of the eastern edge of UTTR-related restricted airspace (which extends eastward from the UTTR's land area over the Cedar Mountains and into Skull Valley). The Sevier B MOA airspace, approximately 145 miles long, is some 12 miles wide in the vicinity of the PFS site and extends more than 100 miles south of Skull Valley. See Cole/Jefferson/Fly Post Tr. 3061, at 13.

FN72. The Sevier D MOA airspace lies directly above the Sevier B MOA. See SER at 15-59.

FN73. There is no dispute among the parties regarding the fourth factor, the effective area of the PFS site. All parties accept the area determined by the Applicant (0.1337 square mile) as the appropriate value. The Board has reviewed the method by which that area value was derived and accepts it as reasonable.

FN74. Because "w" appears in the formula's denominator, a wider airway results in a lesser crash probability. For all the other factors, the larger the value the greater the crash probability.

FN75. As best we can determine from the record, the geographical width of the Valley floor at the site is some 13 miles. See FEIS at 2-3.

FN76. Because the Applicant and Staff also employed the R factor, they did not themselves produce a four-factor probability. The calculation is, however, a straightforward one.

FN77. The table thus illustrates that even if we accepted the Applicant's values for the four

factors (which we do not), the Commission's one-in-a- million criterion would not be met without the R pilot-avoidance factor providing more than a 50% reduction to the four-factor result. Use of the Applicant's proffered value of some 85% reduction would indeed result in a value for P of less than 1 x 10-6 per year. But, starting with the Applicant's R1 value of 90%, an R2 of, say, 50% would provide an R reduction of only 45%, which would adjust the Applicant's four-factor calculation to just under 1.2 x 10-6.

FN78. The Air Force records overall crash data in terms of crashes per hour of flight. Aircraft Crash Report at 9, Tab D. To derive a Skull Valley crash rate per mile of flight, a degree of data manipulation must be employed, thereby introducing an element of estimation and uncertainty in addition to those inherent in determining (1) which operational segment of historic crash rates is most relevant to Skull Valley operations and (2) what years provide historic crash rates most predictive of the future lifetime of the facility.

FN79. The Air Force defines a Class A mishap as one in which the aircraft was destroyed or suffered more than $1 million in damage or there was a fatality. A Class B mishap involves damage to the aircraft between $200,000 and $1 million. Aircraft Crash Report, Tab C at 4-4.

FN80. The ACRAM data are based on four phases of flight: (1) takeoff, (2) landing, (3) normal flight, and (4) special operations. The Skull Valley operations are said by the Applicant to involve "normal flight" as they do not involve takeoff, landing, or aggressive maneuvering on a training range. See Aircraft Crash Report, Tab C.

FN81. We note that the State witness attempted to show an upturn in crash rate near end of life for the aircraft by correlating selected crash rates with the passage of time. Resnikoff Post Tr. 8698, at 9. We find that that selection of data involved an invalid statistical technique and place no reliance upon it. We can find no reliable evidence yet showing a significant upturn in end-of-life crash rate for the F-16. And it would be speculative now to attempt to predict how any changes in the worldwide deployment situation (see discussion of the "N" factor, below) might have a related, indirect effect on crash rates.

FN82. The problem stated in the text concerning the raw data, though described in superficially similar terms to the problem of attempting to use the accident reports for R2-related purposes (see p. 107 above), presents a different situation. The existing data are susceptible to adjustment through various techniques (although the parties disagree as to which techniques are legitimate) to derive data having different parameters. But when reports are prepared for one purpose, there is no ready way to "adjust" them to provide sound analysis on other matters that they did not set out to address.

FN83. The Applicant excluded the Sevier D aircraft count on the theory that it would include flights that took place elsewhere in the airway without overflying Skull Valley. Tr. at 3355-56 (Jefferson).

FN84. The Staff formulation, while invalid as it stands, does have within it an acceptable concept, i.e., that narrower flight paths, offset from the site (see text preceding page), might exist (in actual practice, not in mathematical construct) which would reduce the probability of aircraft crashes to acceptable levels. As suggested elsewhere herein, the Applicant may wish to explore with the Air Force discretionary modification of the effective airway.

FN85. NUREG-0800 at 3.5.1.6-3 (§ III.2).

FN86. Perhaps to avoid this criticism, the Staff indicated that, after halving the number of flights, it would treat the remaining fights as if spread over the original width of the airway and thus keep the "w" value unchanged. That adjustment is unavailing, however, in that if the airway remains at its original width (as the Staff would have it) after N is reduced by half, then that entire airway would still be available to the remaining half of the aircraft. Presumably, half of those aircraft would then occupy the eastern portion of the airway that the Staff found produced a negligible crash hazard. But in keeping with the Staff's offset notion, those aircraft now in the eastern half could then be ignored.

FN87. The conservatism in the Area factor to which the Applicant points, based on less-than-full capacity, we see only as offsetting a potentially nonconservative feature of the facility. Specifically, we have been told from time to time in the proceeding that if the facility were filled to capacity and future events established that the crash rate or number of flights was understated, the Staff could investigate and take remedial action, as it does with nuclear power plants. See Tr. at 4156-58 (Campe). In that regard, if the Staff discovers a problem at an operating power plant, it has the option to order the plant to shut down, thus relatively quickly reducing the nature of the particular risk in issue.

FNBut we asked in vain about what prompt remedial action the Staff would be able to direct PFS to take, as possible future licensee of a facility at full capacity, if it were determined, based on changed circumstances, that the crash probability then exceeded what had previously been envisioned. The record before us indicates that bringing spent fuel to the proposed facility will be a slow process, limited by the facility's capability of offloading and transferring the canisters in which the fuel rods will be transported. By the same token, it is not apparent on this record how it would be possible to effectuate, significantly faster than the casks were delivered, any Staff order to remove casks. Of course, if the facility were not at capacity, the Staff could halt delivery of any more casks. Other than to that extent, then, we cannot rely on any future Staff remedial action as a protection against understating the crash probability.

FN88. The Air Force has not established a minimum distance that pilots must maintain from the Stansbury Mountains. Tr. at 4343 (Horstman).

FN89. The MRR runs from southwest to northeast and passes 2 to 3 miles north of the PFS site.

SER at 15-80.

FN90. The vast majority return to Hill AFB from the UTTR South Area by exiting the northern edge of that range (which is not near the PFS site). Cole/Jefferson/Fly Post Tr. 3061, at 96-97.

FN91. See Cole/Jefferson/Fly Post Tr. 3061, at 96-97; Aircraft Crash Report at 48a-49.

FN92. According to the Air Force, 5726 F-16 sorties were flown on the UTTR South Area in FY 1998, almost all of which flew from Hill AFB (not all aircraft transit Skull Valley enroute to the South Area). From this, the Applicant determined that 286 aircraft (5% x 5726) from Hill and elsewhere used the Moser Recovery Route on their return flights for FY 1998. Cole/Jefferson/Fly Post Tr. 3061, at 97.

FN93. This estimate was derived from FY 1997 data obtained from MAA. Based on the total number of aircraft that took off and landed at MAA in later years (FY 1998 to FY 2000), a lesser number resulted, i.e., 212 non-F-16 flights per year. The Applicant also points out that the total number of aircraft flying over Skull Valley would actually be less than that total, for it includes aircraft flying to and from the airfield in all directions. See PFS Findings ¶ 195 & n. 138.

FN94. See Aircraft Crash Report at 82.

FN95. We think the jettisoning of ordnance thus involves a different analysis than does avoiding a ground site. The matter need not be explored further, however, for the fewer pilots that succeeded in jettisoning ordnance, the lower would be the calculated probability for the accident scenario now under scrutiny -- i.e., the risk of jettisoned ordnance. In other words, the Applicant's assumption of 100% success in jettisoning ordnance is the most conservative it can make here.

FN96. Although the Staff increased the size of the area calculated by PFS by using the length and width of the CTB at its widest point, the Staff, rather than providing a final value for A, merely asserted that the increase in area would marginally increase the probability, P, by 1 x 10-9. See Staff Findings ¶ 2.495. Thus, we accept the Applicant's estimation of A.

FN97. Because we decide this matter on the legitimacy of the concept the Staff is advancing, we do not pause to resolve questions that could be raised about its details, such as where the lower end of the order of magnitude "bracket" would most appropriately fall, which depends on whether the probability scale is viewed, for this purpose, as arithmetically based or log based, and might, instead of 5 x 10-6, be at 2 x 10-6, or "one in five hundred thousand." Another more important question would concern why the Staff's focus was only on the lower end of the so-called "bracket"; if it is truly a "bracket," it would seem the State could focus on its upper end

and argue that a superficially compliant showing ("less than one in a million") failed for not being as infrequent as, depending on how the scale is interpreted, "one in two million" or "one in five million."

FN98. The State, for example, called our attention to a Licensing Board decision in another case where the acceptance criterion was 1 x 10-6 per year and yet the Board closely scrutinized crash probabilities of 1 x 10-10 to be sure the criterion was indeed met. See note 103, below.

FN99. Cf. Bowen v. Georgetown University Hospital, 488 U.S. 204, 212-13 (1998). There, the Court disapproved agency counsel's attempt to express a position during litigation that was different from the established agency position. Here, even though the changed position was not put forward by agency counsel, but by staff involved in later litigation, we think-the principle analogous, in that the new litigating position is inconsistent with that taken in creating the position initially.

FN100. As we have adverted to throughout, that conservatism is not meant to deprive an applicant of its desired license. Rather, as we cover in detail in Subpart E, it is intended simply to require an applicant -- in order to earn that license -- first to take one of several possible steps, or to make one of several possible showings, to demonstrate that (notwithstanding the potential concern identified by the formula) the public health and safety will not be put at risk by an award of the license.

FN101. It is of no moment to this discussion, of course, that the acceptance criterion mentioned in NUREG-0800 is 1 x 10-7, while the criterion applicable here is 1 x 10-6. That difference simply reflects that the formula was initially derived for nuclear power plants and is being used here for a different type of facility. See pp. 86-87, above.

FN102. We mention again (See note 97, above), that a troubling question, involving fairness considerations, could arise if this "bracket" -- even if otherwise permissible -- were for practical purposes to extend, as the Staff seems to intimate, in only one direction.

FN103. See, for example, the decision in Big Rock Point (brought to our attention by the State for another purpose), where the formula gave a result in the 10-10 range. Consumers Power Co. (Big Rock Point Plant), LBP-84-32, 20 NRC 601 (1984), aff'd, ALAB-795, 21 NRC 1 (1985).

FN104. Unsuitable, that is, in the sense of the NRC's site suitability regulations, if the facility is not adequate, or cannot be hardened, to preclude excessive radiological consequences.

FN105. By the same token, the screening purpose for which the formula was created also suggests that, as the "one in a million" criterion is approached, the appropriate response is to

look more closely at the problem under scrutiny. For example, if the formulaic calculation indicated that the likelihood of the accident in question was 1.01 per million, would that result truly be any different from one in which the calculation indicated that the likelihood was 0.99 per million? Is there more reasons to round down the 1.01 to reach a decision in an applicant's favor, than there is to round up the 0.99 to reach a decision against an applicant? In such circumstances, rather than the agency's addressing a marginal proposal by sharpening an analytical pencil, the approach in NUREG-0800 seems to suggest that it would be better to proceed by sharpening an applicant's focus on identified problematic areas.

FN106. As noted earlier, the issue before us involves accidental crashes, but it would seem that any studies of aircraft impacts commissioned (after the September 11 attacks on the World Trade Center and the Pentagon) to assess the consequences of deliberate crashes, might be found to have a bearing on the analogous issue before us. See CLI-02-25, 56 NRC 356; note 4, above, and note 128, below).

FN107. Or it can attempt to make arrangements to reduce significantly the likelihood of the accident. In that regard, NUREG-0800 indicates that "past experience has been that military authorities have been responsive to modification of military operations and relocation of training routes in close proximity to" sites in question. NUREG-0800 at 3.5.1.6-5, § III.2. As already noted (pp. 77-78, above), we have no role to play in any such modification and pause simply to note that whether such "military authority responsiveness" will obtain here appears problematic in light of the April 23, 2002 "limited appearance" affidavit submitted on behalf of the Secretary of the Air Force early in our hearing. See pp. 77-78, above.

FN108. For example, for purposes of analysis, it can be assumed that the radiological consequences of a direct strike by a large meteor onto a nuclear power plant would be enormous. But because a meteor strike is so unlikely (i.e., in regulatory terminology, "incredible"), nuclear plants need not be designed to withstand them.

FN109. That result was reached in this proceeding with respect to the lack of any real effect from an impact by a general aviation aircraft. See note 18, above.

FN110. In this regard, we note the categorization of the issue regarding cask penetration is a gray area that depends on how the "accident" is defined. Thus, cask penetration was spoken of on a few occasions as constituting part of the "accident probability" question (when the accident is defined as cask breach by a crashing aircraft), and on other occasions as part of the "dose consequences" evaluation (when the accident is defined, as it most often has been here, as cask impact by such an aircraft). Compare our analysis of the "nearby ordnance" issue in Subparagraph C.6.d(iii), above.

FN111. The motions on which we heard oral argument on April 8, the eve of trial, had been filed 2 weeks before the start of the hearing, on March 25, with responses filed a week later, on April

1.

FN112. Although the Applicant's motion appeared primarily directed at the State's proposed testimony on "dose consequences" for being outside the scope of the proceeding, it also challenged the State's proposed testimony on an aspect of "cask penetration" as lacking any basis. See Applicant's Motion to Strike (Mar. 25, 2002), at 4-5.

FN113. See Testimony of Jeffrey Johns on Aircraft Crash Hazards at the PFSF Contention Utah K/Confederated Tribes B [hereinafter Johns Testimony] (Feb. 12, 2002).

FN114. In indicating whether "consequences is part of" this proceeding, Applicant's counsel did draw a distinction between "specific, radiological dose consequences," which it thought not before us, and its proffered testimony that "certain impacts ... would not result in a release of radioactive material," which it had included "to show that our probability calculations were conservative." Tr. at 2986 (Barnett). We discuss that purpose below.

FN115. State Memorandum in Opposition (Apr. 1, 2002) at 6 (citing LBP-01-19, 53 NRC 416, 431 n.5 (2001)).

FN116. In other words, given the failure of either the State or the Staff to challenge it frontally, a primary reason the Applicant's proffered testimony on "cask penetration" was subject to exclusion was because the Applicant's and Staff's challenge to the State's testimony had triggered consideration of the overall matter.

FN117. Applicant's Motion for Summary Disposition (Dec. 30, 2000) at 9. See also Staff Response to Motion to Strike (Feb. 20, 2001) at 1 n.1 (arguing that consequences of an F-16 crash impact accident are beyond the scope of this contention). As we read that argument, the Applicant was at least suggesting at that point that the "penetration" issue was not in play by virtue of the State's contention, for hardening the casks would provide an obvious starting point for avoiding an accident's untoward consequences.

FN118. LBP-01-19, 53 NRC at 431 n.5.

FN119. As it turned out, Judge Bollwerk was, for other reasons, present at the April 8 oral argument on the in limine motions. Tr. at 2923-24 (Farrar). This Board took advantage of his presence to consult with him on this matter, and he did not disagree with our resolution of it. See Tr. at 3007-08 (Farrar).

FN120. We note again in this regard (see note 20, above) that a discussion of consequences had

arisen in the case during the period when we, and the Commission, were considering what the criterion should be for determining when an accident was credible. In the course of such consideration, distinctions were drawn between what the criterion should be for nuclear power plants and for spent fuel installations, and a key factor in that distinction was the perceived difference between the consequences of an accident at one and an accident at the other. But the consideration of consequences in that context was in a global, generic sense, not in a targeted, specific fashion, and had no bearing on how the case had been pleaded in terms of trial preparation. See LBP-01-19, 53 NRC at 429-32.

FN121. As is apparent, the proposed consequences testimony we excluded from the hearing was rather sparse compared to the State's and the Applicant's thorough, detailed testimony on the likelihood of the accident.

FN122. Early on, as it conducted its internal review triggered by the filing of the PFS application -- which presented an analysis of the likelihood of crashes into the facility -- the Staff had asked pointedly for an analysis of certain crash consequences. See Commitment Resolution Letter #18 from Applicant to Staff of 10/13/99, reciting the Staff's earlier conference call question about certain "potential consequences" issues if the Applicant was "unable to show the lack of any credible hazard from aircraft crashes ...." The Applicant responded, however, that any such analysis was unnecessary. Although the Applicant eventually was more forthcoming (see next paragraph), it appears that that initial Staff-Applicant exchange may have permanently set the tone for how the Staff approached this matter.

FNIn Revision 22 of its Safety Analysis Report (SAR), the Applicant on the one hand reasserted at one point that because "aircraft crashes do not present a credible hazard ... the facility does not need to be designed to withstand the impact of an aircraft crash." SAR at 2.2-6. The Applicant went on in that same revision, however, to address crash impacts in two not entirely consistent fashions, viz, by (1) pointing out that "no credit was taken" in calculating the annual impact probability "for the resistance to the effects of an air crash impact provided by the concrete storage casks" (except where "light general aviation aircraft" were concerned), but (2) urging, based on material it had submitted on that subject, that "[t]his resistance of the casks to penetration further reduces significantly the calculated risk ... from aircraft crashes ...." SAR at 2.2-22 (emphasis added).

FN123. The NRC's basic rule is that the actual hearing of particular issues (as distinguished from prehearing pleadings and discovery matters related to those issues) is expected to await the Staff's preparation of, respectively, the Final SER (not just the Preliminary SER) and the Final Environmental Impact Statement (EIS) (not just the Draft EIS), or the functional equivalent of those documents. In other words, until the Staff is ready to present its final, complete analyses, a case is usually deemed not ready to move forward. Statement of Policy on Conduct of Adjudicatory Proceedings, CLI-98-12, 48 NRC 18, 20-21 (1998). Here (presumably because of the nature of the Applicant's presentations to it), the Staff had neither conducted nor provided any analysis on the issue in question.

FN124. It has long been the rule that the Staff "does not occupy a favored position at hearings," in that Boards "must evaluate the staff's evidence and arguments in the light of the same principles which apply to the presentations of the other parties," for "the staff's views 'are in no way binding upon' the boards ... [and] cannot be accepted without passing the same scrutiny as those of the other parties." Consolidated Edison Co. of New York (Indian Point, Units 1, 2, and 3), ALAB-304, 3 NRC 1, 6 & n.15 (1976) (footnotes omitted) (quoting Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-268, 1 NRC 383, 399 (1975)). See also Texas Utilities Generating Co. (Comanche Peak Steam Electric Station, Units 1 and 2), LBP-82-87, 16 NRC 1195, 1200 (1982), vacated on other grounds, CLI-83-30, 18 NRC 1164 (1983) (describing how the Board and the Staff have different roles in licensing hearings).

FN125. While Staff review of a subject may thus be a prerequisite to the conduct of a hearing in ordinary circumstances, we do not mean to exclude totally the possibility that Staff review could be dispensed with in an unusual situation, even in a complex case. In some relatively simpler types of proceedings, the Staff conducts its review but, under NRC Rules, has the option (subject to Board approval) not to participate in any hearing that later takes place. See 10 C.F.R. § 2.1213. Here, we were not faced with any such unusual situation, or presented any other reason to take up a subject of this magnitude without benefit of Staff analysis.

FN126. The prefiled testimony had indicated that its coverage of the "cask penetration" subject was qualitative, not quantitative. See Cole/Jefferson/Fly Post Tr. 3061, at 111-12. In short, there has been throughout -- perhaps understandably -- a degree of vacillation in the Applicant's position, and a degree of ambiguity both in the purpose for which material was being put forward and in the conclusions being urged to be drawn from it. See notes 117, 122.

FN127. See Tr. at 2986-87 (Barnett), the excluded testimony of the Applicant's expert panel (Cole/Jefferson/Fly Post Tr. 3061, at Q&A 163-164), and the excluded testimony of Applicant's expert Jeffrey Johns (Johns Testimony).

FN128. Given the time and resources that the Commission has devoted, in the wake of the events of September 11, 2001, to assessing the potential consequences of aircraft striking NRC-regulated facilities (see CLI-02-25, 56 NRC at 356), any further proceedings on this subject (whether in open or closed session) may well now benefit from much more detailed evidence than was proffered to us last year.

FN129. See pp. 138-39, above.

FN130. In light of what we have said earlier, we assume that presentation must first go to the Staff, in the form of an application amendment or in some other fashion, for review before reentering the hearing process.

FN131. Assuming the State is able to show, in a then-timely fashion, that it meets the procedural and substantive ground rules for such participation, hurdles with which it is thoroughly familiar.

FN132. Statement of Policy, CLI-98-12, 48 NRC at 19-20.

FN133. To be sure, the Appeal Board in Byron indicated it would likely not have taken on such discretionary review in the circumstances before it (an issue concerning the adequacy of the applicant's quality assurance plan). ALAB-770, 19 NRC at 1170. In contrast, we think prompt review here is fully appropriate and we see nothing in Byron suggesting that there cannot here take place simultaneously (1) review by the Commission of the findings on probability underlying our refusal now to approve the license, and (2) consideration by us of a presentation on consequences. The final say here on whether there should be expedited discretionary appellate review of the decision and whether we should simultaneously retain jurisdiction for further trial proceedings, of course, rests with the Commission; we simply note that the Byron precedent would indicate there is no legal barrier to proceeding in that fashion.

FN134. The applicable section of the rules, 10 C.F.R. § 2.760(a), allows for Commission review of partial initial decisions. NRC jurisprudence prior to the 1991 restatement of that rule suggests, however, that only partial initial decisions that dispose of a "major segment of the case" may be appealed immediately. More recently in this proceeding, the Commission declined an invitation to indicate whether it would adopt that principle, enunciated by the Appeal Board. See CLI-00-24, 52 NRC at 354 n.5. Although the Commission has the final word on the applicability of that test in this instance, today's decision on crash "probability" does appear to us to dispose of a major segment of the case (cf. Subpart A, above, first sentence); it certainly does so if the Applicant chooses not to make a presentation addressing consequences.

FN135. Ordinarily, we would have given the State, the party prevailing before us, an opportunity to be heard on the immediate referral question before taking that step. But if there can ever be matters that are a foregone conclusion, this is one, and there thus seems little point in putting the State, and the other parties in response, to the effort of briefing that procedural issue. We recognize that in following this course we appear to be violating an important principle -- "audi alteram partem" ("hear the other side") -- we cited at an earlier stage of this proceeding. LBP-02-8, 55 NRC 171, 201 (2002). That salutary principle is intended to ensure fairness to the parties, and to keep judges from making mistakes, but the circumstances before us appear to justify the risk of its nonobservance here.

FN136. As admitted in this proceeding, the contention also included a portion of a contention (Castle Rock 6 -- Emergency Planning and Safety Analysis Deficiencies) submitted by former intervenors Castle Rock Land and Livestock, L.C., and Skull Valley Co., Ltd. (Castle Rock/Skull Valley) in the rewritten contention. See LBP-98-7, 47 NRC at 214, 247-48. This part was dismissed upon Castle Rock/Skull Valley's withdrawal from this proceeding in 1999. See LBP-99- 6, 49 NRC 114, 120-21 (1999).

FN137. See PFS Motion for Partial Summary Disposition of [Contention Utah K/Confederated Tribes B] at 2-18 (June 7, 1999).

FN138. On August 13, 2002, the Staff notified us that the Air Force had lowered from 1000 feet to 100 feet above ground level the minimum altitude for flights in Sevier B MOA at the location of the Applicant's site. The Applicant's Aircraft Crash Report relied on the previous minimum altitude of 1000 feet AGL over the facility's site. Aircraft Crash Impact Hazard at the Private Fuel Storage Facility (Aug. 10, 2000) ("Aircraft Crash Report") (PFS Exh. N) at 6. No party sought to reopen the record or to have us take any other action exploring the significance, if any, of this development. See also Staff letter of December 19, 2002, and its enclosures.

FN139. The Applicant performed an assessment where it evaluated only those accidents that occurred under parameters, such as speed and altitude, at which pilots fly in the Sevier B MOA ("Sevier B MOA flight conditions"). Tr. at 3959 (Fly); Cole/Jefferson/Fly Post Tr. 3061, at 58-60. Those accidents made up a subset of the Skull Valley-type events. The Applicant performed the assessment to evaluate if anything peculiar to the Sevier B MOA flight environment would change its conclusion regarding the fraction of accidents that would leave the pilot in control with the time to attempt to avoid a site on the ground. Nothing did. Tr. at 3959 (Fly); Cole/Jefferson/Fly Post Tr. 3061, at 58-60. The Applicant performed a third assessment in which it assessed all of those accidents that occurred in the "normal" phase of flight (as opposed to special operations, takeoff, and landing), which was also a subset of the Skull Valley- type events, to evaluate whether consideration of the phase of flight would change its conclusion regarding the fraction of accidents that would leave the pilot in control with the time to attempt to avoid a site on the ground. It did not. Tr. at 3860-64 (Fly/Jefferson); Tr. at 3958-59 (Fly); Cole/Jefferson/Fly Post Tr. 3061, at 58-60.

FN140. In this respect, the Applicant included the May 25, 1990 accident in its analysis as a Skull Valley-type event on a different rationale. Cole/Jefferson/Fly Post Tr. 3061, at 63-64. The Applicant assessed the accident as having been caused by the pilot's loss of situational awareness while at low altitude. Aircraft Crash Report, Tab H at 18.

FN141. The NRC Staff's review of the Applicant's analysis assessed in detail the process the Applicant followed as well as the Applicant's data. Tr. at 8910, 8912, 8917-23 (Campe).

FN142. State Exh. 150. Lt. Colonel Horstman suggested that the manual cited by the Applicant was different with respect to emergency procedures than the manual for the F-16s currently flown at Hill AFB because the manual cited by the Applicant was for a block of aircraft that assertedly had different engines. Tr. at 13,628-29 (Horstman). In fact, the Block 30 and the Block 40 F- 16 have the same engines, Tr. at 13,632-33 (Fly), and the manuals have identical language regarding the direction of the aircraft away from populated areas, Tr. at 13,637 (Farrar).

FN143. Between 5000 feet AGL and less than or equal to 14,000 feet AGL, the threshold elevation of the Sevier D MOA, the data collected by Mr. Vigeant showed that there were thirty-one observations of no clouds, twenty-one instances observed of few clouds, eighteen instances of scattered clouds, fourteen instances of broken clouds, and eleven instances of overcast conditions. Tr. at 13,060 (Fly); PFS Exh. 245. Some of the entries in the chart involved multiple layers of clouds at different altitudes. Tr. at 3060 (Fly); see, e.g. PFS Exh. 245 at 1 (Jan. 15, 2001, 0900 entry).

FN144. Because the tiles were laid directly upon the notepad, the demonstration did not accurately reflect the height of the clouds above the ground or the height of the aircraft attempting to observe the facility. See Tr. at 13,041- 43 (Fly). Because the notepad was blank, the Applicant argues that the demonstration did not capture the landmaks on the ground that a pilot could use to orient himself with respect to the facility even if he could not observe it directly. See PFS Findings at 113 n.102.

FN145. The relevant navigational instruments continue to show relative bearing and the distance to the preselected point after an engine failure. Tr. at 13,053-54 (Fly).

FN146. The computer operates on backup power sources after an engine failure. Tr. at 3525-26 (Fly).

FN147. While the reports are required to indicate any damage or injuries on the ground, they are not required to report pilot avoidance actions. Tr. at 3661 (Cole). Thus, a case with no damage but no mention of pilot avoidance might or might not have been a case in which the pilot avoided something; the only thing such a case indicates is that the pilot did not fail to avoid something. Tr. at 3661, 3663-64 (Cole); Tr. at 3670 (Jefferson).

FN148. Accident reports must cover damage or injuries on the ground. See note 147, above.

FN149. See, e.g., Joint Exh. 3, Bates No. 57126 (assistance with location of emergency airfield); Joint Exh. 5 at 2 (assistance with location of airfield); Joint Exh. 10 at 3-4 (location of airfield, safe location to jettison fuel tanks); Joint Exh. 11 at 3 (vector to clear area from air traffic control); Joint Exh. 14 at 3 (altitude and navigation assistance); Joint Exh. 15 at 3 (assistance clearing impact area of boats).

FN150. Entries No. 11 and No. 31 are the same mishap, making a total of fifty- eight mishaps shown on State Exh. 223.

FN151. Mishap data from U.S. Air Force mishap report 1975-2001, State Exh. 154, second page.

FN152. The Staff used FY 2000 data, 7059 flights, rather than an average of FY 1999 and FY 2000 because use of FY 1999 sortie information would lead to an insignificant change to the estimated probability compared to FY 2000 data. SER at 15-81 to 15-82.

FN153. Any F-16 using IR-420 would necessarily fall into the Sevier MOA traffic count as IR-420 ends where the Sevier MOAs begin at the north end of Skull Valley. Any F-16s that went to Michael AAF without transiting Skull Valley would not be relevant to the hazard to the facility. Cole/Jefferson/Fly Post Tr. 3061, at 98 n.169.

FN154. The 414 flight estimate was based on FY 1997 data from Michael AAF. Based on the total number of takeoffs and landings at Michael AAF in later years from FY 1998 to FY 2000, excluding those conducted by F-16s, a maximum of 212 flights per year during that period were conducted by aircraft other than F-16s. If it is taken into account that the aircraft fly to and from airfields in all directions from Michael AAF, the estimated number of flights in the direction of the facility would be even lower. Id. at 99-100.

FN155. Because of the other ways available to Air Force pilots to train to deliver the newer, laser-directed or self-guided ordnance, there is very little requirement for pilots to train by dropping live or heavy-weight ordnance on the UTTR. Tr. at 3501-03, 13,084-85 (Fly).

FN156. Pilots are also trained to steer their aircraft away from populated areas before ejecting if possible, but they are trained to jettison ordnance quickly upon suffering an engine failure at low altitude. See Tr. at 3557-58 (Fly).

FN157. Dr. Resnikoff asserted that the Applicant should have used a "skid area" in front of the facility to account for jettisoned ordnance potentially skidding into the facility. Resnikoff Post Tr. 8698, at 20. The only basis for his assertion was an undocumented conversation between Dr. Resnikoff and Lieutenant Colonel Horstman. Tr. at 8801-05 (Resnikoff). We agree with Applicant's witness General Jefferson, who testified that the ordnance would not skid because it would impact the ground at a steep angle. Tr. at 8868-69 (Jefferson).

FN158. The State did not claim that the Applicant should have used FY 1998 as the baseline for estimating the sortie count for Skull Valley. See Horstman Post Tr. 4214, at 12. Had the State done so, its estimated sortie count would have been approximately 4500 (increasing the FY 1998 Sevior B MOA count by 17.4% to account for the additional F-16s added to Hill AFB in FY 2001). Horstman Post Tr. 4214, at 11.

FN159. The Board notes that PSF did not account for 419th FW ordnance in its Aircraft Report shown in PFS Exh. N, but based all calculations and discussion on 388th FW data only.

FN160. Resnikoff Post Tr. 8698, at 20; see also State Exhs. 79 and 80.

FN161. Resnikoff Post Tr. 8698, at 20; see also State Findings ¶¶ 40-45.

END OF DOCUMENT

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED 06/20/05

COMMISSIONERS:

SERVED 06/20/05

Nils Diaz, Chairman
Edward McGaffigan, Jr.
Jeffrey S. Merrifield
Gregory B. Jaczko
Peter B. Lyons

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

CLI-05-12

MEMORANDUM AND ORDER

The State of Utah has petitioned for review of the Licensing Board's February 24 order rejecting its proposed new contention, Utah UU (Ramifications of DOE's Refusal to Accept Fuel in Welded Canisters from the PFS Site).[1] For the reasons given below, we find the Board decision reasonable and deny the petition for review. Utah's thinly-supported new contention does not justify reopening the adjudicatory record and restarting our hearing process this late in a protracted, 8-year-old proceeding.

I. BACKGROUND

PFS proposes to use a dry storage system manufactured by Holtec corporation at the facility for which it is seeking a license. The system calls for the spent fuel to be taken from fuel

[1]LBP-05-5, 61 NRC 108 (2005).

pools and sealed in a "multi-purpose canister" (MPC) at the site of the originating reactor.[2] The advantage of the Holtec system is that, in the short term at least, the fuel is not removed from the MPC after sealing. The MPC is loaded with fuel assemblies inside the spent fuel pool, then transferred into either a transportation cask or a storage cask, depending whether it will be stored onsite or elsewhere. The MPC contains the fuel and any byproducts, while the cask (or "overpack") provides shielding.

One goal of the PFS project was for the ISFSI to be the last stop for the spent fuel before it is sent to a permanent geological repository. The project's Final Environmental Impact Statement (FEIS) anticipated that the MPC would be used both to store the spent fuel and for transportation to the permanent repository.[3] The FEIS assumed for its transportation impacts analysis that the fuel would be shipped to Yucca Mountain after leaving PFS.[4]

Neither the FEIS nor PFS's Environmental Report discussed costs, procedures, or environmental consequences of repackaging the fuel assemblies somewhere down the line after leaving the PFS facility. PFS has no plans, nor will it have the capability, to remove fuel from the MPC at its storage facility.

Recently, Gary Lanthrum, the Director of the Department of Energy's Office of National Transportation, made remarks suggesting that PFS's vision for this project was unworkable, because under its Standard Contract DOE could not accept fuel in an MPC for permanent storage. He allegedly indicated (in the words of the Board) that "PFS-stored fuel would later be

---

[2]The process is described in detail in Private Fuel Storage's Safety Analysis Report, Ch. 5, and is also described in *Private Fuel Storage, L.L.C* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 132-33 (2004).

[3]*See* Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuels Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah, NUREG-1714, (Dec. 2001), at 5-54 to 5-55.

[4]*Id.* at 5-35; 5-54.

ineligible for disposal at the proposed Yucca Mountain permanent repository, unless it was first to be unsealed and repackaged elsewhere."[5] Utah says that the upshot of this is that the spent fuel stored at the PFS facility would have to be shipped back to either the originating reactor or some other facility for repackaging into containers acceptable to DOE prior to final disposal.

Utah's proposed Contention UU claimed that Lanthrum's remarks mean that the NRC is obliged to redo its FEIS. Utah argues, first, that the EIS should consider the costs and environmental effects of shipping spent nuclear fuel back and forth across the country three times and removing it from a welded canister. Second, Utah maintains, the FEIS should consider the consequences of creating a "dysfunctional" system of nuclear waste disposal, and whether, by approving the project, the NRC would usurp DOE's role in setting waste acceptance criteria for transportation and permanent disposal. Finally, Utah said that PFS should show financial assurances that either it or its customers can pay to repackage the fuel in a form acceptable to DOE. Utah argues that the FEIS's cost/benefit analysis would be affected considerably by the costs of shipping and repackaging the fuel.[6]

II. THE BOARD'S RULING

The Board found that PFS's rebuttal evidence – DOE documents indicating a willingness to accept PFS-type stored fuel – rendered Lanthrum's remarks insufficient to reopen the licensing hearing to consider whether spent fuel shipped to PFS will eventually have to be sent home for repackaging.

The Board cited longstanding agency practice holding that a party seeking to reopen a closed record to introduce a new issue (as opposed to additional evidence on a matter already considered) must back its claim with enough evidence to withstand summary disposition when

---

[5] LBP-05-5, 61 NRC at 110.

[6] Utah proposed contention does not dispute that DOE is ultimately responsible for disposing of the spent fuel, regardless of where it is stored in the next twenty to forty years.

measured against its opponent's contravening evidence.[7] This is in addition to the usual requirements for a well-pleaded contention and for admission of late-filed contention.[8] The Board therefore considered numerous documents PFS submitted showing that DOE has taken the position, consistently and often, that it will accept fuel in a variety of NRC-approved storage containers at the permanent geological repository.

The Board noted that there were two possible views of the significance of Lanthrum's comments. The first is Utah's interpretation that Lanthrum was stating "a new DOE policy" of not accepting any pre-packaged, PFS-type spent fuel, "ever."[9] The other is PFS's, that Lanthrum's statement merely described the current status of DOE's Standard Contract for Disposal of Spent Nuclear Fuel and/or High Level Radioactive Waste,[10] which, as of now, "does not cover PFS-stored fuel," but is expected to be amended to accommodate PFS-type stored fuel.[11]

The Standard Contract says that when DOE is ready to pick up fuel, it will send containers to the reactor site into which the operators will transfer the spent fuel.[12] The contract is silent as to what happens when the reactor operator has already removed the fuel from the spent fuel pool and into dry storage. PFS argued that despite what the Standard Contract currently provides, DOE has officially stated a position that it will modify the contract to cooperate with utilities and accept and transport a variety of packages. After considering PFS's

---

[7]LBP-05-5, 61 NRC at 116, citing *Vermont Yankee Nuclear Power Corporation* (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 523-24 (1973).

[8]*See* 10 C.F.R. §2.714 (former rules).

[9]*See* LBP-05-5, 61 NRC at 118.

[10]*See* 10 C.F.R Part 961.

[11]*See* LBP-05-5, 61 NRC at 117.

[12]See 10 C.F.R. §961.11.

evidence indicating that DOE has attempted to maintain flexibility with respect to possible storage cask designs, the Board concluded that the oral opinion of Lanthrum – whose "management authority ... does not appear to be in the specific area of which he spoke" – was an insufficient basis for concluding that DOE is now turning away from its longstanding policy.[13] Hence, the Board concluded that Utah's claims did not have the factual support necessary to reopen the closed hearing record and introduce a new claim.

III. UTAH'S PETITION DOES NOT SHOW AN ERROR OF LAW OR FACT WARRANTING COMMISSION REVIEW

A. Utah Was Not Denied Procedural Fairness When Petition Deadline Was Not Extended.

As a preliminary matter, Utah claims that the Commission's refusal to extend the time for its petition for review of LBP-05-07 was unfair. The facts do not support Utah's claim of unfairness.

The Board issued its ruling rejecting Contention UU the same day it issued its merits ruling on aircraft crash hazards.[14] On March 7, 2005, Utah filed a motion for reconsideration with the Board on the aircraft crash hazard ruling. The reconsideration motion did not attack the Contention UU ruling in any way. Also on March 7, Utah asked the Commission for an extension of time to file a petition for review of the aircraft crash hazard ruling until 15 days after the Board had ruled on the motion for reconsideration. Utah added that its request "would also extend the time for filing a petition for review of Contention Utah UU." The petitions for review were due on March 16.

The Secretary of the Commission has the authority to rule on procedural matters such

---

[13]*See* LBP-05-5, 61 NRC at 125.

[14]*See* Memorandum (Providing a Publicly-Available Version of Today's Board Decision on F-16 Aircraft Accident Consequences).

as motions for enlargement of time or to expand the page numbers of briefs.[15] On March 11, the Secretary issued an order granting an enlargement of time with respect to review of the Board's aircraft crash hazards ruling, but declining to extend the time with respect to review of the Contention UU ruling. Utah thus had five days, including the weekend, to complete its petition for review after learning that it would not receive any additional time to file it.

This does not strike us as unfair. Utah's extension request focused on the air crash issue only and gave no reason whatever why it needed additional time to file a petition for review of the Board's ruling on Contention UU. Indeed, Utah did not even specifically ask for an extension on the Contention UU ruling, but merely assumed that extending the time for a petition for review on the aircraft crash hazards ruling would extend the petition deadline for Contention UU. There was no reason Utah could not have begun work on the petition for review between the time it filed its reconsideration motion on March 7 and the time it received word on its extension request.

In any event, Utah used the time it had available to file a well-written petition for review using the entire page allowance (15 pages). Utah does not say how it might have improved its petition or made additional arguments if it had more time. In short, Utah has shown no unfair prejudice for the partial denial of its extension request.

B. The Board Reasonably Found an Insufficient Factual Basis to Reopen the Record to Consider a New Contention.

Commission review is warranted when the petitioner demonstrates that the Board made a clear error in a finding of fact, an error of law, a prejudicial procedural error, or where the Board decision raises a "substantial and important question of law, policy or discretion."[16] Utah argues that the Board erred in both law and fact in rejecting its contention.

---

[15] 10 C.F.R. §2.772(b) (former rules).

[16] 10 C.F.R. § 2.786(b)(4) (former rules).

The Board applied the correct standard that a party seeking to reopen a closed record to raise a new matter faces an elevated burden to lay a proper foundation for its claim. Commission practice holds that the standard for admitting a new contention after the record is closed is higher than for an ordinary late-filed contention. The Board quoted the Appeal Board's strict *Vermont Yankee* standard for reopening the record to admit a new contention:

> [T]o justify the granting of a motion to reopen the moving papers must be strong enough, in the light of any opposing filings, to avoid summary disposition. Thus, ... no reopening of the evidentiary hearing will be required if the [documents] submitted in response to the motion demonstrate that there is no genuine unresolved issue of fact.[17]

New information is not enough, *ipso facto,* to reopen a closed hearing record at the last minute; the information must be significant and plausible enough to require reasonable minds to inquire further.[18] As our hearing rules specify, reopening requires a showing that the new information will "likely" trigger a "different result."[19] Therefore the Board here correctly considered both Utah's new allegations and PFS's contrary evidence in determining whether there was a real issue at stake warranting a reopened hearing.

Utah submitted an affidavit from Dianne Neilson, Ph.D., the Executive Director of Utah's Department of Environmental Quality, concerning a conversation she had with Gary Lanthrum, the Director of DOE's Office of National Transportation. Neilson reported that Lanthrum said that "under the DOE standard contract with the nuclear industry, DOE was only required to accept bare fuel. As such, said Mr. Lanthrum, DOE would not accept spent nuclear fuel in welded canisters and DOE has no obligation to pick up fuel from the Private Fuel Storage (PFS)

---

[17]LBP-05-5, 61 NRC at 116, *quoting Vermont Yankee Nuclear Power Station*, ALAB-138, 6 AEC at 523-24 (1973).

[18]*See Vermont Yankee Nuclear Power Station v. NRDC*, 435 U.S. 519, 554-55 (1978). Obviously, "there would be little hope" of completing administrative proceedings if each newly arising allegation required an agency to reopen its hearings. *Id.* at 555.

[19] *See* 10 C.F.R. § 2.734(a)(3) (former rule); *see also Private Fuel Storage* (Independent Spent Fuel Storage installation), CLI-04-9, 59 NRC 120, 123-26 (2004).

facility."[20] Because, obviously, DOE cannot intend to ship "bare fuel" across the country, Utah's second supporting document expands on what Lanthrum might have meant by his statement. An article in the *Salt Lake Tribune* quotes Lanthrum as saying "Nuclear Regulatory Commission (NRC) rules" require that "any radioactive waste heading for Yucca Mountain must be freshly packed by nuclear power plants before the DOE takes ownership of it."[21] "The *current contracts* for how we receive fuel makes [PFS's] plan unacceptable," the article quotes him as saying.

DOE's Standard Contract apparently anticipates that the fuel is still in spent fuel pools at the originating reactor until DOE sends for it. The contract provides that DOE will send containers, suitable for use at the particular nuclear power plant,[22] and the operators are responsible for packing the containers.[23] It also says that the power plants are to notify DOE 60 days prior to packing the containers in case DOE wants to observe.[24]

The PFS plan would differ from this scheme in that DOE would be relieved of the responsibility to provide the shipping containers – the spent fuel stored at PFS would already be in containers – and DOE would not have the opportunity to observe the fuel packed prior to shipment. Of course, the system originally envisioned by the Standard Contract was defeated

---

[20]State of Utah's Request for Admission of Late-Filed Contention Utah UU (Ramifications of DOE's Refusal to Accept Fuel in Welded Canisters from the PFS Site), November 12, 2004, Exhibit 1.

[21]Id. Exhibit 2.

[22]*See* 10 C.F.R. §961.11, Article IV.B.2.

[23]*Id.* at Article IV.A.2(a): "The Purchaser shall arrange for, and provide, all preparation, packaging, required inspections, and loading activities necessary for the transportation of [spent nuclear fuel] and [high level waste] to the DOE facility.

[24] The contract does contemplate that the fuel may have already been moved away from the originating reactor, however: "The term *delivery* means the transfer of custody ... of spent nuclear fuel ... from Purchaser to DOE at the Purchaser's civilian nuclear power reactor *or such other domestic site as may be designated by the Purchaser and approved by DOE.*"*Id.*, Article I.7.

by circumstance long before Private Fuel Storage entered the picture. [25] Because developing a permanent repository had taken much longer than originally contemplated, many power reactors have already removed fuel from pools to dry storage casks well before DOE is in a position to take delivery.

In opposition to Utah's contention, PFS submitted documents showing that DOE has agreed to cooperate with power reactors that could not wait for DOE before moving older fuel out of its storage pools. For example, a 2001 letter from DOE to the Sacramento Municipal Utility District concerning the Rancho Seco Independent Spent Fuel Storage Installation agreed that "the Department has previously stated its willingness to initiate the appropriate actions to include such dual-purpose storage/transport systems as acceptable waste forms under the terms of the disposal contracts."[26] That letter said that the DOE was "in the process of" identifying necessary modifications to the contracts, including developing specifications for standard dual-purpose spent fuel canisters.[27] The letter went on to say that the Department "continue[d] to believe in the overall benefits that may accrue to a multi-purpose storage/transport/disposal system," although it was unable to complete final design and acceptance criteria for canistered fuel.[28]

PFS also included a 1996 letter from DOE, Office of Civilian Radioactive Waste

---

[25] The NWPA directed DOE to start disposing of spent fuel no later than January 31, 1998, *see* 42 U.S.C. §10222(a)(5)(b), leading to a great deal of litigation between DOE and the affected nuclear power reactors. *See, e.g., Alabama Power Co. v. DOE*, 307 F.3d 1300 (11th Cir . 2002); *Wisconsin Electric Power Co. v. DOE*, 211 F.3d 646 (D.C. Cir. 2000); *Northern States Power Co. v. DOE*, 128 F.3d 754 (D.C. Cir. 1997); *Indiana Michigan Power Co. v. DOE*, 88 F.3d 1272 (D.C. Cir. 1996).

[26] *See* Applicant's Response to State of Utah's Request for Admission of Late-Filed Contention Utah UU, (Dec. 6, 2004), Exhibit 8 (DOE letter to Steve Redecker, SMUD, Apr. 6 2001)

[27] *Id.*

[28] *Id.*

Management, to Yankee Atomic Electric Company that similarly indicated a willingness to modify its Standard Contract to accommodate fuel in dry storage or transport casks:

> At the time [the Standard Contract] was developed ... the issue of accepting large multiple spent fuel element containers was not contemplated by the Department or utilities. Therefore, these containers are currently not identified as an acceptable waste form under the contract. *However, consistent with the goals concerning minimizing spent fuel handling*, once the Nuclear Regulatory Commission (NRC) has certified the NAC transport-storage system, the *Department would be willing to initiate the appropriate actions to include such a system as an acceptable waste form.*[29]

Still another DOE letter, this one to the Governor of Maine, concerning the approval of the NAC Universal Storage System for spent nuclear fuel, reiterates DOE's flexibility on accepting spent fuel:

> Your letter also requests that the Commission, as a pre-requisite to approval of the proposed rule, acquire binding assurances from the Department of Energy that the Department will accept spent fuel for transport and disposal that has been stored in accordance with NRC approved procedures. It is my belief that there is no need for the Commission to obtain such assurances from the Department, as they already exist under the terms of the contract for disposal that the Department has with Maine Yankee Atomic Power Company. The contract covers the acceptance, transport, and disposal of all spent nuclear fuel from the Maine Yankee reactor, regardless of the condition of the spent nuclear fuel. [30]

Consistent with this longstanding DOE position that the Standard Contract would be amended to provide for DOE to pick up prepackaged fuel, the proposed Yucca Mountain facility is being designed to receive fuel in dual-purpose canisters such as those to be used at PFS. PFS provided the Board with excerpts of DOE's 2002 Final Environmental Impact Statement for Yucca Mountain, where it described procedures for dealing with commercial spent fuel in a variety of canisters.[31] According to the FEIS, a commercial spent fuel in dual-purpose

---

[29]Applicant's Response, Exhibit 7 (August 20, 1996) (emphasis added).

[30]Applicant's Response, Exhibit 3 (May 3, 2000).

[31]*See* Applicant's Response to State of Utah's Request for Admission of Late-Filed Contention Utah UU, (Dec. 6, 2004), Exhibit 2, USDOE Office of Civilian Radioactive Waste Management, Final Environmental Impact Statement for a Geologic repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County,

canisters would go to an assembly transfer line that would cut off the canister lid, transfer the assemblies into a holding pool, where they could be sorted and "blended."[32] PFS also brought to the Board's attention excerpts from the DOE Civilian Radioactive Waste Management System Requirements Document, a 2004 issuance from the DOE Office of Civilian Waste Management, showing that facilities for dealing with spent fuel in a variety of dual use canisters was a requirement for the geologic repository.[33]

In the face of this rather overwhelming written record, Utah offers only the unexplained (and apparently off-the-cuff) remarks of Lanthrum, and argues that his remarks require a rethinking of fundamental assumptions about the PFS project. The Board sensibly thought differently. The Board pointed to three reasons why Lanthrum's statements did not require reopening the record and conducting further hearings. First, the Board noted, it was unclear from his remarks whether Lanthrum was merely pointing out that there are no provisions in the Standard Contract for dealing with pre-packaged fuel, or whether he literally meant that DOE intended to change its previously-expressed stance with respect to that fuel. Second, the Board pointed out that Lanthrum is outside the direct chain of command from the office in charge of setting waste acceptance policy at the DOE. Third, the Board stressed that Lanthrum's remarks were contradicted by official documents, "whose legitimacy the state has not challenged."[34] We see no reason to second-guess the Board's reasonable conclusion that an officially described

---

Nevada - Readers Guide and Summary, at 2-7, 2-21 (Feb. 2002).

[32]FEIS 2-21, 2-23. Fuel blending is the process of mixing hotter fuel with cooler fuel in a disposal package to manage the total heat.

[33]See Applicant's Response, Exhibit 1 ("Civilian Radioactive Waste Management System Requirements Document," U.S. Department of Energy, Office of Civilian Radioactive Waste management, DOE/RW-0406, Revision 6 (Sept. 2004)). With Yucca Mountain already being designed to accommodate canistered fuel, Utah's argument that PFS's license would pre-empt DOE's authority to set standards for the Geologic Repository is baseless.

[34]LBP-05-5, 61 NRC at 117-18, 124-25.

DOE position cannot be gainsaid by informal remarks by a DOE official speaking outside his own area of direct responsibility.

In addition to not providing any official documentation that DOE has changed its policy, Utah offered no theory why DOE would have a sudden change in policy. As Utah pointed out in its proposed contention, a reversal in DOE policy at this stage would impose additional costs, both on the reactor owners and DOE itself. It is extremely unlikely that DOE would arbitrarily impose risks on the public and expenses on the waste generating utilities without a good reason for doing so. If some logistical obstacle to taking fuel in welded canisters had recently arisen, that might be a reason DOE would change its policy. But the remarks on which Utah's contention rested only referred to the terms of Standard Contract, not any newly-arisen logistical or technical impediment to accepting spent fuel in a welded canister. If there were some new development, seemingly there would be some evidence of it somewhere besides remarks from the director of the DOE's National Transportation Office. Utah has offered no such evidence.

It appears to us that the information PFS presented the Board shows that DOE has consistently both acknowledged that the Standard Contract needs modification to designate prepackaged fuel as an acceptable waste form and indicated a willingness to make any necessary modifications in the contract (consistent with the final design of the geological repository).

Utah also argues that the Board erroneously concluded that the terms of the Standard Contract were not currently binding and that this is a mistake of law on the Board's part, warranting Commission review. The State says that the Standard Contract as it currently exists, not as it could be amended, controls.[35] But if Utah considers the terms of the Standard Contract decisive, then its new contention is untimely by a wide margin. The provisions Standard

---

[35]*See* Utah's Petition for Review, at 7-8.

Contract have not changed in twenty years.

The Board did not attempt to interpret the terms of the Standard Contract as to the obligations of the respective parties. This is appropriate. It is up to DOE, and possibly the courts, to interpret the law governing DOE's obligations under NWPA and the Standard Contract. The Board did not need to rule on whether DOE must take PFS fuel, as PFS claims, or is prohibited from taking PFS fuel, as Utah claims. This is because Utah did not provide sufficient evidence that DOE had reversed its previous position that it would accept pre-packaged fuel and amend the Standard Contract if necessary to do so. We do not think the Board's ruling constitutes a mistake of fact or law on the relevant evidence.

In sum, we agree with the Board's decision not to reopen this case to hold a hearing on Utah's new contention. The new contention is much too thinly supported to conclude that taking it to hearing would "likely" cause a different result within the meaning of our reopening rule.[36]

---

[36]*See* 10 C.F.R. § 2.734(a)(3)(former rules).

IV. CONCLUSION

For the forgoing reason, we deny Utah's petition for review.[37]

IT IS SO ORDERED.

For the Commission[38]

/RA/

Annette L. Vietti-Cook
Secretary of the Commission

Dated at Rockville, Maryland
this 20th day of June, 2005

---

[37]Utah's petition for review (at pp. 14-15) also asks the Commission to initiate a rulemaking to consider how to create "a comprehensive, integrated and coherent national waste system." In its original request for admission of proposed Contention UU, however, Utah request for a new regulation apparently embraced only a requirement that funds be escrowed to cover shipments returning the spent fuel casks to the originating reactors. *See* State of Utah's *Request for Admission of Late-Filed Contention Utah UU (Ramifications of DOE's Refusal to* Accept Fuel in Welded Canisters from the PFS Site) Or in the Alternative Petition for Rulemaking, at 10. But in both its original pleading proposing Contention UU, and in its petition for review, Utah's request was too vague to satisfy our established process for seeking a rulemaking. *See* 10 C.F.R. §2.802. Utah is fully familiar with our rulemaking process. *See Bullcreek v. NRC,* 359 F.3d 536 (D.C. Cir. 2004).

[38] Out of an abundance of caution, Commissioner Jaczko elected to abstain from voting on this order in light of his decision not to make public statements regarding Yucca Mountain for one-year from January 21, 2005. Commissioners McGaffigan and Lyons were not present for affirmation of this Memorandum and Order. Had they been present, they would have affirmed their prior votes.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing COMMISSION MEMORANDUM AND ORDER (CLI-05-12) have been served upon the following persons by electronic mail or facsimile, followed by deposit of paper copies in the U.S. mail, first class, and NRC internal mail on June 21, 2005.

Office of Commission Appellate
Adjudication
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Michael C. Farrar, Chairman
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: mcf@nrc.gov

Administrative Judge
Paul B. Abramson
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: pba@nrc.gov

Administrative Judge
Peter S. Lam
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: psl@nrc.gov

Sherwin E. Turk, Esquire
Laura C. Zaccari, Esquire
John T. Hull, Esquire
Office of the General Counsel
Mail Stop - 0-15 D21
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: pfscase@nrc.gov

Diane Curran, Esquire
Harmon, Curran, Spielberg
& Eisenberg, L.L.P.
1726 M Street, NW, Suite 600
Washington, DC 20036
E-mail: dcurran@harmoncurran.com

Docket No. 72-22-ISFSI
COMMISSION MEMORANDUM AND ORDER
(CLI-05-12)

Joro Walker, Esquire
Director, Utah Office
Western Resource Advocates
1473 South 1100 East, Suite F
Salt Lake City, UT 84105
E-mail: jwalker@westernresources.org

Martin S. Kaufman, Esquire
Atlantic Legal Foundation
205 E. 42nd St.
New York, NY 10017
E-mail: mskaufman@yahoo.com

Denise Chancellor, Esquire
Assistant Attorney General
Utah Attorney General's Office
160 East 300 South, 5th Floor
P.O. Box 140873
Salt Lake City, UT 84114
E-mail: dchancellor@utah.gov;
jbraxton@utah.gov: attygen@xmission.com

Jay E. Silberg, Esquire
D. Sean Barnett, Esquire
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128
E-mail: jay.silberg@pillsburylaw.com;
sean.barnett@pillsburylaw.com

John Paul Kennedy, Sr., Esquire
David W. Tufts, Esquire
Confederated Tribes of the Goshute
Reservation and David Pete
Durham Jones & Pinegar
111 East Broadway, Suite 900
Salt Lake City, UT 84105
E-mail: dtufts@djplaw.com

Richard Wilson
Department of Physics
Harvard University
17 Oxford St.
Cambridge, MA 02138
E-mail: wilson@huhepl.harvard.edu

Tim Vollmann, Esquire
3301-R Coors Road N.W. #302
Albuquerque, NM 87120
E-mail: tvollmann@hotmail.com

Paul C. EchoHawk, Esquire
ECHOHAWK LAW OFFICES
151 North 4th Avenue, Suite A
P.O. Box 6119
Pocatello, ID 83205-6119
E-mail: larry@echohawk.com;
paul@echohawk.com; mark@echohawk.com

Docket No. 72-22-ISFSI
COMMISSION MEMORANDUM AND ORDER
(CLI-05-12)

Joseph R. Egan, Esquire
Martin G. Malsch, Esquire
Egan, Fitzpatrick, Malsch & Cynkar, PLCC
The American Center at Tysons Corner
8300 Boone Boulevard, Suite 340
Vienna, VA 22182
E-mail: eganpc@aol.com;
mmalsch@nuclearlawyer.com

Stephen L. Simpson, Esquire
Office of the Solicitor
Department of the Interior
Division of Indian Affairs
1849 C Street, NW, Mailstop 6456-MIB
Washington, DC 20240
Fax: 202-208-3490

[Original signed by Adria T. Byrdsong]

Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 20th day of June 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED 02/24/05
LBP-05-05

ATOMIC SAFETY AND LICENSING BOARD
Before Administrative Judges:

RAS 9417

SERVED 02/24/05

Michael C. Farrar, Chairman
Dr. Peter S. Lam
Dr. Paul B. Abramson

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	February 24, 2005

MEMORANDUM AND ORDER
(Ruling on State of Utah's Recently-Filed Contention UU)

Toward the end of last year, this proceeding -- concerning the license application of the Private Fuel Storage (PFS) consortium for its proposed temporary spent nuclear fuel storage facility in Skull Valley, Utah -- was seemingly headed to a long-awaited conclusion after a lengthy hearing on the last remaining issue in the case, namely, the degree of potential risk from accidental military jet crashes. On November 12, however, the State of Utah asked us to consider a new contention, designated Utah UU.

That contention was premised on an oral statement assertedly made, a month earlier, by a U.S. Department of Energy (DOE) official concerning the long-term fate of any spent fuel sealed at, and transported from, nuclear power plants around the country for temporary storage at the proposed PFS facility. As the State recounted and understood that statement, it was to the effect that such PFS-stored fuel would later be ineligible for disposal at the proposed Yucca Mountain permanent repository, unless it were first to be unsealed and repackaged elsewhere.

The asserted statement seemed on its face incongruent with a common understanding about the role of the proposed PFS facility held by, among others, the Commissioners who head this agency. Specifically, the Commission recently spoke of what has long been an

underlying assumption about the PFS project: that the Applicant "plans to completely seal spent fuel inside a canister that is never opened from the time it leaves the power plant until it is deposited into a permanent repository . . . ." CLI-04-22, 60 NRC 125, 132 (2004) (emphasis added).

More than one of our decisions has reflected a similar understanding. For example, in our Partial Initial Decision on seismic issues, we had described the facility as "intended to serve as the spent fuel's way station before the coming to fruition of the permanent underground repository long planned for Nevada's Yucca Mountain." [1]

Both the Applicant and the NRC Staff have presented a variety of grounds opposing our admission of the new State contention at this stage of the proceeding. In simple terms, those grounds challenge Contention Utah UU as not material to the issues before us, for lacking a factual underpinning, and for not meeting various standards relating to the timing of its filing.[2]

We discuss all those grounds in the course of determining that we must reject the contention (and the motion to reopen the record) because its factual underpinning is inadequate. The underpinning provided is essentially the State's interpretation of an "unofficial" oral opinion by a DOE Office Director who is not directly responsible for the subject about which he spoke. That opinion, when measured against key "official" DOE documents brought to our attention that portray the matter differently, is insufficient to launch a new adjudicatory inquiry *at this juncture*.

---

[1] LBP-03-08, 57 NRC 293, 296 (2003). See also LBP-01-40, 54 NRC 526, 531 (2001) (discussing PFS's "Start Clean - Stay Clean" policy as including "seal-welded, never-to-be-opened spent nuclear fuel (SNF) canisters"). In this regard, the Applicant's current advertising for the facility (brought to our attention by the State), while not pointing as we did to Yucca Mountain specifically, does indicate that those storing fuel at the PFS site would have "preparation for outbound shipment to DOE provided." See State of Utah's Request for Admission of Late-Filed Contention Utah UU (Ramifications of DOE's Refusal to Accept Fuel in Welded Canisters from the PFS Site) Or In The Alternative Petition for Rulemaking, Exh. 8, PFS Advertisement (Nov. 12, 2004).

[2] Only the Staff, not the Applicant, claims the contention is untimely.

Accordingly, we need reach no firm conclusion on the other grounds advanced for rejecting the contention. But the analysis we do make of those grounds indicates that if the oral statement which launched the new contention were to have signified what the State thought it did upon hearing it, then the new contention might well have required further inquiry.

In Part I below, we discuss the factual and procedural background that led to the issue now before us. In Part II, we discuss the legal standards governing our decision. In Part III, we explain our ruling rejecting the admissibility of the new contention, and conclude by informally commending the matter to the Commission for such consideration as it deems appropriate.

I. THE FACTUAL AND PROCEDURAL BACKGROUND

In August and September of last year, we conducted what the parties expected to be the final phase of the evidentiary hearings in this proceeding, regarding the probability of a spent fuel cask/canister breach (and resulting radiation release) should an F-16 jet fighter plane accidentally crash into the proposed PFS facility. Upon coming to the end of the final day of that hearing on September 15, we closed the taking of evidence.[3]

Nearly two months later, we received the State's request to admit a new contention for consideration on its merits in this proceeding. The newly-filed contention, denominated "Utah

[3] See Tr. at 19700 (where the Board Chairman noted "that concludes our record in the case"); compare 10 C.F.R. Part 2, App. A, § V(g)(5) ("The Chairman should formally close the hearing.").

UU – Ramifications of DOE's Refusal to Accept Fuel in Welded Canisters from the PFS Site," was framed by the State as follows:

> PFS's license application and NRC's final environmental impact statement fail to describe or analyze the effect of DOE's refusal to collect fuel in welded canisters from the PFS site and the concomitant potential to create a dysfunctional national waste management system, and added risks and costs from multiple and unnecessary fuel shipments back and forth across the country. In addition, absent a condition that fuel will only be accepted at PFS's Skull Valley site if it can be shipped directly from PFS to a permanent repository, PFS must provide reasonable assurance that each and every fuel owner will accept the fuel back for repackaging, and PFS or the fuel owner will place, up-front in an escrow account, sufficient funds to cover the cost of fuel shipment back to the reactor or other facility for repackaging.

State of Utah's Request for Admission of Late-Filed Contention Utah UU (Ramifications of DOE's Refusal to Accept Fuel in Welded Canisters from the PFS Site) Or In The Alternative Petition for Rulemaking (Nov. 12, 2004) at 2 [hereinafter State Motion].

As discussed in further detail below, the former version of the NRC rules (under which this proceeding continues to be conducted) requires that a party provide, among other things, factual support for each contention it proffers. See 10 C.F.R. § 2.714(b)(2)(ii). In this vein, the State appended to its motion several exhibits, which it contends provided support for the assertion that DOE would not accept at Yucca Mountain any sealed spent fuel canisters or, for that matter, pick up any spent nuclear fuel from the PFS facility at all.

The principal foundation for the State's new contention is an affidavit of Dianne R. Nielson, Executive Director of the Utah Department of Environmental Quality, elaborating on her recollection of an October 14 conversation she had with Gary Lanthrum, Director of DOE's Office of National Transportation, at a meeting in Salt Lake City of the Nuclear Waste Technical Review Board.[4] Specifically, as Dr. Nielson recalls, Mr. Lanthrum stated that DOE was required

---

[4] This conversation, as well as similar statements allegedly made by Mr. Lanthrum to members of the local Utah press, provides the foundation upon which much of the State's argument is based, and around which much of the controversy here arises. See, e.g., State Motion, Exh. 1, Declaration of Dianne Nielson (Nov. 12, 2004) ¶¶ 4-5; State Motion, Exh. 2, Patty Henetz, *Goshutes' waste plan hits a snag; Yucca Mountain may reject spent nuclear fuel from proposed Skull Valley site; Skull Valley may be stuck with N-waste*, Salt Lake Trib., Oct. 15, 2004, at A1.

only to accept bare spent nuclear fuel from the nuclear utilities that generated it, would not accept spent fuel in pre-sealed welded canisters, and, further, was not obligated to pick up such fuel from the PFS facility. See State Motion, Exh. 1, Declaration of Dianne Nielson (Nov. 12, 2004), ¶ 4.

On November 16, 2004, upon request, we extended the time the Applicant and the Staff had to respond to the State's newly-filed contention. In doing so, and in the interest of efficiency, we directed the State first to supplement its motion by addressing: (1) the possible impact on its pending motion of the 10 C.F.R. § 2.734 criteria for re-opening an evidentiary record; and (2) whether, if we did grant its motion, the issues raised by Contention Utah UU should be addressed in the first instance by this Board, and in what manner, or in the alternative be addressed by the NRC Staff as a supplement to its National Environmental Policy Act (NEPA) review.[5]

The State filed the supplement to its motion on November 29, 2004,[6] addressing the Section 2.734 re-opening factors. It declined the opportunity to address the second part of our order, however, regarding it as premature to consider how to resolve the merits of the proposed contention.[7]

In its December 6, 2004 response, the Applicant urged us to reject Contention Utah UU on essentially three grounds: (1) that the State met neither the Section 2.734 re-opening standard nor the requirements for filing a new contention based on recently-arising information;

---

[5] See our unpublished November 16, 2004 "Order (Addressing Applicant's Request for Extension and Related Matters)" at 2-3.

[6] The State's supplement was inadvertently dated November 16 on its cover page but, as reflected at its conclusion, was actually completed and served on November 29.

[7] Perhaps there was a misunderstanding, for we were seeking only the State's opinion on how the proposed contention should be addressed at this juncture if it were to be admitted. In any event, our decision not to admit the contention moots the second, unanswered question.

(2) that there was no foundation for the asserted DOE informal statement, it being fully undercut by documents reflecting a different, official DOE viewpoint; and (3) that, even if true, the "no PFS fuel to Yucca Mountain" proposition could not lead to a different outcome in, and thus was immaterial to, this proceeding, in light of the consideration given to post-PFS transportation scenarios in the Final Environmental Impact Statement (FEIS) for the facility. With respect to the second ground, the Applicant supplied several supporting documents of its own, which it claimed removed all foundation from the State's proposition that DOE was not obligated to, and indeed would not, accept spent fuel from the PFS facility.[8]

The following day, we decided not to move forward to set the oral argument we had earlier thought might be needed. Rather, in the interest of efficiency, we directed the State to respond by December 17, 2004, to: (1) the Applicant's documentary evidence (by providing either other documents or other interpretations of the same documents); and (2) the Applicant's arguments that the Staff's FEIS was adequate in its current form.[9]

In its December 10, 2004 response to the State's filings, the Staff asserted that: (1) Contention Utah UU was impermissibly late; (2) the State did not show that a materially different result would be reached if the contention were admitted, as required by Section 2.734;

---

[8] See Applicant's Response to State of Utah's Request For Admission of Late-Filed Contention Utah UU (Dec. 6, 2004) [hereinafter Applicant Response].

[9] See our unpublished December 7, 2004 "Order Regarding 'Contention Utah UU'". In the same order, we also directed the Staff to address in its pending response to the State's motion whether any DOE documents had previously been introduced in the PFS proceeding, or were otherwise available to the Staff or PFS, to indicate whether spent fuel from PFS would be acceptable at Yucca Mountain. Id. at 1 n.1. To avoid any potential delays attributable to document unavailability, we also directed the Staff and the Applicant to supply complete copies of referenced documents to the State. Id. at 2. The next day the Applicant advised the State as to where the documents could be retrieved electronically. See Letter from Jay E. Silberg, Counsel for PFS, to Denise Chancellor, Utah Assistant Attorney General (Dec. 8, 2004), ADAMS Accession No. ML043510178.

and (3) even if Contention Utah UU were not impermissibly late, it lacked the substantial factual basis necessary for admissible contentions pursuant to NRC regulations.[10]

One week after we received the Staff's response, the State filed its December 17 reply, the final word to us on the subject. In that pleading, the State averred that the Applicant's papers were non-responsive to the issues posed by Contention Utah UU. Specifically, the State urged that the Applicant had improperly focused on the yet-to-be-designed Yucca Mountain facility and on DOE's obligation to accept all domestic commercial spent nuclear fuel under the Nuclear Waste Policy Act (NWPA), while ignoring the different issues raised by Contention Utah UU of whether the Standard Contract required DOE to accept waste in the form in which it would be stored at the PFS facility and whether DOE would collect the spent fuel from the PFS facility at all.[11] The State further responded to the Staff filing by asserting that a materially different result would indeed be likely should the Board admit Utah UU to this proceeding, for the FEIS cost-benefit analysis had not contemplated the possibility that DOE would not accept spent fuel from the PFS facility.

---

[10] See NRC Staff's Response to "State of Utah's Request for Admission of Late-Filed Contention Utah UU (Ramifications of DOE's Refusal to Accept Fuel in Welded Canisters From The PFS Site) Or In the Alternative Petition For Rulemaking" (Dec. 10, 2004) at 1-2 [hereinafter Staff Response].

[11] See State of Utah's Reply to Responses Filed By the Applicant and the Staff to Utah's Request for Admission of Late-Filed Contention Utah UU (Dec. 17, 2004) at 1-2.

II. THE GOVERNING LEGAL STANDARDS

We have discussed contention admissibility standards on numerous occasions throughout the course of this proceeding,[12] and therefore will not provide an extensive discussion of those requirements here. In sum, 10 C.F.R. § 2.714(b)(2) requires that each contention include: (1) a brief explanation of the bases for the contention; (2) a concise statement of the alleged facts or expert opinion on which the petitioner relied to prove the contention, along with the source references relied upon to establish those facts or opinions; and (3) sufficient information to show that a genuine dispute exists with the applicant on a material issue of law or fact, including references to particular portions of the application and the reasons for the dispute, or the identification of a failure of the application to put forth information on a relevant matter required by law and reasons supporting the alleged omission.

Moreover, where the contention at issue is not filed during the period of time allotted by the agency's rules, the petitioner must also show that a balancing of five factors weighs in favor of admitting the contention. See 10 C.F.R. § 2.714(a)(1). Specifically, the petitioner must show: (1) good cause for failure to file on time; (2) the unavailability of other means of protecting petitioner's interest; (3) the extent to which petitioner's participation may reasonably be expected to assist in developing a sound record; (4) the extent to which petitioner's interest will be represented by existing parties; and (5) the extent to which petitioner's participation will broaden or delay the proceeding.

Of these, the most important factor is whether good cause exists to excuse the untimely filing. If the petitioner is unable to establish good cause, there must be a compelling showing on the remaining four factors sufficient to override the lack of good cause. Because we have elaborated on this balancing test on other occasions in this proceeding, we will not do so here.[13]

---

[12] See, e.g., LBP-98-07, 47 NRC 142, 178-82 (1998); LBP-01-39, 54 NRC 497, 505-06 (2001).

[13] See, e.g., LBP-01-39, 54 NRC 497, 507 (elaborating on the balancing test required by the Section 2.714(a)(1) factors).

In addition, because the contention arrived at the tail end of this proceeding, with the record on the only remaining issue having previously been closed, we need be cognizant of 10 C.F.R. § 2.734, which sets standards regarding what is required for re-opening the record. Included among those standards, in subsections (a)(2)-(3), is that the "motion must address a significant safety or environmental issue" and that it "must demonstrate that a materially different result would be or would have been likely had the newly proffered evidence been considered initially."

In the main, that regulation addresses situations where a party moves to re-open an evidentiary record to present further evidence on a particular issue that was already the subject of the hearing. Subsection (d) goes on, however, to indicate that even where, as here, a party wishes to reopen the proceeding to address a new contention, the party must still fulfill the reopening criteria of subsections (a) through (c), in addition to the late-filing and general contention admissibility criteria found, respectively, in 10 C.F.R. § 2.714(a)(1) and (b)(2). It was based on this interpretation that we asked the parties to address whether the State's filing met not only the criteria necessary for admission of a new contention, but also the standards required to reopen an evidentiary record.[14]

In this regard, the Applicant reminded us that the agency's former Appeal Board had quite some time ago spoken to just the situation now presented, and had defined the procedure to be followed "when confronted with a motion to 'reopen the record' which . . . seeks a further evidentiary hearing on new issues not previously considered." See Vermont Yankee Nuclear Power Corporation (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 523-24 (1973). Not being inclined to try to improve on the test laid down there for how to evaluate the

---

[14] See our unpublished November 16, 2004 "Order (Addressing Applicant's Request for Extension and Related Matters)" at 2-3.

admissibility of contentions on new subjects that arise after the evidentiary record has been closed, we simply repeat that test verbatim:

> [T]o justify the granting of a motion to reopen the moving papers must be strong enough, in the light of any opposing filings, to avoid summary disposition. Thus, . . . no reopening of the evidentiary hearing will be required if the [documents] submitted in response to the motion demonstrate that there is no genuine unresolved issue of fact, i.e., if the undisputed facts establish that the apparently significant . . . issue does not exist, has been resolved, or for some other reason will have no effect upon the outcome of the licensing proceeding.
>
> * * * *
>
> [W]hile it is useful from an analytical standpoint to keep separate the factors to be considered on a motion to reopen, it will not always be possible, in passing upon the motion, to give them separate consideration. The questions of whether the matter sought to be raised is significant and whether it presents a triable issue may often be intertwined, and can be so treated . . . .

Id. (emphasis added) (citations omitted).

In effect, then, the Vermont Yankee Appeal Board was indicating that, at this stage of a case, the standards governing contention admissibility and those governing summary disposition can, and should, be conflated. That advice seems to have withstood the test of time,[15] and we therefore follow it here.

---

[15] If anything, the agency's regulations governing the admission of contentions have been made more stringent in the half a lifetime since Vermont Yankee was decided. Accordingly, those rule changes would not be expected to have served to convert the Vermont Yankee test into one more favorable to the State at this juncture of a proceeding.

III. THE RESULTING RULING

For purposes of ruling on the pending request, we take the State's averments as true, and presume the accuracy of Dr. Nielson's rendition of what she heard the DOE official say. That leaves as the crucial matter the import of what he said.

Taking that approach, we have been presented with arguments against the contention's admission that challenge its materiality (in terms of leading to a different result), its underpinning (in terms of its factual support and basis), and its timeliness (in terms of the applicable regulatory criteria). We will discuss those arguments in that order.

But we begin by noting what emerges from the parties' filings, which in some respects pass by each other rather than meet head on. Quite simply, there are two different perspectives from which to view the statement of the DOE official.

On the one hand, the statement heard and recounted by the State could have been meant just to refer to a long-recognized situation, i.e., that a key document, the Standard Contract between DOE and the nuclear utilities, does not cover PFS-stored fuel because at the time it was developed "the issue of accepting large multiple spent fuel element containers" had simply not been "contemplated by [DOE] or utilities."[16] In light of that situation, DOE had made it clear in the past that "consistent with the goals concerning minimizing spent nuclear fuel handlings," DOE would eventually "be willing to initiate the appropriate actions to include such a system as an acceptable waste form under the terms of the standard contract."[17]

It could well be, then, that the recent oral pronouncement that PFS-stored fuel is not covered by the Standard Contract may have been intended -- as the Applicant sees it -- as

---

[16] See Applicant Response, Exh. 7, Letter from Lake Barrett, Deputy Director, DOE Office of Civilian Radioactive Waste Management, to R. M. Grube, Director, Fuel Management Department, Yankee Atomic Electric Company (Aug. 20, 1996) at 1 (emphasis added).

[17] Ibid. (emphasis added).

nothing more than an innocuous repetition of what has long been a fact. Under that view, it would have no more import than to remind everyone that the amendment of the Standard Contract to incorporate the PFS-type eventuality -- not contemplated when the Standard Contract was drafted -- has yet to be done.

If this latter interpretation is all that was meant, the DOE statement would indeed add nothing material to the matters before us. It follows that the pending contention, which relies on the statement for its basis, would warrant no consideration by us, being barred both as an untimely rehash of old information and as contributing nothing that would raise any question about the common understanding (see pp. 1-2, above) about the PFS project's relationship to the longer-term issues concerning spent nuclear fuel. (The unfinished business to which it refers may, however, warrant attention elsewhere, as we explain at pages 23-25, below.)

The statement could, however, have been intended -- as the State's arguments seemed to be suggesting -- to have more dramatic import than simply reciting the existing, yet-to-be-amended, contractual state of affairs. Along those lines, it may have been put forward as a way of announcing a new DOE policy that PFS-stored fuel -- in its pre-sealed canisters -- was now viewed as indeed substantively unacceptable, ever, in that form at the now-contemplated Yucca Mountain repository. Under that view, being not now covered in the Standard Contract, the PFS-stored spent fuel was not only not now eligible for disposal at Yucca Mountain, but would remain so unless repackaged.

As indicated above, the Applicant would prevail, and the State's new contention would have to be rejected, if the Applicant's interpretation of the DOE statement were correct. If the State's interpretation of the DOE statement were correct, however, we might well reach the opposite result. We discuss all this below.

A. Materiality. In determining whether the State's new NEPA-driven contention could bring about a material change in the existing FEIS's NEPA-related approval of the project, we

start by pointing out that, broadly speaking, there are as a factual matter two distinct components to, and recipients of, the environmental impacts of this facility. One impact would be felt by the neighboring residents, stemming from the facility's construction and its operation (the latter derived largely from the presence of the spent fuel casks on site for whatever period they remain there).[18] The other, entirely distinct, impact is that felt across the country by those (including residents of Utah) upon whom the transportation of the fuel -- to and/or from the facility -- may have a potential impact.[19]

In terms of legal principles, we look first to how the federal courts have interpreted NEPA. Again speaking broadly, NEPA requires, under the "cumulative impacts" rubric, the taking into account of future reasonably foreseeable results of current federal (licensing) actions, and imposes a rule against incrementalism, that is, against analyzing a succession of

---

[18] We assume it was this factor the Applicant had in mind when, in opposing admission of the State's new contention, it pointed out that the Commission had previously expressed approval of our indication that the environmental impacts of the project were slight. See Applicant Response at 15 (citing CLI-04-22, 60 NRC 125, 145 (Aug. 17, 2004)). But we had expressed that view in the course of ruling on the State's Contention Utah SS, where what was at stake was the difference between a 20 and a 40 year license. It was in that context that we were speaking of the environmental impact at the facility itself, as envisioned in Skull Valley on private lands (i.e., on the Reservation of the Skull Valley Band of Goshute Indians, who had willingly leased their lands for that purpose). To say that the environmental impacts at that facility are small in the context of comparing a 20 year versus a 40 year operational period is not in any way to imply that rehandling, repackaging and reshipping the spent fuel to be stored there is a matter of little concern under NEPA in light of the common understanding and current advertising pointing otherwise. See pp. 18-19, below.

[19] This makes the facility unlike a nuclear reactor, with respect to which the environmental risk of radiological effects associated with decades of operation dwarfs any similar risks associated with transportation. See 10 C.F.R. § 51.52(c) at n.4. The construction and operation of the PFS facility, on the one hand, and the transportation of spent fuel to and away from it, on the other, present an entirely different balance of relative environmental impacts than does the relationship of spent fuel transportation to reactor operation. The FEIS recognizes as much, in that the Staff determined that transportation impacts for the PFS facility required a more detailed analysis than that applied to reactors. See Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah (Dec. 31, 2001) at 5-40 [hereinafter PFS FEIS].

currently contemplated federal (licensing) actions in series, as though they were separate, unrelated activities.[20]

For these purposes, then, the scope of the NEPA analysis requires that the project, including its definite follow-ons, be fairly defined. See 40 C.F.R. §§ 1501.7, 1508.25. Here, one could argue that, for NEPA purposes, the only subject of the pending license application is the PFS facility as proposed for Skull Valley. Under that view, where the fuel goes afterwards could be viewed as too speculative to consider at this juncture.[21] In turn, that would mean that only transportation to and from the site need be considered (and, as we will see, that has indeed been done here).

We might readily agree with the legitimacy of this "PFS-only" definition of the project but for its being called into question by the Applicant's indication in its own Environmental Report that "[t]he storage system technology is compatible with the long-term plans of the DOE interim storage facility and permanent repository" [22] and by its current advertising for the project (see

---

[20] See the general NEPA regulations developed by the Council on Environmental Quality at 40 C.F.R. § 1508.7; 10 C.F.R. § 51.14(b) (NRC-specific NEPA regulation); Kleppe v. Sierra Club, 427 U.S. 390, 410 n.20 (1976) (less imminent contemplated actions need not be analyzed); see also Utahns For Better Transportation v. DOT, 305 F.3d 1152, 1173-74 (10th Cir. 2002) (future additional lanes in highway project need not be considered if only speculative); Airport Neighbors Alliance, Inc. v. United States, 90 F.3d 426 (10th Cir. 1996); Natural Res. Def. Council v. Callaway, 524 F.2d 79, 87-88 (2d Cir. 1975); Tex. Comm. on Natural Res. v. Van Winkle, 197 F. Supp. 2d 586 (N.D. Tex. 2002).

To be sure, many of these precedents involve matters where the court held that the future action which the plaintiffs wanted included in the NEPA analysis was in fact too speculative or uncertain to require its inclusion. But the limiting factual determinations those courts made about the scope of a particular project do not undercut the underlying principle that where a future action is found to follow ineluctably (rather than to be speculative or uncertain in nature), its inexorable impacts must be included in the current NEPA analysis of the government action.

[21] There is, indeed, language in the FEIS which seems to embody a Staff view explicitly recognizing some degree of uncertainty about Yucca Mountain for this purpose. See PFS FEIS at 5-35, 5-46, 5-54; but see "waste confidence" rule, discussed at p. 15, below.

[22] Private Fuel Storage Facility Environmental Report, Ch. 1, Rev. 11, at 1.2-7.

n.1, above), which similarly ties in to the common understanding about the fuel's eventual DOE destination. And, again, this view of the bigger picture of the project is apparently one shared by the Commission, as mentioned on page 2, above. Under this view of the project, a more integrated NEPA analysis might well be demanded if the State's assertion of a new DOE position against acceptance of PFS-stored fuel at Yucca Mountain carried the day.

Of course, it might eventually turn out that Yucca Mountain will simply not be built (notwithstanding that, for purposes of this and previous NRC licensing proceedings, the Commission's "waste confidence" rule has required that analysis be conducted on the assumption it would be).[23] The FEIS for this project notes precisely that possibility, but because of the NWPA presents an analysis of the consequences of shipment to a permanent repository at Yucca Mountain.[24]

In any event, the Applicant has dealt with the "no Yucca Mountain" eventuality, in terms of its contractual insistence that the utilities generating the spent fuel both retain title to it, and take it back at the end of the PFS license if Yucca Mountain or another permanent repository is not in existence.[25] And on that score, the FEIS analyzes the transportation impacts in a manner that takes care of that eventuality.

That FEIS transportation analysis goes this way. The FEIS considers the environmental effects of transporting the fuel across the country from the originating utility to the PFS site.[26]

---

[23] See 10 C.F.R. § 51.23.

[24] See FEIS p. 5-54; see also id. at 5-46.

[25] See, e.g., LBP-02-08, 55 NRC 171, 177 (2002)

[26] We note that in doing so the FEIS abandons any notion that the transportation effects are fully delineated by the elements of Table S-4 and are thus de minimis. As the Staff now appears to recognize in the PFS FEIS, considering transportation of spent fuel from a reactor to a storage or disposal site as de minimis in terms of the construction and operation, for several decades, of a nuclear power plant, does not establish that transportation of much of the Nation's spent fuel to a storage or disposal site is de minimis in terms of the comparatively minor construction and operation impact of a storage facility. See PFS FEIS at 5-40.

Then, in order to consider the environmental effects of transporting the fuel from PFS to a permanent repository, for convenience the FEIS reasons that those effects -- involving a "going out" transportation run with spent fuel whose radioactivity will then be approximately one-half of what it was when shipped to the PFS site,[27] and assuming the outgoing trip is of equal length to the incoming run (even though it may in fact be shorter)[28] -- will certainly not be more than the cross-country effects of getting it to the PFS site in the first place. In effect, then, the FEIS for the PFS project has already factored in the equivalent of two cross-country trips, in the course of evaluating one such trip to the PFS site and one trip, of indeterminate distance, away from it.

Viewed that way, the FEIS has already evaluated (1) the environmental impacts of transporting the spent fuel from the originating reactor to the proposed PFS site, and (2) upon the failure to build a permanent repository, the impacts of transporting it back. This argument has some merit, if all that is involved are the supposedly-minimal transportation impacts mentioned in the FEIS.

But the State's challenge is not to the necessity for a second cross-country shipment if Yucca Mountain is not built. It is, rather, to the addition -- if Yucca Mountain is built but rejects the PFS-stored fuel as is -- of (1) not only an unnecessary second such shipment but a third one as well, and of (2) a major operational step, before that third shipment, of unsealing the welded canister to "re-package" the spent fuel.

It is, of course, possible that all these concerns are de minimis, and thus to agree with the Applicant that full consideration of the contention would not lead to any materially different environmental consequences, in that whatever happens to the fuel after its arrival at PFS is not material to the outcome here. In that connection, it could also be argued that concerns over the ultimate later fate of the fuel are not environmentally consequential but simply involve a

---

[27] See PFS FEIS at 5-55.

[28] See id. at 5-38.

business matter to be resolved between PFS and its customers, who are free to reject the opportunity the PFS facility would provide if the terms are not satisfactory to them.

As it turned out, no evidentiary record was ever developed, in an adversary context, to test the Applicant's and Staff's assumptions about the minimal impact of cross-country transportation. We would thus be at some disadvantage in any effort to evaluate the merits of these arguments.[29]

But assuming that any transportation-related environmental impacts could be justified as part of a coherent scheme of waste fuel disposal -- from originating reactor, cross-country to temporary storage, then to nearby permanent repository, all in the same canister -- those impacts may make far less sense if they are known to be part of what the State calls a dysfunctional system -- from originating reactor, cross-country to temporary storage, back cross-country to reactor (or elsewhere) to be "recontainerized," and back again cross-country to permanent repository not far from the initial temporary storage site. If NEPA requires anything, it is that alternatives be evaluated, and that latter one would seem to have little to commend it.

This is the nature of the argument the State seeks to raise here. If its interpretation of the DOE statement embodied in its new contention is correct, that contention challenges the common (and Commission's) understanding about a role of the facility proposed to be licensed.

In that instance, more of an inquiry might well be in order, regardless of what has been said about transportation impacts and independent of the earlier dismissal, on procedural not substantive grounds, of the State's transportation-related contentions. Our thought process in this regard takes a cue from Judge Wisdom's insightful approach in McCain v. Davis, where he

---

[29] At an earlier stage, the State's attempts to raise a series of transportation-related contentions were rebuffed by our predecessor Board for having been filed a few days later than the thirty-day deadline the Board had established for new contentions arising from newly-available information. LBP-00-28, 52 NRC 226, 236 (2000). The Commission upheld that ruling. CLI-04-04, 59 NRC 31, 46 (2004)

famously remarked, in the context of racial discrimination, that "What all Louisianans know, this Court knows." 217 F. Supp. 661, 666 (E.D. La. 1963) (three-judge court).

Along that line, we hazard the observation that "What all those dealing with spent nuclear fuel know, this Board knows." That would include that the fewer the times spent fuel canisters are transferred from one cask to another, the better; and even more to the good are the fewer the times bare fuel bundles are switched from one canister to another, and the fewer the times canisters are shipped cross-country.[30] If this were not the case, then presumably DOE would not have spoken officially (see p. 11, above) of the need to act "consistent[ly] with the goals concerning minimizing spent nuclear fuel handlings."

Congress would certainly seem to have already taken a position in implicit agreement with the view that shipping spent-fuel-laden canisters fewer, rather than more, times across the country, would make sense (and thus would better comport with NEPA). For the NWPA directs that, before DOE begins shipping spent fuel from reactor sites to Yucca Mountain, that agency fund and train the "first responders" in local communities along the way, preparing them to deal with possible emergencies.[31] In that fashion, Congress has seemingly recognized that the risk of those shipments is not zero; rather, that risk – whatever its calculated or actual level – must

---

[30] Our observation is consistent, not only with the DOE documents before us here, but with the reported statement, which we cite only because it is a truism, of two Nuclear Energy Institute officers to the effect that the industry believes "you don't handle spent fuel more often than you need to." See Christopher Smith, *Nuclear Industry Doesn't Back Temporary Utah Storage*, Salt Lake Trib., Dec. 9, 2004, at A15.

[31] 42 U.S.C. § 10175(c). That law does not apply to the privately-arranged shipments that would go the PFS site. But we take judicial notice that the consortium's Chief Executive Officer informed the Nuclear Waste Technical Review Board that the Applicant anticipates providing its own training to first responders along the travel routes. See United States Nuclear Waste Technical Review Board, Transportation Planning Panel Meeting (Oct. 14, 2004), Tr. at 384-85. Presumably, then, the Applicant too shares the view that, in the real world, potential transportation impacts deserve real attention.

have been viewed as sufficient to justify the expenditure of considerable training time and financial resources to ameliorate it.[32]

Thus, it is perfectly understandable that State of Utah officials would be alarmed, and would embody that alarm in a new contention, upon hearing from a DOE official a statement that they thought undercut the overall scheme which they understood to accompany the PFS facility -- i.e., the plan that, assuming that both it and the Yucca Mountain facility are built, the spent fuel temporarily stored at PFS would eventually move directly to the permanent repository. Not to do so would seem not to make sense, at least from a NEPA standpoint if not from others, particularly given the proximity of Yucca Mountain to Skull Valley.

In that regard, we are unaware that the Applicant ever suggested during this entire proceeding that, if Yucca Mountain were built, the spent fuel would not go there, but instead would go back to its point of origin to be removed, not just from the shipping cask, but from the multi-purpose canister, and readied for another cross-country shipment. Nor can we recall that it ever suggested that there might someday need to be added at Skull Valley a facility to extract spent fuel from canisters and repackage it for shipment to Yucca Mountain.

Our view, then, is that before we could credit the Applicant's and Staff's arguments that the State's new contention could be dismissed because no materially different environmental result could possibly obtain in this proceeding, we would need to invest, at the least, far more analytical effort than we are now prepared to give it. We would also have to reconcile the views of individual Board members, whose differing preliminary analyses might lead them in different directions.

---

[32] The Congressional action serves a different purpose than did the Commission's determination that, for purposes of NEPA consideration of the construction and decades-long operation of a nuclear power plant, the environmental impacts of shipping spent fuel are comparatively small and can be summarized in the minimalist "Table S-4." As the Staff's FEIS recognizes, the impacts of those shipments are entirely different in the context of a facility whose central purpose is the temporary away-from-reactor storage of spent nuclear fuel. See PFS FEIS at 5-40.

As it turns out, we need not pass final judgment on the theory behind the immateriality argument, for the Applicant's next argument carries the day -- the facts as they appear at this juncture do not provide a basis to which that theory can be tied. But for purposes of the NEPA analysis of this project, the foregoing discussion can be considered to have amended the FEIS pro tanto.[33]

B. Underpinning. In contrast to the foregoing, the Applicant's argument that the State's new contention lacks a sufficient underpinning is one that prevails. In light of the positions taken, and the countering documents submitted, by the Applicant, nothing in the State's newly-proffered contention survives that would support our requiring an inquiry into whether DOE now intends to force on the Nation either of the potential outcomes referred to in the third-from-last paragraph of Section A, above. It is on that understanding -- alone -- that we dismiss the State's contention without any further Licensing Board proceedings. If the facts change, it will then be for others to examine the legitimacy of any new approach to the project.

The reasoning behind the conclusion just indicated is as follows. Although the State did indeed appear to have new information that, standing alone, might well have justified admission of a new contention, the admission of Contention Utah UU to this proceeding came down to a simple question: whether or not that factual support for the proffered contention could, in the face of contradictory information, be relied upon for even that preliminary purpose.

As an initial matter, we note that a Licensing Board cannot admit to a proceeding a contention which is formulated as a bare assertion without factual underpinning.[34] A close

---

[33] See LBP-03-30, 58 NRC 454, 474 (2003) (citing Allied-General Nuclear Services (Barnwell Nuclear Fuel Plant Separations Facility), ALAB-296, 2 NRC 671, 680 (1975); Louisiana Power and Light Co. (Waterford Steam Electric Station, Unit 3), LBP-82-100, 16 NRC 1550, 1571 n.20 (1982); 10 C.F.R. §§ 51.102(c), 51.104(a)(3)).

[34] See 10 C.F.R. § 2.714(b)(2)(ii) and, e.g., an earlier decision herein, LBP-98-07, 47 NRC 142, 178, 180-81 (1998).

examination of the documents submitted by the State, the Applicant, and the Staff with regard to Contention Utah UU, make clear that there is, at this time, inadequate factual support for the proposition that DOE will not accept spent nuclear fuel from PFS because the spent nuclear fuel is stored in pre-sealed containers. Although the State offered the statement of a witness who heard a DOE official make a remark to that effect, that remark itself has no factual underpinning except its reference to the current form of the Standard Contract being executed between originating nuclear utilities and DOE for acceptance of spent nuclear fuel by DOE at Yucca Mountain (a form contract that does not indicate what different contract would eventuate, if the PFS facility were to be built and to be utilized by nuclear utilities).

In response, the Applicant submitted documents embodying the affirmations, over time, of cognizant DOE officials to the effect that DOE will accept waste in a variety of packages, including dual purpose canisters such as that contemplated for PFS,[35] and that the existing Standard Contract will be adapted to accommodate that packaging.[36] Therefore, we find that the statement allegedly made by the DOE official, on which the State bases its new contention, cannot reliably be interpreted or viewed as reflecting new DOE policy.

Stated otherwise, the State has put forward an opinion about the Yucca Mountain framework advanced by a DOE Office Director.[37] But the Applicant has supplied what appear to be official DOE documents – whose legitimacy the State has not challenged [38] – that undercut the oral opinion that is the foundation for the State's new contention. These

---

[35] See Applicant Response at 13.

[36] See id.

[37] If this matter had made it to trial, the DOE official's in-person testimony, rather than its recounting by another, would have been needed. For purposes of today's ruling, we are assuming he made the statement precisely as attested to by Dr. Nielson. What is in issue is the shortcomings inherent in the statement as recounted.

[38] The State is challenging their interpretation and import.

countering documents take on added significance because the management authority of the DOE official upon whose statement the State would rely does not appear to be in the specific area of which he spoke.

Thus, we are not faced with the oral opinion of a program administrator about the nature of his program, and inconsistent documents from elsewhere in the agency, but the converse -- documents from the affected program that take clear precedence over the opinion of an official from elsewhere. Under the Vermont Yankee standard, then, this potential controversy can be resolved at this re-opening stage in favor of what the documents appear to establish.

C. Timeliness. In light of the conclusion just reached, we need devote little attention to the question of timeliness. We need only note that, if -- as is not the case -- there was a clear foundation for the State's contention as to the nature of the Yucca Mountain conditions on receipt of spent fuel, the contention might well have met the following conditions: (1) good cause for its so-called "late-filing," in that it was submitted within 30 days of the emergence of the new announcement on which it was premised;[39] and (2) potential for changing the outcome of the proceeding, justifying admission even though the record had been closed.[40] Because the contention is being rejected on another ground, we need not address these and other timeliness-related factors.

As indicated above, the materials submitted by the Applicant make it appear that no one in a position of authority in DOE is advocating the result that the State thinks would be so

---

[39] That was the time period established, and relied upon, by our predecessor Board, and it still governs this proceeding. See note 29, above.

[40] We do admit to some conceptual difficulty in applying the same outcome-changing test to, on the one hand, (1) new evidence sought to be admitted on an already-tried issue, for which the test is readily understandable and easily applied by the Board which has heard the earlier evidence; and on the other hand, to (2) a new contention, for almost by definition most admissible contentions can change the outcome (for if they cannot lead to any remedy, they are on that ground inadmissible). See 10 C.F.R. § 2.714(d)(2)(ii).

untoward. On the other hand, no one has yet taken the initiative to do what those official documents say should be done, i.e., the reshaping of the Standard Contract to accommodate the PFS-type eventuality.

Perhaps, as one of the documents indicated, that cannot be done until the Yucca Mountain plans are farther along.[41] Perhaps, as the same DOE official told the Nuclear Waste Technical Review Board, the ongoing litigation between the nuclear utilities and DOE has precluded the conduct of the negotiations that would have to take place for the contract amendment to be accomplished.[42]

It may not be of concern that this has not yet been accomplished. AEC/NRC doctrine, going back to earliest times, provides an analogy -- applicants do not have to have all their other permits in hand before they can obtain an agency license.[43] Applicants are, instead, allowed to pursue in parallel the many permits and licenses they will eventually need to move forward with their proposal. But given the understanding, created by the Applicant's filings with the agency and advertising to its customers (see note 1, above), about the movement of fuel seamlessly from storage in Skull Valley to ultimate repose, it would seem advisable at least to attempt, before any spent fuel were to move to the proposed PFS facility, to put into place an arrangement whereby DOE has agreed to take that fuel, as then packaged, to Yucca Mountain, if it is eventually approved and built.

Putting such an arrangement in place does not seem like a role for us. As we have held, the papers before us establish that no evidentiary hearing is needed, or would be useful,

---

[41] See Applicant Response at 13-14.

[42] See United States Nuclear Waste Technical Review Board, Transportation Planning Panel Meeting (Oct. 13, 2004), Tr. at 84-85.

[43] See, e.g., Philadelphia Electric Co. (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 58 (1974); Consumers Power Co. (Palisades Nuclear Plant), LBP-79-20, 10 NRC 108, 124 (1979).

on this point. Rather, it seems to be a matter the Commission would want to address in some other manner.

This could take place in several fashions. Under the special regulation applicable to this facility, if the adjudicatory process ends in the Applicant's favor, the Staff is not empowered -- as it is in other instances -- to issue the requested license. Rather, the Commission has to consider whether to authorize the Staff to do so. 10 C.F.R. § 2.764(c).

That regulation is silent as to what the Commission is supposed to consider or weigh at that point. The matter embodied in the State's latest contention might be suitable for the Commission to consider if that juncture is reached, perhaps making the receipt of spent fuel dependent upon the utilities and DOE having negotiated the anticipated changes in the Standard Contract.

The Commission may have other avenues for accomplishing the same result -- e.g., a rulemaking proceeding[44] looking toward a directive to any nuclear utilities contemplating off-site temporary storage; or a management overture to DOE as part of the regular series of quarterly meetings referred to in the materials before us;[45] or some other approach. The point is this -- the State's latest contention is not suitable for resolution in the adjudicatory process, but it is too important to be ignored, unless the "creation of a dysfunctional spent fuel management system" is viewed as not of NRC concern but is something to be left entirely to (1) the discretion of DOE or (2) such arrangements as the consortium and its customers are able, and choose, to make.

Given the seemingly universal recognition that extra or unnecessary handling and shipping of spent fuel should be avoided if possible, we think NEPA requires more, and that our

---

[44] The State's moving papers sought rulemaking as an alternative (see p. 4, above).

[45] See Staff Response at 11 n.23.

role in NEPA's implementation requires us to say so. We rest with having called the matter to the Commission's attention.

Thus, we hold that Contention Utah UU is inadmissible in that it provides inadequate factual support, *at this juncture and in light of the opposing filings*, for the proposition that DOE will not accept sealed canisters of spent nuclear fuel from the proposed PFS facility. Accordingly, the State's request that Contention Utah UU be accepted for consideration in this proceeding is DENIED, and that Contention is DISMISSED. Our discussion herein of that Contention's NEPA aspects will be deemed to have AMENDED the PFS FEIS pro tanto.

Under the agency's Rules of Practice, this ruling is interlocutory and thus not appealable upon issuance. Any appeal is to be taken after we render our final ruling in the proceeding.[46]

It is so ORDERED.

THE ATOMIC SAFETY
AND LICENSING BOARD

/RA/

Michael C. Farrar
ADMINISTRATIVE JUDGE

/RA/

Peter S. Lam
ADMINISTRATIVE JUDGE

/RA/

Paul B. Abramson
ADMINISTRATIVE JUDGE

Rockville, Maryland
February 24, 2005

Copies of this Order were sent this date by Internet e-mail transmission to counsel for Applicant PFS; Intervenor State of Utah; and the NRC Staff.

---

[46] In that regard, only one matter remains before us for determination: a decision on the merits on the accidental aircraft crash "consequences" matter, which was the subject of a 16-day evidentiary hearing and on which we received the final brief on December 22, 2004. Issuance of that decision is imminent.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LB MEMORANDUM AND ORDER (RULING ON STATE OF UTAH'S RECENTLY-FILED CONTENTION UU) (LBP-05-05) have been served upon the following persons by deposit in the U.S. mail, first class, or through NRC internal distribution.

Office of Commission Appellate Adjudication
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Michael C. Farrar, Chairman
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Paul B. Abramson
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Peter S. Lam
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Sherwin E. Turk, Esquire
Laura C. Zaccari, Esquire
John T. Hull, Esquire
Office of the General Counsel
Mail Stop - 0-15 D21
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Diane Curran, Esquire
Harmon, Curran, Spielberg & Eisenberg, L.L.P.
1726 M Street, NW, Suite 600
Washington, DC 20036

Joro Walker, Esquire
Director, Utah Office
Western Resource Advocates
1473 South 1100 East, Suite F
Salt Lake City, UT 84105

Martin S. Kaufman, Esquire
Atlantic Legal Foundation
205 E. 42nd St.
New York, NY 10017

Docket No. 72-22-ISFSI
LB MEMORANDUM AND ORDER (RULING ON STATE OF UTAH'S RECENTLY-FILED CONTENTION UU)
(LBP-05-05)

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

Jay E. Silberg, Esquire
D. Sean Barnett, Esquire
Shaw Pittman
2300 N Street, NW
Washington, DC 20037-1128

John Paul Kennedy, Sr., Esquire
David W. Tufts, Esquire
Confederated Tribes of the Goshute Reservation and David Pete
Durham Jones & Pinegar
111 East Broadway, Suite 900
Salt Lake City, UT 84105

Richard Wilson
Department of Physics
Harvard University
Cambridge, MA 02138

Tim Vollmann, Esquire
3301-R Coors Road N.W., #302
Albuquerque, NM 87120

Paul C. EchoHawk, Esquire
ECHOHAWK LAW OFFICES
151 North 4th Avenue, Suite A
P.O. Box 6119
Pocatello, ID 83205-6119

Joseph R. Egan, Esquire
Martin G. Malsch, Esquire
Egan, Fitzpatrick, Malsch & Cynkar, PLCC
The American Center at Tysons Corner
8300 Boone Boulevard, Suite 340
Vienna, VA 22182

Stephen L. Simpson, Esquire
Office of the Solicitor
Department of the Interior
Division of Indian Affairs
1849 C Street, NW, Mailstop 6456-MIB
Washington, DC 20240

[Original signed by Evangeline S. Ngbea]

Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 24th day of February 2005

REDACTED VERSION

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS

Nils J. Diaz, Chairman
Edward McGaffigan, Jr.
Jeffrey S. Merrifield

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

CLI-04-10

MEMORANDUM AND ORDER
(Original Version Contains Proprietary Information)

Private Fuel Storage, L.L.C. (PFS) and the State of Utah have filed cross petitions for review of Licensing Board decisions concerning financial qualifications and decommissioning funding. PFS seeks review of one order--the Licensing Board's January 5, 2004 Memorandum and Order Granting in Part and Denying in Part Motion for Reconsideration and/or Clarification of Financial Qualifications Decisions (unpublished) ("Reconsideration Ruling"). Utah seeks review of several related orders--the Board's May 27, 2003 Partial Initial Decision (Contention Utah E/Confederated Tribes F, Financial Assurance) ("PID-E"), its May 27, 2003 Partial Initial Decision (Utah S, Decommissioning) ("PID-S"), its May 27, 2003 Memorandum and Order (Rulings on

REDACTED VERSION

Summary Disposition Motion and Other Filings Relating to Remand From CLI-00-13) ("MSA Ruling"), and its January 5, 2004 Reconsideration Ruling.[1]

The Commission has full discretion whether to undertake appellate review of its licensing boards' merits decisions. NRC rules say that the Commission may grant review of initial Board decisions (or partial initial decisions) based on "any consideration" it "deems to be in the public interest."[2] Review is particularly appropriate where the Board's ruling may have made a clear error as to a material fact, where the ruling turns on a legal conclusion that is without precedent or conflicts with existing precedent, or where the ruling raises an important policy issue that the Commission itself should consider.[3]

For the reasons set forth below, we grant review of PFS's claims concerning whether PFS must have service contracts in place to cover O&M costs for 1000 casks prior to beginning operations and whether those contracts must be in a specific dollar amount. We deny review of the issues raised in Utah's petition.

I. BACKGROUND

The petitions for review concern Utah Contention E/Confederated Tribes F, raising the question whether PFS has provided reasonable assurance of being able to cover its costs of

---

[1]This series of Board decisions remains unpublished because of as yet unresolved questions of proprietary information and confidentiality.

[2]*See* 10 C.F.R. § 2.786(b)(4); *see generally Private Fuel Storage, L.L.C.*, CLI-04-4, 59 NRC __ (2004), slip op. at 1-2. Throughout this decision we refer to the provisions of our former Part 2, which applies to this proceeding. Effective February 14, 2004, we have changed Part 2 in significant respects. *See Changes to Adjudicatory Process; Final Rule*, 60 Fed. Reg. 2182 (Jan. 14, 2004).

[3]*See* 10 C.F.R. § 2.786(b)(4).

operating and maintaining its proposed facility, and Utah Contention S, raising the question whether PFS will have adequate decommissioning funding.[4]

In a March 2000 decision in response to a PFS motion for summary disposition of Utah E, the Board found that only two issues should proceed to hearing: the accuracy of PFS's operation and maintenance cost estimate, and the adequacy of its onsite liability insurance coverage.[5] The Board found that two license conditions proposed by the NRC staff provided reasonable financial assurance. The first required that PFS have enough funds committed to construct the entire first phase of the project prior to beginning any construction, and the second required that it have service contracts in place to cover operational, maintenance and decommissioning costs prior to accepting spent fuel for storage. The Board referred to the Commission its ruling that these conditions provided reasonable financial assurance. In CLI-00-13, the Commission affirmed the Board's ruling, thus approving the concept of service agreements as a means to show financial assurance. But the Commission required PFS, on remand, to produce a model service agreement for the Board's review so that Utah could raise (and litigate) any deficiencies in the agreement's terms.[6]

On remand, the Board issued a decision finding the model service agreement adequate despite a series of Utah challenges.[7] The Board also found that PFS had met its burden to show

---

[4]*See* 10 C.F.R. §72.22(e).

[5]*See* LBP-00-6, 51 NRC 101 (2000).

[6]CLI-00-13, 52 NRC at 35.

[7]*See* MSA Ruling, slip op. at 80-81.

reasonable assurance of adequate financing.[8] Finally, the Board required PFS, prior to operation, to have in place sufficient service contracts to fund the estimated operating costs of a full-size, 4000-cask facility.[9] On reconsideration, the Board relaxed the initial funded capacity to 1000 casks.[10]

Much earlier, in June, 2000--before the Commission had issued CLI-00-13--the Board had held hearings on estimated costs of operation, maintenance, decommissioning and liability insurance. At the time of the June 2000 hearings, PFS had in place a financing plan quite different from the one that emerged later in connection with litigation over the model service agreement.

The original PFS plan called for the customer to pay a "base storage fee," divided into three lump sum payments, and annual storage fees.[11] The lump sums would cover construction, canister and other up-front costs. Under PFS's current plan, the only sum certain the customer is obligated to pay is a nonrefundable xxxxxxxx "commitment fee" upon signing.[12] In addition to the commitment fee, to cover construction costs, PFS's new scheme calls for its customers to xxxxxxxxxx in the amount of xxxxxxxxx per kilogram of uranium in "reserved capacity," the amount of fuel the customer plans to store.[13] xxxxxxxxxxx.

---

[8]*See* PID-E, slip op. at 101-102.

[9]*See* PID-E, slip op. at 87; 95.

[10]*See* Reconsideration Ruling, slip op. at 16-17.

[11]For a comparison of previous funding scheme versus PFS's new plan, *see* MSA Decision, slip op. at 5-13.

[12]*Id.*

[13]*See id.* at 7-8.

The new plan calls for customers to pay estimated annual operation and maintenance costs up-front on a quarterly basis.[14] At the end of each year, the customer is either billed or credited to reflect the difference between the estimated and actual costs. Whereas the previous plan called for canister and cask costs to come out of a second lump sum payment to PFS, now the plan calls for the customers to own the casks and canisters and pay the vendors directly. Upon shipping a cask, the customer pays its allocated portion of decommissioning costs.[15]

In November 2000, Utah voiced various objections to the new financing plan and moved to reopen the record in the June evidentiary hearings. The Board ultimately refused to reopen the record, finding that the changes in PFS's financing scheme and Utah's objections to it would not "materially alter the result" of the hearing, as required for reopening a hearing record.[16] The Board agreed with PFS's argument that the subject of the June hearings was cost estimates only.[17] The Board noted that Utah had not filed any late-filed contention in light of PFS's changed financial plan, but rested on its previous contention.[18] None of Utah's concerns about the new financing plan fell within the scope of the hearings or would alter the result, the Board concluded.[19]

Before us today is Utah's challenge to the Board's decision, its challenge to the Board's approval of the model service agreement, and its challenge to the Board's overall financial

---

[14] *Id.* at 8.

[15] *Id.* at 9.

[16] 10 C.F.R. §2.734(a).

[17] MSA Ruling, slip op. at 78-80.

[18] *See* id. at 57, n. 7.

[19] *Id.* at 80.

assurance holding. Also before us are PFS's claims that the Board imposed unnecessarily restrictive financial conditions on operating the proposed PFS facility.

II. DISCUSSION

A. PFS Petition for Review

PFS requests review of the Board's requirements that (1) a specific dollar amount of projected O&M costs must be covered by customer service agreements in order to satisfy the license conditions the Commission approved in CLI-00-13, and (2) PFS have customer service agreements in place to cover the full O&M costs of at least a 10,000 MTU (1000 cask) facility prior to beginning operations.

1. "Specific Dollar Amount" Requirement

PFS argues that it need not have agreements in a specific dollar amount because it intends to use "passthrough" contracts wherein the customer agrees to pay for all associated O&M costs, similar to the contracts approved by the Commission a few years ago in a license transfer case, *Northern States Power Co.* (Monticello Nuclear Generating Plant).[20] On reconsideration, the Board rejected this argument because the Commission in CLI-00-13 had explicitly provided that PFS should have contracts in place to cover costs in an "amount to be determined at a hearing."[21] The Board noted that the Commission's directive in CLI-00-13 requiring contracts for specific amounts predated the MSA cost passthrough scheme, but said:

---

[20]CLI-00-14, 52 NRC 37 (2000) (order issued the same day as CLI-00-13).

[21]*See* Reconsideration Ruling, slip op. at 12; *see also* CLI-00-13, 52 NRC at 36.

"to the extent PFS now considers that mechanism a basis for negating the Commission's directive, this seems a matter best taken up with the Commission."[22]

The NRC staff opposes review of the "specific dollar amount" issue. The staff agrees with the Board that the Commission's order in CLI-00-13 called for contracts in a specific dollar amount, as determined by the Board after a hearing. It argues that PFS should have asked the Commission to revise its directive, rather than asking the Board to change its ruling on a motion for reconsideration. The staff also notes various differences between PFS's situation and that of Nuclear Management, the power plant operators whose passthrough contracts the Commission found adequate in the *Monticello* case.[23] For example, the staff says, in *Monticello*, Nuclear Management's sole customer was an electric utility with rate-backed revenues. Finally, the staff argued that PFS "never sought to eliminate consideration of its cost estimates and prices as a basis for demonstrating financial assurances."[24] Utah opposes the PFS position on similar grounds.

But the differences or similarities between the PFS plan and the situation in the *Monticello* case may prove irrelevant. The Board found that the model service agreement provides reasonable financial assurance, even though the executed contracts would not provide

---

[22]MSA Ruling at 13, n. 9.

[23]*See* "NRC Staff's Response to 'Applicant's Petition for Review of Memorandum and Order Granting and Denying in Part Motion for Reconsideration And/Or Clarification of Financial Qualification Decisions,'" at 7-8.

[24]Two years elapsed between the hearings on cost estimates and the Board's decisions on financial assurance, during which time PFS developed its new financing plan. It is not clear, however, that using "passthrough" contracts would eliminate the need to estimate the costs of the facility. NRC regulations require that the licensee provide reasonable assurance that it will be able to cover "estimated costs." 10 C.F.R. §72.22(e). This suggests that a cost estimate would be necessary regardless of the type of billing method in the service contracts.

for a specific sum but would be passthrough contracts. If the Board's decision stands as it is, the service agreements may have to be redrafted.[25]

The PFS petition for review and the responses do not adequately clarify the seeming contradiction between approving the passthrough contracts–which apparently lack specific dollar amounts–and requiring contracts for a specific sum as a condition of operation. Hence, we have decided to grant PFS's petition for review in the expectation that full briefing will shed light on the matter.

2. O&M for Initial Capacity Facility of 1000 Units.

PFS also contests the Board's finding that it must have service agreements in place to cover O&M costs and decommissioning costs sufficient for a 1000 unit facility prior to beginning operations.[26] PFS's application is for a facility holding up to 4000 units. PFS points out, though, that it has always planned to build the facility in stages.

The Board initially held that PFS must have service contracts in place to cover the full amount of estimated operating, maintenance and decommissioning costs for a 4000-unit facility.[27] PFS's reconsideration motion argued that it always planned to build in stages, and that in CLI-00-13, the Commission did not require O&M funding for a 4000 unit facility prior to commencing operations. On reconsideration, the Board decided to require full O&M funding for

---

[25]It is possible that the Board meant that **xxxxxxxxx**, as provided in the MSAs, must equal 1/120 of the Board's estimated costs (20 years times 4 quarters), but that is not clear from the decisions.

[26]*See* Reconsideration Ruling, slip op. at 16-17.

[27]PID-E at 101-102.

a 1000 unit facility.[28] The Board chose this figure because the record was "replete" with references to a 1000 unit initial capacity facility.[29]

PFS objects to the 1000 unit figure, arguing that it never said it would start operations with as many as 1000 units. It wants to begin operations as soon as it has enough service contracts to cover fixed costs plus per unit costs, whatever that initial number of units will be.

The license conditions as originally proposed by the NRC staff in the SER, and as substantially approved by the Commission in CLI-00-13, required that prior to construction, PFS have full funding for *construction* of "a facility with the initial capacity as specified by PFS to NRC."[30] In CLI-00-13, the Commission also ordered that license conditions should require that operations would not begin until service contracts were in place to cover operational, maintenance and decommissioning costs, but did not refer to the "initial capacity." But the Board seemingly interpreted CLI-00-13 to require specifying a total dollar amount for which PFS must have commitments prior to commencing *operations*, which would in turn require the Board to pick a certain number of casks for startup.

There is a substantial practical difference between a license condition that requires full funding for *constructing* a facility of a certain capacity, and one that requires full funding sufficient to cover operations and decommissioning for that same number of casks. As long as the Board's estimates of fixed and per-unit costs is accurate, it seems reasonable that PFS could satisfy NRC's financial assurance regulations at the operational stage by having service

---

[28]Reconsideration Ruling, slip op. at 18.

[29]*Id.* at 16-17.

[30](Emphasis added). CLI-00-13, 52 NRC at 27. The "initial capacity" was omitted from the SER as proprietary information.

contracts in place that cover both the fixed costs and the per-unit costs for each cask actually accepted.

The Board ruling requiring O&M funding for a specific facility size, therefore, arguably reflects a mistake of law or fact, perhaps deriving from ambiguities in our own opinion in CLI-00-13. We intend to examine this issue more closely upon receipt of full briefs. We therefore accept review of this issue.

B. Utah's Petition for Review

Before addressing the specific charges of error in Utah's petition for review, we offer a few general observations. In CLI-00-13, the Commission approved the use of license conditions, including customer service agreements, as a means of showing PFS's financial assurance. At the time, PFS proposed to use service contracts that would ensure that it has a dependable revenue stream to cover its costs of running the facility throughout the term of the license. CLI-00-13 approved the NRC staff's proposal to use license conditions to establish enforceable financial assurance commitments. The Commission also directed that PFS produce a model service contract for review by the Board.

The point of having the model service agreement supplied and reviewed by the Board was to give Utah and the NRC staff an opportunity to uncover legal weaknesses or loopholes in the model agreement that would permit a customer to walk away from its waste or leave PFS with costs that it could not recover from its clients. But to a great extent, Utah complains not of flaws in the contracts themselves, but argues that either (1) the terms of the contracts are so lopsided that no customer would enter them or (2) the customer would simply ignore its contractual obligations.

The first complaint is simply addressed: if a particular nuclear power plant operator does not agree to the terms of the model service agreement, that operator will not store spent fuel at the PFS facility. If PFS can find no customers willing to enter into the contracts, then the PFS facility will never commence operations, even if PFS obtains an NRC license. The second concern is completely speculative. All of PFS's potential customers are NRC licensees–many are rate-regulated utilities–and all have themselves previously undergone evaluations of their financial capability to operate their facilities safely, including waste storage. We reject Utah's suggestion that PFS must establish the creditworthiness of each and every potential customer prior to operations. It is enough that PFS's customers will have the ability and contractual obligation to pay. PFS cannot be expected to prove that all of its customers invariably will fulfill their financial commitments. There is always a risk in business that some customer may ignore its obligations and force its creditor into court. "The Commission will accept financial assurances based on plausible assumptions and forecasts, even though the possibility is not insignificant that things will turn out less favorably than expected."[31]

Keeping these general observations in mind, we review each of the specific issues raised in Utah's petition.

1. PFS License Conditions Go Far Beyond Claiborne[32]

Utah argues that the Commission should look again at PFS's financing plan because it goes far beyond *Claiborne* and the Commission's previous assumptions about the PFS plan. Utah argues PFS has substantially revised its financial plan from what it was when the

---

[31]*North Atlantic Energy Service Corp.* (Seabrook Station, Unit 1), CLI-99-6, 49 NRC 201, 222 (1999).

[32]*Louisiana Energy Services* (Claiborne Enrichment Center), CLI-97-15, 46 NRC 294 (1997).

Commission initially approved the license condition concept. Specifically, PFS will have no capital contributions from its members, will seek no commercial loans, and will rely entirely on revenues from its customers for operating costs.

This argument appears to be an attempt to relitigate the Commission's prior approval of the service contract device as a means of establishing financial qualifications.

Utah's reliance on distinguishing PFS's plan from the license applicant's in *Claiborne* is inapposite. Financial assurance must be viewed on a case-by-case basis. A license applicant's financial plan reflects estimated construction and operating costs, revenue streams, etc., which will vary dramatically depending on the type of facility. Here, a storage facility is entirely different from the uranium enrichment facility at issue in *Claiborne*. Consequently, the financial mechanisms necessary to show financial assurance will undoubtedly differ.

While Utah attempts to point out various disparities between the PFS plan and LES's in *Claiborne*, it ignores the fact that many of the "weaknesses" of which it complains in its petition were present in the LES case. For example, Utah objects that PFS will have no commercial loans; but in *Claiborne*, at the time the Commission found LES financially qualified, no lender had committed to finance the project either.[33] As the Commission found, "the LES financial plan [was] not based on prelicensing funding commitments from either the LES partners or lending institutions." And just as PFS relies on what Utah styles "hypothetical customers," LES had no executed enrichment contracts in hand at the licensing phase.[34] Both LES and PFS relied primarily on their own commitments not to go forward with the project without the contracts in hand.

---

[33] *Id.* at 304.

[34] *Id.*

In some respects, PFS's plan offers greater assurances than those present in *Claiborne*. For example, PFS plans to use service contracts covering the entire life of the license. In contrast, LES's "long-term service contracts" were of only five years' duration.[35] LES faced greater challenges meeting its operating expenses given the highly competitive world market for enriched uranium. PFS, on the other hand, has no competitors now or in the foreseeable future for private, away-from-reactor dry storage. Finally, LES never produced a model contract for scrutiny by the Board, staff and intervenor, as PFS has done.

While there no doubt are substantial differences between the LES plan and PFS's, the fundamental question is whether PFS's plan departs from governing regulations, the Commission's controlling order on financial qualifications (CLI-00-13), and sound financial sense. Utah cites no regulation the PFS plan violates, and no specific conflict with CLI-00-13. Further, Utah's argument that financial soundness requires PFS to have equity payments from members or commercial loans is fact-driven. The Board saw the record otherwise.[36] Utah has not shown that the Board erred in finding the plan adequate despite the full reliance on customer service contracts for funding.

2. Non-specificity of License Conditions

Utah claims that the license conditions should be made more specific to incorporate promises (1) to use the approved model service agreement, (2) to obtain insurance in the amount determined by the Board, and (3) to annually review decommissioning costs to ensure the adequacy of funding.

---

[35] *Id.*

[36] *See e.g.*, MSA Ruling, slip op. at 22-23 (rejecting argument that PFS will have "no assets").

We held in an earlier decision in this proceeding that not all licensee commitments need to be reduced to license conditions in order to bind PFS.[37] Utah's complaints help to illustrate why this is true. The Commission's order in CLI-00-13 suffices to ensure that the service agreements actually entered by PFS depart in no material respect from the model service agreement. As we explained in CLI-00-13, minor variations may be acceptable, but we reasonably can leave to the NRC staff the task of monitoring the agreements and making sure that PFS lives up to its commitments.[38]

Utah wants incorporated as a license condition the Board's order that PFS obtain insurance in the appropriate amount as the Board determined.[39] This concern also does not warrant Commission review. The Board's order fully binds PFS. Because we see no suggestion of error in the Board's determination of the amount of insurance, we will not review it.

Finally, Utah wants a license condition requiring PFS to review its decommissioning costs annually. The Board found a specific license condition to be unnecessary, because the Commission's regulations already require a Part 72 licensee to conduct "periodic" reviews.[40] In addition, the Board found a license condition unnecessary because PFS had publicly committed to conducting annual reviews, and because its customers, by contract, would cover any

---

[37] *See* CLI-01-09, 53 NRC 232, 236 (2001).

[38] *See* CLI-00-13, 52 NRC at 34-35 (Staff is allowed "room to exercise professional judgment").

[39] *See* PID-E at 100-101. Because PFS committed to pay **xxxx** per annum and obtain at least $70 million in insurance coverage, the Board ordered PFS to obtain insurance coverage of either $70 million or the amount that a **xxxxx** annual premium will obtain, whichever is greater.

[40] 10 C.F.R. §72.30 (b).

decommissioning funding shortfall.[41] In light of these considerations, the Board's ruling is appropriate.

3. *The Model Service Agreement Does Not Satisfy Bases 1-10 of Utah E*

Utah contends that the Board erred in finding that the model service agreement resolved the issues raised in its financial assurance contention (Utah E). Utah claims that the Board violated due process in refusing to reopen the record of the June 2000 hearing to address Utah's concerns with the model service agreement, and in denying Utah discovery.

The Board found that the standard for reopening the record was that the new evidence must "materially alter the outcome of the hearing." The Board found that Utah's concerns would not. The Board stressed that the subject of the June 2000 hearing was PFS cost estimates, not PFS's method of recovering those costs from its customers. The Board further ruled that the ambiguities Utah found in the model service agreements did not demonstrate that there were "relevant uncertainties significantly greater than those that usually cloud business outlooks" in the PFS business plan.[42]

Utah contends that because the model service agreement is so "lopsided and open-ended that no reasonable business would enter into them," PFS's business plan is completely unrealistic. Utah points out that no customer has yet entered into one of PFS's contracts. It also argues that the model service agreement is "illusory" and the NRC's financial assurance finding should be based on executed contracts.

---

[41] *See* PID-S, slip op. at 45-47.

[42] PID-E, slip op. at 63-64, *quoting North Atlantic Energy Service Corp.* (Seabrook Station, Unit 1), CLI-99-6, 49 NRC 201, 222 (1999).

Our decision in CLI-00-13 already addressed Utah's concerns that no customer will agree to the terms of the model service agreement. PFS cannot commence operations until funding is committed–that is, until long-term agreements are entered. Hence, if no customer enters into the service agreements, then PFS may not start up operations. The Board's ruling in PID-E also recognized this.[43] While it is evidently true that no customer has yet entered into a contract with the as yet unlicensed facility, this fact alone does not expose any weakness in the contract that would allow a customer to walk away from its spent fuel or payment obligations. Our decision in CLI-00-13 contemplated that financial assurance could be demonstrated by a *model* contract coupled with PFS's commitment to use that model. We see no reason to revisit that holding now.

The Board's decision not to reopen the record (or to restart discovery) correctly applied the standard for reopening a hearing record. It was also consistent with the Commission's direction in CLI-00-13 and NRC's financial assurance regulations. There is no need for further Commission review here.

4. Inadequacy of Model Service Agreement to Meet PFS's Costs.

Utah objects that PFS's financing scheme does not require it to have sufficient cash on hand to cover costs as they arise, creating the potential for PFS to risk safety to save costs. Utah faults PFS's proposal xxxxxxxxxxxx. Utah also contends that financing its operations through service agreements is unreliable because it depends on the creditworthiness of PFS's customers.

---

[43] *See, e.g.*, MSA Decision, slip op. at 76 ("And to the degree those provisions create questions about the extent to which PFS will be able to find customers willing to contract with it for SNF storage services under the MSA, LC-1 and LC-2 make it clear that PFS bears the risk that its funding design will leave it unable to attract a sufficient number of customers and so be unable to receive authorization to construct and/or operate the facility").

The flaw in the scheme, as Utah sees it, is the likelihood that some of the customers that enter the service contracts will not pay their bills on time. Fundamentally, then, the "inadequacy" of which Utah complains is not with the model service agreement as written, but with the possibility that PFS customers will evade their contractual obligations.

The Board considered Utah's concerns, and found that PFS customers were reasonably creditworthy:

> [T]o the degree the State has concerns about continued customer viability in the context of facility operations and the concomitant lack of a large PFS cash reserve to address this purported (albeit somewhat overstated) problem, ... general, undifferentiated concerns about the future viability of PFS customers are not adequate to establish a lack of compliance with Part 72 financial assurance provisions, particularly when such concerns are expressed (1) relative to entities already subject to Part 50 financial qualifications requirements, ... and (2) in the face of MSA requirements for regular, quarterly payments of all PFS estimated costs ...[44]

In addition, the service agreements must have provisions requiring customers to periodically provide updated credit information and additional financial assurances.[45] In light of the Commission's prior approval of service agreements as evidence that PFS will have an adequate revenue stream, the Board did not err in accepting these particular service contracts as assurance of revenue.

---

[44] MSA Ruling at 63-64 (internal citations omitted).

[45] A license condition will require the service agreements to include these provisions. CLI-00-13, 52 NRC at 36.

5. Board's Ruling Allows PFS to Avoid Showing Reasonable Financial Assurances Throughout the Life of the Facility

Utah complains that in allowing the passthrough contracts to substitute for estimating some costs, the Board ignored §72.22(e)'s requirement that the applicant must show "reasonable assurance of obtaining the necessary[] funds ... to cover ... [e]stimated operating costs over the planned life of the ISFSI." This, Utah says clearly requires that costs be estimated prior to finding financial assurance.

Utah argues that PFS has not demonstrated funding through the "planned life of the facility," because the Board found that the service agreements actually entered would only need to cover the O&M for the 20-year license term, not the facility's actual planned life of 40 years. Utah claims that the Board should not have halved the amount of costs that PFS needs to operate the facility through the anticipated 40 years of operation. But the Commission held in CLI-00-13 that service contracts should be in place to cover "the life of the license."[46] In addition, while PFS readily admits that it may seek to renew its license after 20 years, there is no certainty about that. PFS's continued existence will depend on a continued need for private away-from-reactor storage. If such a need develops, financial assurance for the renewal term will be an issue for the license renewal proceeding. It was not error for the Board to choose 20 years as the applicable term.

Utah also claims that the use of passthrough contracts directly violates the NRC rule, 10 C.F.R. §72.22(e), requiring reasonable assurance that it will "obtain" funds to cover estimated O&M costs. Utah claims that passing costs on to customers is not the same as "obtaining funds." But the Commission has already held, in this case and in *Claiborne* before it, that having

---

[46]52 NRC at 36.

binding service contracts in place can provide reasonable assurance that the licensee will obtain the necessary funds. Again, this is not the time to relitigate issues settled earlier in this proceeding.

6. Board's Rulings Require Staff to Make Subjective, Non-Ministerial Post-Licensing Judgments

Utah complains that likely customer resistance to the "lopsided" service agreements will result in significant alterations, which in turn will require the NRC staff to make sophisticated legal judgments in determining whether PFS has complied with its license conditions. We reject this argument. First, it relies on the claim that PFS will violate its license condition by willfully redrafting the contracts to its own financial peril, which we find speculative. In addition, Utah's argument presumes that the NRC staff cannot be relied on to recognize a significant alteration in the contract that PFS has bound itself to follow. We already have discussed, in CLI-00-13, the scope of the NRC staff's post-licensing authority to review PFS's compliance with its license conditions.[47]

V. CONCLUSION

For the foregoing reasons, the Commission grants review of PFS's claims of error and denies review of Utah's claims of error. The parties are directed to file briefs, not to exceed 25 pages, on the two issues on which review is accepted. PFS should file its opening brief within 21 days of this order; the NRC staff and Utah should file their answering briefs within 21 days after receipt of PFS's brief. PFS may file a reply brief, not to exceed 5 pages, within 7 days after receipt of the staff and PFS briefs. The NRC staff may also file a short brief (not to exceed 10

[47] *See* 52 NRC at 34-35.

pages) in support of PFS in the facility size issue. That brief must be filed at the same time as PFS's opening brief.

All briefs should be served electronically. Any brief exceeding 10 pages shall contain a table of cases and authorities and a table of contents. Any interested *amici curiae* are authorized to file briefs as set out above, at the time of the party they support.

Finally, because today's decision discusses PFS's financial plan it contains proprietary information. The parties, may, if they choose, submit to the Commission a designation of appropriate redactions prior to our order's publication. We will withhold publishing for at least 14 days. If we receive any proprietary designation, we will redact the order appropriately prior to publication.

IT IS SO ORDERED.

For the Commission

/RA/

Annette L. Vietti-Cook
Secretary of the Commission

Dated at Rockville, Maryland,
this 24th day of March, 2004.

RAS 10305

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

LBP-05-21
DOCKETED 08/12/05

ATOMIC SAFETY AND LICENSING BOARD

SERVED 08/12/05

Before Administrative Judges:

G. Paul Bollwerk, III, Chairman
Dr. Jerry R. Kline
Dr. Peter S. Lam

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, L.L.C.	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	May 27, 2003

Partial Initial Decision
(Contention Utah E/Confederated Tribes F, Financial Assurance)

[Note: Although this partial initial decision was originally issued in May 2003, it was treated as a non-public issuance pending review of challenges by intervenor State of Utah to claims by applicant Private Fuel Storage, L.L.C., that pursuant to 10 C.F.R. § 2.790 certain portions of the decision should be withheld from public disclosure as proprietary information. With issuance of the Commission's final decision on that matter, see CLI-05-16, 62 NRC __ (July 22, 2005), this decision is being publically released in a redacted form.]

– PUBLICLY-AVAILABLE VERSION –

TABLE OF CONTENTS

– PUBLICLY-AVAILABLE VERSION –

– PUBLICLY-AVAILABLE VERSION –

– PUBLICLY-AVAILABLE VERSION –

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

G. Paul Bollwerk, III, Chairman
Dr. Jerry R. Kline
Dr. Peter S. Lam

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, L.L.C.	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	May 27, 2003

Partial Initial Decision
(Contention Utah E/Confederated Tribes F, Financial Assurance)

I. INTRODUCTION

1.1 In June 1997, Private Fuel Storage, L.L.C., (PFS) submitted an application to the Nuclear Regulatory Commission (NRC) requesting a license under 10 C.F.R. Part 72 to construct and operate an independent spent fuel storage installation (ISFSI) on the Skull Valley, Utah reservation of the Skull Valley Band of Goshute Indians (Skull Valley Band). The ISFSI proposed in that application is designed to store temporarily up to 40,000 metric tons uranium (MTU) of spent nuclear fuel (SNF) generated by commercial nuclear power reactors in an above ground dry cask storage facility until a permanent SNF storage facility becomes available. This partial initial decision presents the Licensing Board's findings of fact and conclusions of law relative to portions of admitted contention Utah E/Confederated Tribes F, Financial Assurance, contesting PFS's financial qualifications to construct and operate the ISFSI. Specifically, it concerns subparts five, six, and ten of the contention as they challenge

the adequacy of (1) PFS's construction and operating and maintenance (O&M) cost estimates; and (2) the amount of onsite property insurance coverage PFS intends to obtain.

1.2 For the reasons set forth below, the Board finds that PFS has carried its burden of proof to demonstrate its financial qualifications in accordance with 10 C.F.R. § 72.22(e) to safely construct and operate the proposed Skull Valley storage facility. Therefore, the Board concludes that the contention Utah E/Confederated Tribes F challenge to the PFS license application cannot be sustained.

II. PROCEDURAL BACKGROUND

2.1 Following the June 1997 filing of the PFS application for a twenty-year license for the proposed ISFSI facility in Skull Valley, Utah, the NRC published a notice of opportunity for a hearing on July 31, 1997. See 62 Fed. Reg. 41,099 (July 31, 1997). In response to the published notice, several entities, including the State of Utah (State) and the Confederated Tribes of the Goshute Reservation (Confederated Tribes), filed hearing requests/petitions to intervene pursuant to 10 C.F.R. § 2.714 seeking to participate as parties in any proceeding concerning the PFS license application. See [State] Request for Hearing and Petition for Leave to Intervene (Sept. 11, 1997); Request for Hearing and Petition to Intervene of the [Confederated Tribes] (Aug. 29, 1997). Acknowledging these intervention requests, the Board issued an initial prehearing order on September 23, 1997, establishing an October 24, 1997 deadline for the submission of supplements to the hearing/intervention requests, including the filing of contentions and their supporting bases. See Licensing Board Memorandum and Order (Initial Prehearing Order) (Sept. 23, 1997) at 2-3 (unpublished). The Board later issued a series of orders that provided a thirty-day extension of this filing period and set dates for a site visit

and prehearing conference for the week of January 26, 1998. See Licensing Board Memorandum and Order (Schedule for Prehearing Conference/Site Visit and Responses to Supplemental Petition) (Oct. 24, 1997) at 1 (unpublished); Licensing Board Memorandum and Order (Ruling on Motions to Suspend Proceeding and for Extension of Time to File Contentions (Oct. 17, 1997) at 11 (unpublished). Thereafter, the State and the Confederated Tribes separately filed their supplemental petitions, which included contentions Utah E and Confederated Tribes F, to which PFS and the NRC staff subsequently filed timely responses. See [State] Contentions on the Construction and Operating License Application by [PFS] for an [ISFSI] (Nov. 23, 1997) at 27-38; Supplemental Memorandum in Support of the Petition of [the Confederated Tribes] to Intervene and for a Hearing (Oct. 15, 1997); Statement of Contentions on Behalf of [the Confederated Tribes] (Nov. 24, 1997) at 8-9; [PFS] Answer to Petitioners' Contentions (Dec. 24, 1997) at 69-83, 662-71; [PFS] Answer to [Confederated Tribes] Supplemental Memorandum in Support of Petition to Intervene and for a Hearing (Dec. 12, 1997); NRC Staff's Response to Contentions Filed by (1) [State], (2) Skull Valley Band, (3) Ohngo Gaudadeh Devia, (4) Castle Rock Land and Livestock L.C., [et al.], and (5) [Confederated Tribes] (Dec. 24, 1997) at 26-27, 32-33; NRC Staff's Response to the Supplemental Memorandum Filed by [Confederated Tribes] in Support of Their Petition to Intervene (Dec. 23, 1997).

2.2 Following a January 1998 visit to the PFS site and other potentially relevant areas in Tooele County, Utah, the Board conducted a three-day prehearing conference in Salt Lake City, Utah, during which it heard participant arguments regarding standing to intervene and the admissibility of submitted contentions. In its subsequent ruling, the Board found that the State and the Confederated Tribes had established their standing to intervene in the

proceeding and admitted contentions Utah E and Confederated Tribes F.[1] See LBP-98-7, 47 NRC 142, 187, 236 (1998). Because of their similarity, the two contentions were consolidated into a single contention for litigation, and the Board designated the State as the lead intervenor for contention Utah E/Confederated Tribes F.[2] See Licensing Board Memorandum and Order (Memorializing Prehearing Conference Rulings) (May 20, 1998) at 2 (unpublished). As admitted in LBP-98-7, consolidated contention Utah E/Confederated Tribes F provides as follows:

> Contrary to the requirements of 10 C.F.R. §§ 72.22(e) and 72.40(a)(6), the Applicant has failed to demonstrate that it is financially qualified to engage in the Part 72 activities for which it seeks a license in that:
>
> 1. The information in the application about the legal and financial relationship among the owners of the limited liability company (i.e., the license Applicant PFS) is deficient because the owners are not explicitly identified, nor are their relationships discussed. See 10 C.F.R. §§ 50.33(c)(2) and 50.33(f) and Appendix C, § II of 10 C.F.R. Part 50.
>
> 2. PFS is a limited liability company with no known assets; because PFS is a limited liability company, absent express agreements to the contrary, PFS's members are not individually liable for the costs of the proposed [PFS facility (PFSF)], and PFS's members are not required to advance

---

[1] In addition to the tribe itself, Confederated Tribes' Business Council Chairman David Pete also sought party status, which the Board declined to grant because of his failure to establish his standing. See LBP-98-7, 47 NRC 142, 170-71, aff'd on other grounds, CLI-98-13, 48 NRC 26 (1998).

[2] Petitioners Castle Rock Land and Livestock, L.C., Skull Valley Co., Ltd., and Ensign Ranches of Utah, L.C., (hereinafter referred to collectively as Castle Rock) were also admitted as a parties to the proceeding. See LBP-98-7, 47 NRC at 169. Although their contention Castle Rock 7 dealing with financial qualifications was also admitted and consolidated with portions of Utah E and Confederated Tribes F, see id. at 214-15, the Board removed the reference to Castle Rock 7 from the consolidated contention's designation after Castle Rock withdrew from the proceeding, see LBP-99-6, 49 NRC 114, 119-20 (1999).

equity contributions. PFS has not produced any documents evidencing its members' obligations, and thus, has failed to show that it has a sufficient financial base to assume all obligations, known and unknown, incident to ownership and operation of the PFSF; also, PFS may be subject to termination prior to expiration of the license.

3. The application fails to provide enough detail concerning the limited liability company agreement between PFS's members, the business plans of PFS, and the other documents relevant to assessing the financial strength of PFS. The Applicant must submit a copy of each member's Subscription Agreement, see 10 C.F.R. Part 50, App. C., § II, and must document its funding sources.

4. To demonstrate its financial qualifications, the Applicant must submit as part of the license application a current statement of assets, liabilities and capital structure, see 10 C.F.R. Part 50, Appendix C, § II.

5. The Applicant does not take into account the difficulty of allocating financial responsibility and liability among the owners of the spent fuel nor does it address its financial responsibility as the "possessor" of the spent fuel casks. The Applicant must address these issues. See 10 C.F.R. § 72.22(e).

6. The Applicant has failed to show that it has the necessary funds to cover the estimated costs of construction and operation of the proposed ISFSI because its cost estimates are vague, generalized, and understated. See 10 C.F.R. Part 50, App. C, § II.

7. The Applicant must document an existing market for the storage of spent nuclear fuel and the commitment of [a] sufficient number of Service Agreements to fully fund construction of the proposed ISFSI. The Applicant has not shown that the commitment of 15,000 MTUs is sufficient to fund the Facility including operation, decommissioning and contingencies.

8. Debt financing is not a viable option for showing PFS has reasonable assurance of obtaining the necessary funds to finance construction costs until a minimum value of service

agreements is committed and supporting documentation, including service agreements, are provided.

9. The application does not address funding contingencies to cover on-going operations and maintenance costs in the event an entity storing spent fuel at the proposed ISFSI breaches the service agreement, becomes insolvent, or otherwise does not continue making payments to the proposed PFSF.

10. The Application does not provide assurance that PFS will have sufficientresources to cover non-routine expenses, including without limitation the costs of a worst case accident in transportation, storage, or disposal of the spent fuel.

LBP-98-7, 47 NRC at 251-52. The Board then published a notice of hearing recognizing that the State and other participants had established standing and had submitted litigable contentions that entitled them to party status in this proceeding. See 63 Fed. Reg. 23,476 (Apr. 29, 1998). Thereafter, the parties conducted discovery on this and other contentions in accordance with a Board-established schedule and procedures. See Licensing Board Memorandum and Order (General Schedule for Proceeding and Associated Guidance) (June 29, 1998) at 5-8 & attach. A (unpublished).

2.3 PFS subsequently filed a motion on December 3, 1999, requesting summary disposition on all subparts of contention Utah E/Confederated Tribes F, except subpart six. See [PFS] Motion for Partial Summary Disposition of Utah Contention E and Confederated Tribes Contention F (Dec. 3, 1999) at 3 [hereinafter PFS Motion]. The State opposed the motion. See [State] Response to the [PFS] Motion for Partial Summary Disposition of Utah E/Confederated Tribes Contention F (Dec. 27, 1999) at 3-14. Although the staff supported the PFS motion, see NRC Staff's Response to [PFS] Motion for Partial Summary Disposition of Utah Contention E and Confederated Tribes Contention F (Dec. 22, 1999) at 4-5 [hereinafter Staff Response], in

its safety evaluation report (SER) for the PFSF, the staff proposed the following two license conditions to implement commitments made by PFS Chairman John Parkyn:[3]

> "A. Construction of the [PFS] Facility shall not commence before funding (equity, revenue, and debt) is fully committed that is adequate to construct a Facility with the initial capacity as specified by PFS to the NRC [xxxxxxxxxx capacity]. Construction of any additional capacity beyond this initial capacity amount shall commence only after funding is fully committed that is adequate to construct such additional capacity.
>
> B. PFS shall not proceed with the Facility's operation unless it has in place long-term Service Agreements with prices sufficient to cover the operating, maintenance, and decommissioning costs of the Facility, for the entire term of the Service Agreements."

LBP-00-6, 51 NRC 101, 109 (2000) (quoting Staff Response at 7).

2.4 In a February 2, 2000 order, the Board issued a revised schedule that established June 19, 2000 as the beginning of an evidentiary hearing on contention Utah E/Confederated Tribes F, as well as contentions Utah R, Emergency Plan, and Utah S, Decommissioning. See Licensing Board Order (General Schedule Revision and Other Matters) (Feb. 2, 2000) attach. A (unpublished).

2.5 In granting in part and denying in part the December 1999 PFS motion for summary disposition, the Board determined in a March 10, 2000 order that in accordance with the Commission's decision in Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-97-15, 46 NRC 294 (1997), license conditions, such as those proposed by the staff, could

---

[3] See PFS Motion, Decl. of John Parkyn (Dec. 2, 1999) at 2 (quoting Letter from John Parkyn, Chairman, PFS, to Director, NRC Office of Nuclear Materials Safety and Safeguards (Sept. 15, 1998) attach. B, Private Fuel Storage Facility License Application Requests for Additional Information No. 1, Question 1-1, at 2 of 2).

appropriately be used to establish compliance with the financial assurance requirements of 10 C.F.R. § 72.22(e). See LBP-00-6, 51 NRC at 113-17. The Board subsequently dismissed subparts one through five and seven through ten, with the exception of those aspects of subparts five and ten relating to onsite property insurance. See id. at 137. Thus, after the Board's March 10, 2000 ruling, the only issues remaining open for litigation were (1) the adequacy of PFS's onsite property insurance coverage, and (2) because PFS did not seek summary disposition of subpart six, the adequacy of its construction and operating cost estimates. Pursuant to 10 C.F.R. § 2.730(f), the Board also referred its ruling concerning its application of the Commission's Claiborne analysis to Part 72 proceedings to the Commission. See id. at 136. On that same date, the Board issued a separate order denying a State request to admit three late-filed bases for contention Utah E/Confederate Tribes F in which the Board found that the late-filed bases fell short of the specificity and basis requirements of section 2.714(b)(2). See LBP-00-7, 51 NRC 139, 144 (2000).

2.6 Shortly thereafter, in a March 24, 2000 order, the Board denied a State motion to delay the scheduled June 2000 evidentiary hearing pending a Commission ruling on the Board's referral. See Licensing Board Memorandum and Order (Denying Motion to Delay Hearing Schedule and Requesting Scheduling Information) (Mar. 24, 2000) at 1-2 (unpublished). On April 19, 2000, the Board issued a notice of hearing relative to this evidentiary proceeding along with a notice of opportunity to make oral or written limited appearance statements. See 65 Fed. Reg. 24,230 (Apr. 25, 2000), as revised, 65 Fed. Reg. 37,184 (June 13, 2000). During the evidentiary hearings held in Salt Lake City, Utah, a total of eight witnesses testified on behalf of PFS, the staff, and the State regarding contention

Utah E/Confederated Tribes F on June 20-22, 2000, and on June 27, 2000. See Tr. at 1673-2413, 2556-681.

2.7 Following the evidentiary hearing, PFS, the State, and the staff each timely filed their proposed findings of fact and conclusions of law on July 31, 2000. See [PFS] Proposed Findings of Fact and Conclusions of Law on Contentions Utah E/Confederated Tribes F and Utah S (July 31, 2000) [hereinafter PFS Findings]; [State] Proposed Findings of Fact and Conclusions of Law Regarding Contention Utah E (July 31, 2000) [hereinafter State Findings]; NRC Staff's Proposed Findings of Fact and Conclusions of Law Concerning Contention Utah E/Confederated Tribes F (Financial Qualifications) (July 31, 2000) [hereinafter Staff Findings]. The next day, however, the Commission ruled on the Board's March 2000 interlocutory referral of its summary disposition order relative to contention Utah E/Confederated Tribes F. See CLI-00-13, 52 NRC 23 (2000), aff'g in part and rev'g in part, LBP-00-6, 51 NRC 101 (2000). In that decision, accepting the Board's referral, the Commission found the staff-proposed conditions acceptable and, indeed, directed that a number of the PFS commitments upon which the Board relied be incorporated as license conditions (LCs) as well. See CLI-00-13, 52 NRC at 32. As set forth by the Commission, id. at 27, 32, 36, the license conditions that the staff is to make applicable to the PFS facility, based on promises made by PFS during the licensing process, are as follows:[4]

[4] As the Board noted in LBP-00-6, 51 NRC at 137, the initial LCs were designated by the staff as LC17-1 and LC17-2 based on nomenclature that tied proposed license condition numbering to the section of its December 15, 1999 PFSF SER to which the condition related, e.g., SER section 17 concerning financial qualifications and decommissioning funding assurance. In this instance, for ease of reference we adopt the same numbering order as the Commission outlined in CLI-00-13, albeit noting that when actually incorporated into any PFS license these conditions may well be numbered differently.

> [LC-1. PFS shall] not commence construction before funding, in the amount to be determined at hearing, is adequately committed;
>
> [LC-2. PFS shall] not commence operations before service agreements for the life of the license, with prices adequate to fund operations, maintenance, and decommissioning, in the amount to be determined at hearing, are in place;[5]
>
> [LC-3. PFS shall] include provisions in service agreements requiring customers to retain title to the spent fuel stored and allocating liability among PFS and the customers;
>
> [LC-4. PFS shall] include provisions in the Service Agreements requiring customers to provide periodically credit information, and, where necessary, additional financial assurances such as guarantees, prepayment, or payment bond;
>
> [LC-5. PFS shall] include in the customer service agreements a provision requiring PFS not to terminate its license prior to furnishing the spent fuel storage services covered by the service agreement;
>
> [LC-6. PFS shall] obtain insurance for offsite liability in the amount of $200 million (the maximum amount commercially available); and,
>
> [LC-7. PFS shall] obtain insurance covering onsite liability in an amount to be determined at hearing.

The Commission, however, did not agree with the Board's determination that PFS commitments relative to its service agreements provided a sufficient basis for a reasonable assurance finding based on post-licensing staff inquiry. According to the Commission, without even a draft of the proposed service agreements, there was no basis for determining "within acceptable bounds,

---

[5] In CLI-00-13, 52 NRC at 32, relative to this license condition the Commission declared that

> proposed license condition LC 17-2 should be revised to read as follows: "'PFS shall not proceed with the Facility's operation unless it has in place Service Agreements covering the entire term of the license, with prices sufficient to cover the operating, maintenance, and decommissioning costs of the Facility for the entire term of the license."

what the agreements' terms will be, how inviolate their provisions will be, and how easy it will be for NRC verification reviews to determine compliance." Id. at 34. Consequently, the Commission directed that

> the Board (1) require PFS to produce a sample service contract that meets all financial assurance license conditions, and (2) give Intervenors an opportunity to address the adequacy of the service contract to meet the concerns raised in Contention E. If Intervenors do not raise further objections after reviewing the sample contract, or if the Board finds [I]ntervenors' objections insubstantial, then PFS would be entitled to summary disposition on Utah Contention E. Otherwise, the contention should be set for hearing.

Id. at 35.

2.8 In light of the possible impact of the Commission's decision on the pending financial assurance issues, on August 4, 2000, the Board ordered the parties to submit a discussion of the effect of CLI-00-13 on the PFS proceeding with regard to the pending determinations on contentions Utah E/Confederated Tribes F and Utah S, which was due at the same time as their proposed finding responses. See Licensing Board Order (Scheduling/Administrative Matters) (Aug. 4, 2000) at 2 (unpublished). In the same order, the Board also directed the parties to provide the Board with a joint report outlining a schedule for (1) the submission by PFS of a sample service contract; and (2) an opportunity for the State to address the adequacy of the sample service contract that provides for further summary disposition filings relating to this contention. See id. at 1. The parties responded to the Board's directive by filing a joint report proposing a tentative schedule subject to the finalization of the sample service agreement by PFS. See Joint Report on the Schedule for the Applicant's Provision of a Sample Service Agreement and Opportunity for the [State] to Address its Adequacy (Aug. 14, 2000) at 2. The Board subsequently issued an order directing PFS to

submit its sample service agreement to the Board and the other parties by September 29, 2000. See Licensing Board Order (Schedule for Submission of Sample Service Agreement) (Aug. 16, 2000) at 1-2 (unpublished).

2.9 On August 28, 2000, PFS, the State, and the staff each filed responses to the other parties' proposed findings of fact and conclusions of law.[6] See [PFS] Reply to the Proposed Findings of Fact and Conclusions of Law of the [State] and the NRC Staff on Contentions Utah E/Confederated Tribes F, Utah R, and Utah S (Aug. 28, 2000) [hereinafter

---

[6] Also in connection with the evidentiary record of this proceeding, on September 15, 2000, the parties submitted to the Board two joint filings that (1) proposed corrections to the evidentiary hearing transcript concerning contention Utah E/Confederated Tribes F, see Joint Corrections to the Transcript of the Evidentiary Hearing (Sept. 15, 2000); and (2) identified those portions of the evidentiary hearing transcript, pre-filed testimony, and exhibits which they agreed could be placed on the public record, see Joint Filing of the Parties on Portions of the Hearing Transcripts, Pre-Filed Testimony, and Exhibits Concerning Utah E that Can Be Placed on the Public Record (Sept. 15, 2000). In a separate filing on the same date, the State requested the public disclosure of additional evidentiary material, including (1) the methodologies and assumptions that PFS used to arrive at its cost estimates, including the planned capacities for the three phases of the ISFSI; (2) the total bottom-line construction costs for each of the three planned construction phases; (3) references to the fact PFS intends to pass through costs to its customers under the service agreements; and (4) the maximum amount of property insurance (xxxxxxxxxxxx) currently available to PFS at reasonable terms and costs. See [State] Request to Disclose Evidentiary Material Relating to the Hearing on Contention Utah E/Confederated Tribes F and Request to Reply (Sept. 15, 2000) at 4-6. Pursuant to a September 18, 2000 Board order, see Licensing Board Order (Schedule for Responses to Petition and to Evidentiary Material Disclosure Request) (Sept. 18, 2000) at 2, PFS responded to the State's request by arguing that, with the exception of the Phase II and Phase III capacities, the information it sought to keep confidential was proprietary commercial or financial information protected from public disclosure under 10 C.F.R. § 2.790, see [PFS] Response to [State] Request to Disclose Evidentiary Material Relating to the Hearing on Contention Utah E/Confederated Tribes F and Request to Reply (Sept. 25, 2000) at 2. For its part, the staff did not oppose PFS's efforts to protect certain confidential commercial and financial information, while at the same time, it expressed no opinion on the disputes that had arisen between PFS and the State over the disclosure of specific documents. See NRC Staff's Reply to "[PFS] Response to [State] Request to Disclose Evidentiary Material Relating to the Hearing on Contention Utah E/Confederated Tribes F and Request to Reply" (Oct. 11, 2000) at 1.

PFS Reply]; [State] Proposed Response to Findings of Fact and Conclusions of Law Relating to Contentions Utah E/Confederated Tribes F (Aug. 28, 2000) [hereinafter State Reply]; NRC Staff's Proposed Findings in Reply to the [State] Proposed Findings Concerning Contentions Utah S and Utah E/Confederated Tribes F (Aug. 28, 2000) [hereinafter Staff Reply]. Relative to the impact of CLI-00-13 on the pending proceeding, PFS and the staff elected to provide their discussions on the financial qualifications issues in their responses to the other parties' proposed findings, see PFS Reply at 3-4; Staff Reply at 39-41, while the State submitted its discussion as a separate document, see [State] Discussion of the Impact of CLI-00-13 on Proposed Findings of Fact and Conclusions of Law Relating to Contentions Utah E/Confederated Tribes F and Utah S (Aug. 28, 2000) [hereinafter State Discussion]. In its filing, the State argued that the Board should interpret CLI-00-13 to require promises made by PFS to be formulated into license conditions and to require PFS to submit a sample service agreement containing the appropriate provisions to the Board and the parties. See id. at 1. Subsequently, when the Board afforded all the parties an opportunity to respond to the other parties' views regarding the impact of CLI-00-13, see Licensing Board Order (Granting Motion for Leave to File Reply and Permitting Additional Filings on Impact of CLI-00-13 (Sept. 1, 2000) (unpublished), PFS and the staff addressed, among other things, the State's assertions regarding the application of CLI-00-13 to contention Utah E/Confederated Tribes F, see [PFS] Response to the [State] and NRC Staff's Filings Regarding the Impact of Commission Decision CLI-00-13 (Sept. 11, 2000) at 3-7; NRC Staff's Response to the [State] Comments Concerning the Impacts of CLI-00-13 (Sept. 11, 2000) at 4-9.

2.10 On September 29, 2000, PFS filed its Model Service Agreement (MSA) with the Board, along with a summary of the relevant financial provisions and a request that the

sensitive proprietary commercial and financial information contained in the MSA remain confidential. See [PFS] Submission of [MSA] (Sept. 29, 2000). Responding to an October 3, 2000 Board order, see Licensing Board Memorandum and Order (Request for Additional Information) (Oct. 3, 2000) at 1-2 (unpublished), PFS supplemented its September 29, 2000 submission by identifying additional provisions in the MSA whose terms differed from previous PFS representations, see [PFS] Identification of Additional MSA Provisions That Embody Changes from Previous PFS Representations (Oct. 17, 2000). Thereafter, the State filed a motion to re-open the hearing record on contention Utah E/Confederated Tribes F for the purposes of conducting discovery and hearing regarding the impacts of the MSA on PFS's construction and operation cost estimates and insurance coverage. See [State] Motion to Re-open the Hearing Record on Contention Utah E (Nov. 7, 2000) at 1. In a separate filing also dated November 7, 2000, the State submitted its objections to the adequacy of the PFS MSA to satisfy the concerns raised in contention Utah E/Confederated Tribes F. See [State] Objections to the Adequacy of the [PFS MSA] to Meet Part 72 Financial Assurance Requirements (Nov. 7, 2000) at 1. In their responses to the State's motion to re-open the hearing record, both PFS and the staff argued that the Board should deny the State's request. See [PFS] Response to [State] Motion to Re-open the Hearing Record for Contention Utah E (Nov. 21, 2000) at 1-2; NRC Staff's Response to "[State's] Motion to Re-open the Hearing Record on Contention Utah E" (Nov. 21, 2000) at 1.

2.11 Thereafter, on December 4, 2000, PFS filed a motion for summary disposition on the issues that were remanded in CLI-00-13, asserting that because the MSA implements the financial assurance license conditions prescribed by the Commission's decision, no genuine

issue as to any material fact relevant to the issues remanded by the Commission existed.[7] See [PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State's] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements (Dec. 4, 2000) at 1, 4-8. In its filing, PFS also responded to the State's objections to the adequacy of the MSA to meet the Part 72 financial assurance requirements, see id. at 8-25, and provided an updated version of the MSA that incorporated several PFS revisions, see id. Parkyn Declaration exh. 1 (Model Agreement for Storage of Spent Nuclear Fuel By and Between [PFS] and ___ (Dec. 4, 2002)) [hereinafter MSA].[8] While the staff supported the PFS motion for summary disposition and dismissed the State's objections concerning the MSA, see NRC Staff's Response to "[PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements" (Dec. 20, 2000) at 1, 4-24, the State opposed the motion, because in its view, there remained genuine issues of material fact concerning the MSA relative to the issues remanded by the Commission, see [State] Response to [PFS] Motion for Summary Disposition of Issues Remanded by CLI-00-13 on Utah Contention E/Confederated Tribes Contention F (Dec. 22, 2000) at 1. In a subsequent filing, the State also responded to the staff's filing in support of PFS's motion. See [State] Reply to

---

[7] Although we make reference herein to the MSA and other post-CLI-00-13 filings as appropriate, our principal vehicle for addressing the various matters raised by the parties arising from that Commission remand is a separate decision we issue today. See LBP-05-20, 62 NRC _ _ (May 27, 2003).

[8] Unless otherwise noted, references in this decision to particular provisions of the MSA are to the version included as exhibit 1 to the Parkyn affidavit filed in support of the December 4, 2000 PFS dispositive motion.

the NRC Staff's Response to "[PFS] Motion for Summary Disposition of Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements" (Jan. 5, 2001). Moreover, for its part, PFS filed a motion to strike portions of the State's December 22, 2000 response to its December 4, 2000 motion for summary disposition on the grounds that those portions raised issues that should have been raised when the State filed its November 7, 2000 objections to the MSA and/or those portions were outside the scope of the Commission's remand and, hence, outside the Board's jurisdiction. See [PFS] Motion to Strike Portions of [State] Response to [PFS] Motion for Summary Disposition of Issues Remanded by CLI-00-13 on Utah Contention E/Confederated Tribes Contention F (Jan. 5, 2001) at 1. In response to the PFS motion to strike, the State filed a reply on January 16, 2001, urging the Board to deny what it viewed as a meritless PFS request. See [State] Response to [PFS] Motion to Strike Portions of the [State] Response to [PFS] Motion for Summary Disposition of Issues Remanded by CLI-00-13 on Utah Contention E/Confederated Tribes F (Jan. 16, 2001) at 1.

III. PARTIES' POSITIONS ON CONTENTION UTAH E/CONFEDERATED TRIBES F

3.1 As noted above, the only subparts of contention Utah E/Confederated Tribes F that remained for litigation at the June 2000 evidentiary hearing were subparts five and ten, as they related to onsite property insurance, and subpart six, concerning PFS's construction and O&M cost estimates. As was also noted previously, evidence bearing on these issues was heard by the Board on June 20-22, 2000, and on June 27, 2000, in Salt Lake City, Utah, during

which it received the testimony of eight witnesses. Below, we outline the positions of the parties pertaining to the evidence presented at the hearing.

A. Witness Qualifications

3.2 During the portion of the June 2000 hearing relating to contention Utah E/Confederated Tribes F, PFS presented the testimony of Mr. Joseph Gase and Mr. George Takacs, both of Stone & Webster Engineering Corporation (Stone & Webster), who testified as a panel regarding the PFS construction cost estimates. Mr. John Parkyn, the PFS Board of Managers Chairman, provided additional testimony on construction costs. Testimony on the O&M costs for PFS was provided by a panel comprised of Mr. Parkyn and Mr. Jon Kapitz, a dry cask storage project manager for Northern States Power Company. Mr. Parkyn and Mr. Hanson Pickerl, Senior Vice President of the Midwest Region Marsh Power Group of Marsh USA, Inc., testified individually on behalf of PFS on the subject of onsite property insurance. The staff presented two witnesses, Dr. Alex McKeigney and Mr. Robert Wood, both of the NRC's Office of Nuclear Reactor Regulation. Dr. McKeigney and Mr. Wood testified on behalf of the staff regarding construction and O&M costs, as well as onsite property insurance. Dr. Michael Sheehan, who is a partner in the firm Osterberg and Sheehan, Public Utility Economists, was the sole witness presented by the State and testified on all three matters being litigated during the contention Utah E/Confederated Tribes F portion of the hearing.

3.3 An initial controversy among the parties concerns the weight to be given to the testimony of the witnesses, particularly the State's sole witness. Below, we set forth the parties' positions regarding the qualifications of the various witnesses.

1. PFS Witnesses Gase, Takacs, Kapitz, Pickerl, and Parkyn

a. Construction Costs

3.4 Testimony for PFS on the cost of structures and site work for the proposed ISFSI was provided by Stone & Webster employees Mr. Joseph Gase and Mr. George Takacs. In addition, PFS Board Chairman John Parkyn testified on the cost of equipment and administrative costs to be incurred during construction.

3.5 According to the evidence then presented, Mr. Gase has twenty-nine years of experience in the engineering and construction industry, including experience as a construction engineer, cost estimating engineer, and supervisor, all at Stone & Webster, the architect/engineer for the PFS facility. In his current capacity as Manager of Project Controls and Resource Staffing for Stone & Webster's Denver office, he is responsible for, among other things, enhancing project performance by providing business and financial support, cost and schedule control, and construction estimating services. He earned a bachelor's degree in civil engineering from the Indiana Institute of Technology in 1971. Throughout his career at Stone & Webster, Mr. Gase has participated in and led the estimating efforts on large-scale construction projects. See Testimony of Joseph E. Gase and George L Takacs IV on PFS Construction Costs – Contention Utah E/Confederated Tribes F (fol. Tr. at 1681) at 1-2 & attached resume [hereinafter Gase/Takacs Testimony].

3.6 Mr. Takacs has over twenty-five years of experience in estimating, cost control, and scheduling in the construction industry. As Principal Estimating Engineer in the Cost and Scheduling Department of Stone & Webster's Denver office, Mr. Takacs is responsible for all estimating work in that office and has prepared numerous cost estimates for various power, government, industrial, and process facilities. He received a bachelor's degree from Montana

State University in construction engineering technology in 1974. Prior to joining Stone & Webster in 1980, Mr. Takacs was employed by Townsend and Bottum, the Naval Facilities Engineering Command, and Commonwealth Associates. In addition, Mr. Takacs is a member of the American Association of Cost Engineers, and served as vice-chairman of the Association's cost estimating committee. See id. at 2-3 & attached resume.

3.7 Mr. Parkyn's experience in the nuclear power industry spans some thirty years. In addition to being the Chairman of the PFS Board of Managers, he serves as Vice President of Genoa Fuel Tech, Chairman and Chief Executive Officer of the Great Salt Lake and Southern Railroad (GSLSR), and a Director of River Bank in La Crosse, Wisconsin. Mr. Parkyn earned a bachelor's degree in nuclear engineering from the University of Wisconsin. He is a licensed Professional Engineer in Wisconsin and a licensed Professional Nuclear Engineer in California. Mr. Parkyn has also served in several professional organizations, including the National Planning Committee for the American Nuclear Society, the Wisconsin Division of the American Nuclear Society, as well as the Evaluation and Review Group for the Institute of Nuclear Power Operations. In connection with the various positions he has held at nuclear power facilities beginning in 1967, Mr. Parkyn was involved in the cost estimation and budgeting relative to the La Crosse Boiling Water Reactor and the Point Beach Nuclear Power Plant, Units 1 and 2, and spent fuel management at the La Crosse reactor. In addition, he has authored many papers on nuclear energy and its implementation. See Testimony of John Parkyn of PFSF Construction Costs -- Contention Utah E/Confederated Tribes F (fol. Tr. at 1854) at 1-3 & attached resume [hereinafter Parkyn Construction Testimony].

b. Operating and Maintenance Costs

3.8 Testimony for PFS on the proposed ISFSI's O&M costs was provided by a panel of two witnesses, Mr. Jon Kapitz of Northern States Power and PFS Chairman Mr. Parkyn.

3.9 Mr. Kapitz has some twenty years of experience in the nuclear power industry. In his current capacity as Project Manager for Dry Cask Storage at Northern States Power's Prairie Island Nuclear Generating Plant, Mr. Kapitz is responsible for the overall project management of the Prairie Island ISFSI. After earning both a bachelor's degree and a master's degree in nuclear engineering from the University of Wisconsin, Mr. Kapitz began working as a nuclear engineer for Northern States Power in 1981. In addition to being a registered professional engineer in Minnesota, he has completed the Minnesota Management Institute program at the Executive Development Center of the University of Minnesota Carlson School of Management. Mr. Kapitz is also a member of the EPRI Fuel Reliability, Storage, and Disposal Steering Committee, the NEI Dry Cask Storage Issues Task Force, and the American Nuclear Society. See Testimony of John Parkyn and Jon Kapitz on the Operation and Maintenance Cost of the PFSF – Contention Utah E/Confederated Tribes F (fol. Tr. at 2017) at 1-2 & attached resume [hereinafter Parkyn/Kapitz O&M Testimony].

3.10 Although Mr. Parkyn's educational and professional qualifications have been discussed above in connection with his testimony on construction costs, relative to O&M cost estimates Mr. Parkyn also possesses experience particular to the operation and maintenance of nuclear facilities. His PFS-pertinent responsibilities at the La Crosse reactor included the costing out of staffing levels, preparation of technical specifications, license amendments, NRC approvals, and other related activities. See id. at 4-5.

c. Onsite Property Insurance

3.11 Mr. Hanson Pickerl and Mr. Parkyn testified on behalf of PFS about the cost, availability, and scope of coverage concerning nuclear property insurance for the proposed facility.

3.12 Mr. Pickerl serves as Senior Vice President of the Midwest Region Marsh Power Group, a specialty group within Marsh USA, Inc. He received a bachelor's degree in physics from the U.S. Naval Academy in 1980 and a Master of Business Administration from the University of Chicago in 1989. He has been a member of the Marsh Nuclear professional staff since 1985 and has been responsible for all aspects of nuclear insurance procurement and administration for utility and nuclear industry clients. See Testimony of Hanson D. Pickerl on Nuclear Property Insurance for the PFSF – Contention Utah E/Confederated Tribes F (fol. Tr. at 1757) at 1-2 & attached resume [hereinafter Pickerl Testimony].

3.13 With respect to nuclear insurance, Mr. Parkyn's experience includes knowledge of the requirements for and costs of nuclear insurance for reactors that are operating and undergoing decommissioning. See Testimony of John Parkyn on On-site Property Insurance for the PFSF – Contention Utah E/Confederated Tribes F (fol. Tr. at 2173) at 3 [hereinafter Parkyn Insurance Testimony].

3.14 The staff agrees that each of the witnesses PFS presented should be considered experts in their respective fields. See Staff Findings at 9-10. In its proposed findings, the State did not express a view on the qualifications of the witnesses who testified on behalf of PFS.

2. Staff Witnesses McKeigney and Wood

3.15 In support of the adequacy of the PFS license application with respect to contention Utah E/Confederated Tribes F, the staff introduced a panel of two witnesses, Dr.

Alex McKeigney and Mr. Robert Wood. The staff asserts that these witnesses are well-qualified as expert witnesses in the areas of nuclear facility construction, O&M costs, and nuclear facility property insurance. See Staff Findings at 11.

3.16 Dr. McKeigney has over twenty years of experience in strategic and financial planning and financial analysis and is currently employed by the NRC as a Financial Analyst in the agency's Office of Nuclear Reactor Regulation. In his capacity as a Financial Analyst, Dr. McKeigney performs a wide range of analytical functions pertaining to NRC regulations in such areas as financial qualifications and decommissioning funding assurance. He holds a bachelor's degree in sociology and economics from the University of Mississippi, a master's and doctoral degree in sociology from the University of North Carolina, and a Master of Business Administration from Harvard Business School. His professional experience include evaluating the relative feasibility and profitability of alternative corporate strategies and financing plans, comparing options for project financing, and conducting numerous other quantitative analyses and reviews for electric utilities. See NRC Staff Testimony of Alex F. McKeigney and Robert S. Wood on Utah Contention E/Confederated Tribes F (Financial Assurance) (fol. Tr. at 2559) at 1-2 & attached resume [McKeigney/Wood Testimony].

3.17 Mr. Wood has some thirty years of experience with the NRC. Currently, Mr. Wood is a Senior Level Licensee Financial Policy Advisor in the agency's Office of Nuclear Reactor Regulation, where he is responsible for, among other things, the development and implementation of NRC policies on and programs for nuclear property and liability insurance, evaluating financial assurance for decommissioning nuclear power facilities, and assessing the financial qualification of NRC licensees. He earned a bachelor's degree in economics from Drew University in 1968, an M.P.A. degree from Ohio State University in 1971, and has

completed doctoral level courses and qualifying exams for a Ph.D. in economics also from Ohio State University. See id. at 1-2 & attached resume.

3.18 Neither PFS nor the State expressed an opinion on the expertise of the staff's proffered witnesses.

3. State Witness Sheehan

3.19 The State presented Dr. Michael Sheehan as its sole witness. Dr. Sheehan is currently a partner in the firm of Osterberg & Sheehan, Public Utility Economists. He holds bachelor's, master's, and doctorate degrees in economics from the University of California at Riverside, as well as a legal degree from the College of Law at the University of Iowa. In addition to having taught graduate level courses at the University of Iowa, he has published a substantial number of articles in scholarly journals and a number of book chapters. Much of Dr. Sheehan's practice over the past twenty years has been involved with utility rate cases, project planning, budgeting, and financial analysis. Specifically, he has worked on municipal valuation cases and projects, rate setting and regulation of local and regional solid waste operations, prevailing wage rates on public projects, and financial studies and analyses with respect to municipal collective bargaining and county planning. Dr. Sheehan has also testified as an expert witness in numerous administrative proceedings, including several before the NRC. See Prefiled Testimony of Michael F. Sheehan, Ph.D. on Behalf of the [State] Regarding Contention Utah E (fol. Tr. at 2190) at 1-4 [hereinafter Sheehan Testimony]; State Exh. 9 (Resume of Michael Sheehan).

3.20 Both PFS and the staff consider Dr. Sheehan to be well-qualified as an expert witness in the field of economics. See PFS Reply at 4; Staff Findings at 10. PFS asserts, however, that because Dr. Sheehan has no prior experience in estimating construction or

operating costs for nuclear facilities or large industrial projects generally, the Board should accord far less weight to his testimony than it would to the testimony of a witness with such experience. See PFS Findings at 11; PFS Reply at 4-5. PFS further claims that Dr. Sheehan's testimony should be accorded little weight regarding nuclear insurance markets generally, because nothing in his background, aside from some general academic experience with risk management, establishes any expertise, experience, or particular knowledge in the area of nuclear insurance. See PFS Findings at 14; PFS Reply at 5. Moreover, PFS argues, the Board should give no weight at all to Dr. Sheehan's testimony on the effects of potential accidents at the proposed ISFSI, based on his admitted lack of experience in estimating the probabilities or consequences of accidents. See PFS Findings at 14; PFS Reply at 5.

B. Applicable Legal Standards

1. Cost Estimates

3.21 Pursuant to 10 C.F.R. § 72.22(e), an ISFSI applicant must submit sufficient information to demonstrate its financial qualifications to carry out the activities for which the license is sought. As relevant to contention Utah E/Confederated Tribes F, the information must show that the applicant either possesses the necessary funds or has reasonable assurance of obtaining them, or by a combination of the two, the applicant will have the necessary funds available to cover the following: (1) estimated construction costs, and (2) estimated operating costs over the planned life of the facility. See 10 C.F.R. § 72.22(e).

3.22 Although the parties are in general agreement that the Commission's acknowledgment in North Atlantic Energy Service Corp. (Seabrook Station, Unit 1), CLI-99-6, 49 NRC 201, 221 (1999), that cost estimates must be "reasonable" is relevant to the instant proceeding, they disagree over the level of precision required in the accuracy of the cost

estimates. The State contends that while absolute precision is not required in cost estimates, see Tr. at 1720, PFS's cost estimates must nonetheless be "hard," as the term was used by the Commission in its Claiborne decision to describe the reliability of cost estimates, CLI-97-15, 46 NRC at 306, or, as interpreted by Dr. Sheehan, "reasonably firm and precise and not unreasonably unfirm and imprecise." Tr. at 2224; see also State Reply at 3; Sheehan Testimony at 8; Tr. at 2223-31. PFS and the staff, however, disagree with the State's interpretation of the term as it appears in the Claiborne decision. Both PFS and the staff assert that the Commission's use of the term "hard" appears to describe cost estimates concerning such items as physical structures, as distinguished from "soft construction costs" such as interest and financing costs. See PFS Findings at 32; Staff Findings at 26. Thus, while PFS recognizes that it must provide reasonable cost estimates to demonstrate reasonable assurance that it will have sufficient funds to construct and operate its proposed facility, see PFS Findings at 18; PFS Reply at 7, it argues that "reasonable assurance" is not the equivalent of absolute or near certainty, see PFS Findings at 19. Moreover, according to the staff, regardless of how the Board interprets "hard construction costs," the Claiborne decision does not mandate any degree of precision in cost estimates. See Staff Findings at 26.

3.23 Also in controversy is what an intervenor must establish to negate an applicant's purported showing of financial assurance. Relying on the Commission's Seabrook decision, the State argues that an applicant must present estimates based on plausible assumptions and forecasts and, in challenging PFS cost estimates, acknowledged that it bears the burden of doing more than casting doubt on some aspect of the estimates. See State Reply at 3. PFS avers, however, that it is not enough for the State merely to cast doubt. Based on the same Seabrook decision, PFS argues that the State's challenge will fail unless the State can

demonstrate that "'relevant uncertainties significantly greater than those that usually cloud business outlooks'" exist. PFS Findings at 19 (quoting Seabrook, CLI-99-6, 49 NRC at 222). For its part, the staff agrees with PFS that the State's challenge should be held to a more demanding standard in accordance with Seabrook. See Staff Reply at 11.

2. Onsite Property Insurance

3.24 Also at issue is the amount of onsite property insurance coverage PFS must carry for the proposed storage facility. NRC regulations require operating nuclear power reactors to have insurance coverage in the amount of $1.06 billion or the amount generally available from private sources, whichever is less. See 10 C.F.R. § 50.54(w). Apparently recognizing that 10 C.F.R. Part 72 does not require applicants to provide onsite property insurance for an ISFSI, the State relies on sections 72.22(e) and 72.40(a)(5) and (6) in asserting that the Commission cannot issue a license to PFS unless it finds that PFS is financially qualified to construct and operate the facility and has adequate operating procedures to protect health and to minimize danger to life or property. See State Findings at 48. Thus, the State argues, the adequacy of insurance coverage cannot be left to the business judgment of the Applicant. See id. at 48-49. Rather, the State insists only when license conditions requiring a specific amount of insurance coverage are imposed on PFS can the Commission find that PFS is financially qualified to construct and operate the facility and that public health will be protected and danger to life or property minimized. See id. at 49. PFS counters that it can provide reasonable assurance that it will be able to cover non-routine expenses with its commitment to obtain onsite property insurance coverage amounting to the lesser of (1) the amount justified in terms of a reasonable evaluation of the risks to onsite property associated with the proposed ISFSI, or (2) the maximum amount of onsite property coverage available for

the proposed ISFSI at reasonable costs and reasonable terms from commercial sources. See PFS Findings at 58. While the staff also acknowledges that ISFSIs are not required to be covered by insurance, it nonetheless considers it appropriate and in accord with sound business practice that PFS should pursue onsite property insurance coverage. See Staff Findings at 12. Given that the Commission has not mandated that ISFSI applicants obtain a particular amount of onsite coverage, the staff finds the PFS proposal to be reasonable. See Staff Reply at 38.

C. General Standards that Apply to PFS's Cost Estimates

3.25 In the State's view, the principal purpose of the agency's financial assurance requirements is to ensure that an ISFSI applicant will possess sufficient funds to build and operate the facility safely, such that it will not be susceptible to economic pressure to "cut corners" on safety. See State Findings at 9. Further, the State argues, if important details in the project design remain uncertain, such as the ultimate size and capacity of the facility or the timing of the various phases of construction, it will be difficult to arrive at a reasonably accurate estimate of construction and O&M costs. See id. at 9, 10. The State alleges that at this point in the planning stages, "[e]ven a five percent error . . . due to [an] insufficiently specified project design could result in a multi-million dollar shortfall during construction or operation of the ISFSI." Id. at 9.

3.26 In response, PFS argues that when addressing alleged uncertainties in an applicant's cost estimates, the Board must consider whether the uncertainty is material, i.e., whether it is significant enough to affect the applicant's ability to take precautions necessary to ensure that activities under the license will not create an undue risk to public health and safety. See PFS Reply at 8. PFS suggests that a multi-million dollar shortfall, put in the context of a $3

billion project, would not materially affect its ability to take necessary safety measures at the facility. See id. at 9. For its part, the staff maintains that not only is there no evidence in the record to suggest that PFS will incur a five percent error, but that PFS has also factored a ten percent contingency into its estimates to accommodate unforeseen expenses. See Staff Reply at 12 n.5. Moreover, the staff finds that PFS has provided a detailed plan regarding what will be built during the three phases of construction and the total costs to construct and operate the facility, and is satisfied that PFS has demonstrated reasonable assurance that it will obtain the necessary funds to cover the estimated costs of construction and operation. See id. at 12.

1. Project Definition and Quality of the Data

3.27 The State claims that many of PFS's cost estimates are unreliable because the ISFSI project is still in the preliminary planning stage. See State Findings at 10. For example, the State points out that decisions remain to be made on some of the most important and expensive features of the project, such as whether PFS will use the Low rail spur and/or the intermodal transfer facility (ITF) at Rowley Junction for transportation of SNF to the ISFSI. See id. In addition, the State contends the ultimate size of the proposed facility, the timing and size of the phases of the project, and the rate of incoming shipments of fuel are still in the preliminary planning state. See id. at 11. According to the State, the reliability of PFS's estimates are further undermined because capital costs, such as the acquisition of rail equipment and canisters, are treated at times as construction costs, at other times as O&M costs, and at other times not accounted for at all. See id. at 10-11.

3.28 In response to the State's claims, PFS and the staff assert that PFS has adequately defined its project in terms of the design of the facility, the amount of spent fuel that will be stored there, and the operational activities that will take place there. See PFS Reply

at 9; Staff Reply at 12. Responding to the State's assertion that PFS must show the rate at which spent fuel will be shipped to the proposed ISFSI, PFS avers that the timing of when PFS will incur each of the costs of constructing and operating the facility is not only beyond the scope of the contention, but also immaterial to determining the total costs of the facility. See PFS Reply at 11-12. In support of PFS's position, the staff considers it unreasonable to require PFS to predict the volume of SNF for each year of generation, given that PFS has provided a plausible forecast for its annual O&M costs based on different scenarios. See Staff Reply at 13. PFS also dismisses the State's concern that PFS's use of preliminary data in its calculations renders its estimates unreliable by maintaining that its estimates were developed through reasonable methodologies based on specific data and explicit, plausible assumptions. See PFS Reply at 13. Likewise, the staff finds the State's argument unpersuasive in this regard, given that most of the major decisions regarding the project design have, in fact, been resolved. See Staff Reply at 13. PFS further argues that the State's concerns over PFS's categorization of capital costs as construction or O&M costs are immaterial, because the fundamental issue before the Board is whether PFS has included the costs at all in its estimates, such that they are not understated. See PFS Reply at 10-11. For its part, the staff asserts that it is satisfied that PFS has appropriately accounted for all capital costs as either part of its construction or O&M estimates. See Staff Reply at 14.

2. Accountability of All Costs

3.29 A second general concern voiced by the State is PFS's treatment of certain costs that it plans to pass through to its customers. The State claims that by treating certain expenditures, such as xxxxxxxxxxxxxx costs, as revenue rather than expenses, PFS and the staff have grossly underestimated the overall costs of the ISFSI project. See State Findings at

12. Given that pass-through costs account for xxxxxxx percent of the O&M budget, the State argues that PFS must account for these costs in its estimates, regardless of how they will be offset by incoming revenue. See id. at 12-13.

3.30 Countering the State's concern, PFS maintains that the pass-through costs are treated as costs, rather than as revenue, in its estimates and that the pass-through provisions in PFS's customer service agreements are an acceptable means of providing assurance under the Commission's decision in Monticello that such costs will be paid. See PFS Reply at 14-15 (citing Northern States Power Co. (Monticello Nuclear Generating Plant), CLI-00-14, 52 NRC 37, 51 (2000)). Although the staff similarly rejects the State's argument, in its analysis of PFS's financial qualifications, the staff considered the pass-through costs to be both expenses and revenues. See Staff Reply at 14. Thus, the staff finds that regardless of whether a pass-through cost is accounted for as a cost, it will not impact PFS's ability to fund the construction or operation of the ISFSI, because it will be paid for by PFS's customers rather than by PFS itself. See id.

D. Construction Cost Estimates

1. Inadequate Scope

3.31 The first of the State's concerns regarding PFS's construction cost estimates relates to certain costs that were not included in the estimates. The State argues that it would be irrational to exclude estimates for the design drawings of the proposed facility, which are potentially significant costs that PFS will likely attempt to recover, along with all of the costs associated with the project, regardless of whether they were incurred before or after construction begins. See State Findings at 14. The State asserts that such cradle-to-grave cost estimates are consistent with the estimates approved in Claiborne, in which the

Commission observed that "[h]ard construction costs of the [facility] . . . include the cumulative construction costs of the centrifuges, and owners' costs back to the beginning venture phase." CLI-97-15, 46 NRC 294, 306 n.16. Furthermore, the State argues, PFS's construction estimates are inadequate in that they do not take into account the cost of capital renewal. See State Findings at 14.

3.32 Both PFS and the staff maintain that because the design drawings constitute pre-construction costs, they need not be accounted for in the construction cost estimates. See PFS Reply at 16; Staff Reply at 15. PFS directs the Board's attention to the language of 10 C.F.R. §§ 50.10(c)(1) and (2) in arguing that the NRC's regulations specifically allow an applicant to engage in pre-construction activities such as site exploration and the procurement or manufacture of facility components before obtaining a construction permit from the agency. See PFS Reply at 16. Furthermore, PFS contends, because the text of the regulations refers only to "construction" costs, and not to "pre-construction" costs, pre-construction activities -- such as the design of the facility, preparation of the safety analysis report, and licensing before the NRC -- fall outside the scope of Part 72 and, hence, outside the scope of contention Utah E/Confederated Tribes F. See id.

3.33 In refuting the State's assertions in this regard, the staff argues that the State's reliance on the Commission's Claiborne decision for including pre-construction costs in the estimates is misplaced. According to the staff, when the Commission referred to hard construction costs as including "owners' costs back to the beginning venture phase," this did not reflect the Commission's holding but rather its understanding of what the applicant considered to be the construction costs. See Staff Reply at 15 (citing Claiborne, CLI-97-15, 46 NRC at 306 n.16). Furthermore, the staff contends, because PFS will not recoup its pre-construction costs

from either its construction or O&M funding, unless revenue exceeds costs by a sufficient amount to refund money back to the owners, these costs need not be listed as construction costs. See id. (citing Tr. at 2619-20).

3.34 With regard to the cost of capital renewal, both PFS and the staff argue that any capital renewal (i.e., replacement of capital equipment) that would be required would be part of PFS's maintenance costs, which have already been accounted for in the O&M estimates. See PFS Reply at 17 (citing Tr. at 1746); Staff Reply at 16.

2. Uncertain Seismic Qualification Costs

3.35 The State avers that because Mr. Takacs did not know under which seismic code the canister transfer building (CTB) and the crane were qualified, and because no additional funds have been set aside for potential seismic design upgrades, PFS's construction cost estimates are uncertain and less conservative. See State Findings at 15.

3.36 In response, both PFS and the staff maintain that the CTB and the crane were seismically qualified when the vendors quoted their prices to Mr. Takacs, see Tr. at 1750; therefore, his awareness of which particular seismic code was applicable is irrelevant, because the seismic factors were taken into account. See PFS Reply at 18; Staff Reply at 16. Moreover, they argue, even assuming that the seismic designs will need to be changed, the State has proffered no evidence to show that the ten percent contingency fund would be insufficient to offset any additional costs needed to bolster PFS's seismic qualifications. See PFS Reply at 18; Staff Reply at 16.

3. Estimates Unreliably Based on Preliminary Information

3.37 The State alleges that the reliability of PFS's construction estimates is further undermined by the use of conceptual renderings by Stone & Webster in the preparation of the

estimates. See State Findings at 15. Because conceptual drawings, which represent the earliest stage of the design process, were used to estimate the cost of construction for most of the proposed buildings, the State claims that PFS has not established that the costs of constructing the facility are adequately defined. See id. at 16-17. Furthermore, the State argues, Mr. Takacs testified that the anticipated margin of error between the estimated and actual construction costs was between minus fifteen and plus twenty-five percent. See id. at 16; Tr. at 1706-07. Although he also testified that this divergence was within the accuracy standard used by the American Association of Cost Engineers and that he expected the actual costs to fall below the estimate provided by Stone & Webster, the State is concerned that PFS may have underestimated the project by as much as fifteen percent and urges the Board to give little credence to portions of Mr. Takacs' testimony that the costs were probably overestimated. See State Findings at 16-17.

3.38 PFS and the staff respond to the State's claim by arguing that the actual drawings used by Mr. Gase and Mr. Takacs in the preparation of their estimates, see PFS Exh. K (Floor Plan, Elevation, and One-Line Diagram Electrical Drawings for PFSF Administration, O&M, and Security and Health Physics Buildings), provide a level of detail that goes beyond the conceptual stage, see PFS Reply at 19; Staff Reply at 17. Furthermore, they assert, the drawings of the CTB and the storage pads were even more detailed than the drawings used for the other structures. See PFS Reply at 19; Staff Reply at 17. In light of the level of detail available to Stone & Webster and Mr. Takacs' expertise, PFS and the staff contend that the Board should accept Mr. Takacs' testimony that his estimates are likely conservatively overstated. See PFS Reply at 19-20; Staff Reply at 17-18.

4. Breached or Defective Canisters at PFSF

3.39 The State asserts that the elimination of two breached canister overpacks from the most recent PFS construction budget is an omission that further undermines any conservatism built into PFS's cost estimates. See State Findings at 19, 21. According to the State, under PFS's plan to place a breached canister in one of the six transportation casks PFS intends to acquire, a transportation cask that would normally be used to transport SNF would have to be taken out of service in order to store the breached canister. See id. at 19. The State argues that the funds needed to replace a transportation cask taken out of service would apparently come from the xxxxxxxxxxxxx miscellaneous contingency fund, which the State asserts is a slight contingency margin to cover other large capital expenses that fall under the "miscellaneous" category. See id. at 19-20.

3.40 In its rebuttal, PFS argues that the issue of whether PFS should include breached canister overpacks in its design plan is outside the scope of contention Utah E/Confederated Tribes F, because the design of the proposed facility does not include breached canister overpacks. See PFS Reply at 21. Furthermore, PFS avers, because the xxxxxxxxxxx construction contingency fund is not segregated, monies in the fund can be used to meet any unexpected cost associated with the facility, not just unexpected expenses associated with miscellaneous items. See id.

3.41 For its part, the staff considers PFS's decision to use a transportation cask, rather than a breached canister overpack, in the unlikely event of a breached canister to be a reasonable business decision, not to be second-guessed by the staff and Board, if avoidable. See Staff Reply at 18 (citing CLI-98-13, 48 NRC 26, 36-37 (1998)). The staff also regards

PFS's ten percent contingency fund as sufficient to cover any unexpected costs. See id. at 19.

5. Rail Equipment

3.42 According to the State, another erosion of conservatism in PFS's construction cost estimates is its plan to acquire mostly used or refurbished rail equipment -- e.g., mainline and shortline locomotives, a security car, and buffer cars -- for transporting SNF from the various reactor sites around the country to the PFS ISFSI. See State Findings at 21. The State asserts that the cost differential between new and used rail equipment is substantial. See id. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxx See id. at 22. As such, the State claims that these costs do not appear in PFS's cost estimates, although they should be accounted for in either the construction or O&M estimates. See id. at 22-23. The State also contends that because PFS has no apparent fiscal plan to replace the used capital equipment, including rail equipment, PFS cannot provide reasonable assurance of its financial qualifications, particularly if the used equipment needs to be replaced or if its maintenance becomes a financial drain over the twenty- to forty-year life of the facility. See id. at 23. Finally, the State argues that the used railroad cars that PFS plans to acquire and operate as buffer cars may not be free from contaminants at the time of purchase. See id.

3.43 PFS and the staff respond to the State's claims by arguing that even if new rail equipment is more expensive than used and refurbished equipment, the State does not demonstrate how that assertion invalidates PFS's cost estimates. See PFS Reply at 22; Staff Reply at 20. PFS also contends that the State has offered no evidence indicating that the used rail equipment will require replacement or costly maintenance; to the contrary, Mr. Parkyn's

unrefuted testimony stated that used rail equipment was highly reliable and could be operated as long as it was maintained. See PFS Reply at 22; Staff Reply at 20-21; see also Tr. at 1862, 1892. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See PFS Reply at 22. For its part, the staff is satisfied that xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See Staff Reply at 21. In response to the State's concern relative to possible contamination of the used cars, PFS argues that this issue falls outside of the scope of the contention. See PFS Reply at 23. Moreover, PFS and the staff assert, Mr. Parkyn's testimony that the used or refurbished cars would not previously have been exposed to radioactive material or other hazardous materials, see Tr. at 1873-74, was not challenged by the State. See PFS Reply at 23; Staff Reply at 22.

6. Cask Transfer Systems

3.44 The State also takes issue with PFS's method of estimating the costs of the Hi-Trac transfer casks that will be used to transfer fuel from the transportation casks to the storage casks. The State argues that the PFS estimate for the transfer casks is too conceptual in nature, in that it is based on a comparison of the functions of a transfer cask with that of a transportation cask, rather than on a "hard estimate." State Findings at 24. In addition, the State contends that because the dry transfer system, which will be used to load the fuel assemblies into the canisters at the utility sites, will need to be specially designed to meet PFS's specifications, PFS needs to account for the expenses of designing, licensing, and fabrication of the two dry transfer casks in its construction costs estimate. See id. at 24-25.

Furthermore, the State argues, as with the transfer casks, the design of the dry cask system remains in the conceptual stage. See id. at 25-26. In this regard, the State disputes PFS's claim that the design and licensing of the dry cask system will be completed prior to the start of construction, and thus, asserts that those costs must also be included as construction expenditures. See id. at 26.

3.45 In response, PFS maintains that it is not unreasonable for an applicant to estimate the cost of one system, such as the transfer cask system, on the basis of the cost of a similar system. See PFS Reply at 23. Likewise, the staff does not view PFS's methodology as being problematic. See Staff Reply at 22-23. Moreover, PFS avers, the State has presented no evidence showing that PFS's estimates for the transfer cask and dry cask systems are incorrect and no evidence showing that the dry cask design would not be completed during the pre-construction period. See PFS Reply at 24; Staff Reply at 24. According to PFS and the staff, the design and licensing costs of the dry cask system fall outside the scope of PFS's construction costs. See PFS Reply at 24; Staff Reply at 23.

7. Interest During Construction

3.46 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See State Findings at 27. The State asserts that all interest payments made during the construction period must be accounted for in PFS's construction cost estimates. See id.

3.47 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxx See PFS Reply at 25; Staff Reply at 24.

8. Contingencies

3.48 Contrary to the staff's findings, the State avers that the ten percent contingency in PFS's cost estimates will not be sufficient to cover unanticipated construction costs or costs caused by delays during construction. See State Reply at 11. The State describes a number of expenses that PFS has either not included or established firmly in its estimates, such as numerous pass-through costs, costs of capital rail equipment purchases, and costs associated with the dry cask transfer system design. See id.

9. Additional License Conditions

3.49 In addition to the license conditions mandated by the Commission in CLI-00-13, see 52 NRC at 36, the State requests that the Board impose additional conditions before granting the PFS license. To eliminate any conflict between the PFS environmental report and Mr. Parkyn's testimony regarding the construction start date, the State seeks the imposition of a license condition that prohibits PFS from commencing construction until after the NRC issues the license for the proposed ISFSI. See State Reply at 6. Because the capacity of the PFS facility has a direct bearing on PFS's cost estimates and when those costs will be incurred, the State also requests a license condition specifying the three phases of construction. See State Reply at 6-7. In addition, the State insists that PFS agree to a license condition stating that it will use the Low rail corridor option for shipping the SNF from the reactor sites to the ISFSI, because PFS has not described in detail the estimated costs associated with the alternative shipping option, which would entail shipping the SNF by rail to the Rowley Junction ITF and

then by heavy haul truck to the ISFSI. See State Reply at 8. According to the State, merely asserting that the Low rail option is the upper bound for the cost estimate without breaking out the costs of the ITF option is insufficient. See id. The State also asks the Board to impose a license condition that would proscribe PFS from shifting construction or operating rail and other transportation-related costs to the GSLSR. See id. at 10. To avoid any confusion as to the scope of construction costs that the staff must review, the State also urges the adoption of a license condition requiring that administrative and operating expenses incurred during construction be included in the PFS construction cost estimates. See id. at 11.

10. Staff Review of Construction Costs

3.50 In addition to questioning the adequacy of PFS's construction cost estimates, the State also criticizes the staff's evaluation of PFS's estimates. In particular, the State challenges what it sees as the staff's deferral to PFS's business judgment and "wholesale acceptance" of PFS's cost estimates. See State Findings at 28, 29. Rather than preparing its own estimates or hiring an independent contractor, the staff relied on the Commission's guidance in CLI-98-13 on second-guessing private business decisions and merely compared the 1997 PFS Business Plan with the 1998 Plan without analyzing more recent cost estimates produced by PFS, according to the State. See id.

3.51 The State also takes issue with the staff's inconsistent treatment of the license period in its analysis of PFS's cost estimates. The State points out that while the staff allows PFS to use a forty-year license term to calculate costs, such as average annual O&M costs, on the one hand, on the other hand, the staff argues against including all expenses, including capital replacement costs, in the forty-year period. See State Reply at 6. The State argues that

all cost estimates must be evaluated in terms of the twenty-year license for which PFS has applied. See id.

3.52 Addressing the State's concerns, PFS defends the staff's review, noting the staff is not required to prepare its own estimates to determine whether the PFS estimates are reasonable. See PFS Reply at 25. In the view of PFS, the staff applied the proper standard of reasonableness in evaluating PFS's construction cost estimates, taking into account the Commission's statements in CLI-98-13 regarding avoiding second-guessing business judgments and in CLI-00-13 concerning estimates based on plausible assumptions and forecasts. See id. at 26.

3.53 In its response to the State's claims, the staff first observes that given that the applicant, not the staff, bears the burden of proof relative to safety issues, the adequacy of the staff's safety review is irrelevant to whether an application should be approved. See Staff Reply at 24-25. Furthermore, the staff argues staff witnesses McKeigney and Wood did not accept PFS's estimates wholesale; rather, they devoted a combined 600-700 hours over the past three years reviewing PFS's financial qualifications and cost estimates. See id. at 25. Although they did not prepare their own independent estimates, the staff contends that Dr. McKeigney and Mr. Wood reviewed the cost of nuclear facilities and other ISFSIs to compare the key parameters of costs and steps identified by PFS, performed a confirmatory review of the Stone & Webster estimates to determine whether major components were covered, and confirmed PFS's mathematical calculations. See id. Finally, the staff notes that contrary to the State's assertion, it did consider the most recent fourth quarter 1999 cost estimates provided by PFS. See id. at 26.

E. Operating and Maintenance Costs

1. Scope of O&M Costs

3.54 The State claims that while the actual size of the facility that PFS will operate remains uncertain, the planned capacity of the ISFSI is a forty-year, 40,000 MTU facility. See State Findings at 30. In this regard, the State argues, because there are no license conditions that will ensure that PFS has reasonable assurance of securing the necessary funds to pay for the estimated operating costs for any additional SNF stored at the facility beyond the initial amount included in PFS's LC-2 compliance demonstration, PFS must show reasonable assurance of obtaining enough money to cover the estimated operating costs for a 40,000 MTU facility. See id. at 31. According to the State, some O&M costs are variable and dependent upon the amount of inbound and outbound SNF each year, the amount of SNF stored at the site each year, the geographical location of the reactor site, or the customer's desire to finance its construction payment through debt financing, and these uncertain factors will determine when O&M costs are incurred. See id. Thus, the State points out, the terms and conditions of the customer service agreements, which will incorporate provisions relative to these factors, will play a significant role in defining the scope of the PFS project and its related O&M costs. See id. at 32.

3.55 In response to the State's arguments, PFS takes the position that pursuant to LC-1, the capacity of the proposed ISFSI will be known before operations begin; therefore, it is unnecessary for PFS to provide assurance that it will have funds to cover the operating costs for a larger 40,000 MTU facility. See PFS Reply at 27. PFS further argues that the State's concern regarding expenses associated with any additional SNF stored onsite is misplaced, in that those costs will be covered by long-term customer service agreements. See id. at 28.

Because it will submit an model service contract to the Board and parties, PFS contends that a finding by the staff that the model agreement meets the financial assurance requirements embodied in LC-2 would also ensure that subsequent agreements for additional storage would likewise provide reasonable assurance of sufficient funds to cover the ensuing operating costs for such additional storage. See id. For its part, the staff argues that when the Commission revised LC-2 to prevent PFS from proceeding with operation of the facility unless it had service agreements with sufficient prices in place to cover the entire term of the license, the Commission resolved the issue of covering the costs of any additional fuel stored at the PFS facility. See Staff Reply at 27.

3.56 With respect to the variable factors affecting annual O&M costs alluded to by the State, PFS asserts that many of its O&M costs would not change significantly with the storage of additional SNF at the facility, given that most of the expenditures are either not overly sensitive to the amount of fuel or constitute a relatively small portion of the total O&M budget. See PFS Reply at 28. Significant costs that would vary with the amount of spent fuel to be stored at the ISFSI would include storage canisters and casks (xxxxx percent of O&M costs for a 40,000 MTU facility) and transportation costs (nearly xxxxx percent of O&M costs). See id. at 28-29. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See id. at 29. Again, PFS observes, verification by the staff that the MSA satisfies LC-2 would similarly assure that subsequent agreements for the additional storage of SNF at the facility would provide reasonable assurance of sufficient funds to cover the additional costs. See id.

2. Relationship of Costs to the License Conditions

3.57 The State avers that LC-2 requires PFS to establish not only average O&M costs but also the estimated O&M costs at the time they are expected to be incurred over the planned life of the facility. See State Findings at 32-33. Thus, argues the State, the average annual costs bear no relationship to projected actual yearly O&M expenses. Without this showing, the State maintains, there will be no relationship between O&M costs and the revenue generated under each individual sufficient to cover the operating costs at the time the costs are incurred. See id. at 33. The State further contends that if costs are not broken down by the year in which they are anticipated to be incurred, the staff will be placed in a position of making factual and legal determinations in its post-hearing/post-license review of O&M costs. See State Reply at 14, 15.

3.58 PFS responds to the State's claim by first asserting that the timing of PFS operating costs is outside the scope of contention Utah E/Confederated Tribes F. See PFS Reply at 30. Second, PFS argues, LC-2 only requires PFS to show that its service agreements will include prices sufficient to cover the total operating costs of the facility; therefore, PFS need not provide its O&M cost estimates as a function of time. See id.

3.59 In its reply, the staff points out that compelling PFS to provide estimated costs for each year of operation exceeds the regulatory requirements set forth in 10 C.F.R. § 72.22(e). See Staff Reply at 28. Instead, the staff finds that an estimate that provides an average yearly cost is adequate to provide reasonable assurance as to the amount of funding that is required. See id.

3. Unsupported Cost Estimates

3.60 The State further argues that because PFS has neither described nor supported the basis of its cost estimates, PFS has failed to establish on the record the reasonableness or reliability of its O&M cost estimates. See State Findings at 33.

3.61 In response, PFS maintains that it has provided the bases and assumptions underlying its estimates for each category of its O&M costs. See PFS Reply at 30 (citing Parkyn/Kapitz O&M Testimony at 7-26).

4. Assumptions

3.62 Moreover, the State contends, PFS O&M costs must be estimated based only on the twenty-year period of the initial license, rather than on the anticipated forty-year term. See State Findings at 34. PFS, however, has based its total O&M costs on the assumption that it will receive a twenty-year license renewal after the initial twenty-year license term, which, in the State's view, renders the existing estimates "utterly meaningless." Id. In this context of PFS's anticipated license renewal application review, the State is concerned that because a Department of Energy permanent repository may not be available to receive all the SNF stored at the PFSF at the end of the ISFSI's initial twenty-year license term, the staff will have no option but to renew the PFS license, without a meaningful review, if the SNF cannot be returned to the owners. See id.

3.63 PFS counters that contrary to the State's claim, basing its estimates on a forty-year planned term for the facility is permitted under both NRC case law and regulations. See PFS Reply at 31. Furthermore, PFS asserts, it would be reasonable to assume that PFS would be able to renew its license for an additional twenty years, given that the storage casks and other systems PFS plans to use at the facility can be either maintained for much longer than

twenty years or replaced as necessary over the forty-year planned life of the facility. See id.

5. Uncertainties

a. Capacity and Quantity of Stored Fuel

3.64 The State claims that both the rate at which fuel will be received at and leave the PFS facility and the length of time it will be stored at the site affect when PFS's O&M costs will be incurred. See State Findings at 35. Without any signed service agreements in place, the State argues, PFS cannot even speculate as to the amount of inbound, outbound, and stored SNF for any given year. See id. Thus, asserts the State, PFS cannot reasonably estimate its annual or total O&M costs. See id. at 36.

3.65 In its reply, PFS reiterates its argument that the issue of when PFS will incur its O&M costs is outside the scope of the contention. See PFS Reply at 32. PFS contends that the O&M estimates it has provided have adequately addressed the amount of SNF that will be stored at the proposed facility. See id. Furthermore, PFS argues, the timing of the fuel shipments to the ISFSI will not have a material impact on the O&M costs. See id. In PFS's view, the State has not proffered any evidence suggesting that shipment of less than 40,000 MTU of SNF to the facility, the amount on which PFS estimates are based, would cause PFS estimates to be deficient. See id. In addition, PFS maintains that the primary effect of storing less fuel at the site would be to eliminate the need for storage casks and canisters. See id. In this regard, because it will have service agreements in place before it begins to operate the facility, PFS claims that the cost of the unused casks and canisters can easily be deducted from the cost estimates in order to demonstrate that PFS will have sufficient funds to cover its operating costs for a smaller facility. See id.

b. Canisters and Casks

3.66 The State also challenges PFS's O&M cost estimates based on when PFS will incur the costs of canisters and storage casks, which constitute a significant portion of the O&M budget. See State Findings at 36. Because there are no service agreements in place and because the availability of canisters and storage casks may be limited due to manufacturing issues, the State argues that PFS cannot reasonably estimate when it will incur canister and storage cask costs. See id. at 37. This timing, the State avers, is critical to estimating annual O&M costs, see id., and the PFS approach does not, in the State's view, take into account the fact that most of the canister and cask costs will be incurred within the first twenty years of the facility's operation. See State Reply at 14.

3.67 In rebuttal, PFS again asserts that the timing of when PFS incurs its O&M costs is outside the scope of the contention at issue. See PFS Reply at 33. Moreover, PFS contends, while the State claims that the rate at which SNF is shipped to the planned facility may be limited because of cask and canister fabrication restrictions, it does not indicate how those restrictions would cause PFS O&M cost estimates to be understated. See id.

3.68 For its part, the staff finds no reason to assume that PFS will not be able to acquire the casks and canisters at a rate consistent with the estimated use of the facility. See Staff Reply at 28-29. The staff is satisfied that Holtec, the manufacturer of the casks, will be able to build within two years a local manufacturing facility in Utah capable of producing between 100 and 200 units per year. See id. at 28. According to the staff, the State has not presented any evidence to suggest that PFS's plan for and estimate of production by a local manufacturing facility is inaccurate. See id.

c. Transportation Costs

3.69 The State also points out what it views to be various problems with PFS transportation cost estimates. For example, the State argues, PFS has not estimated any reasonably available operating costs for either of the two SNF transportation alternatives; the all-rail alternative utilizing the proposed GSLSR or the ITF alternative in which transportation casks brought by rail to an ITF near Rowley Junction would be transferred onto heavy haul trucks for transport to the proposed ISFSI. See State Findings at 37-38. According to the State, as evidence of its O&M estimate, PFS has merely proffered a transportation allowance that was based on the all-rail alternative from the LaCrosse, Wisconsin reactor to the PFS site in Utah. See id. at 38. In the State's view, the PFS transportation cost allowance or railroad fee has no relationship to actual transportation costs, which are a function of actual distances traveled. See State Reply at 14. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See State Findings at 38. In this regard, the State argues that PFS has structured its planning such that any effort to provide accurate and complete evaluation of its estimated transportation costs is avoided. See id. In addition, the State challenges PFS's decision to choose the transportation alternative after the NRC issues PFS the ISFSI license. See id. Because the O&M costs cannot be estimated for the selected transportation alternative at this time, the State asserts that it is reasonable for PFS to provide cost estimates for both alternatives. See id. According to the State, however, PFS has not proffered any evidence establishing the operating estimates for the ITF alternative. See id.

3.70 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See PFS Reply at 33. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See id. Contrary to the State's assertions, PFS and the staff argue that both Mr. Parkyn and Mr. McKeigney testified that the total life cycle (construction and operating) costs for the ITF option were lower than that of the all-rail alternative. See id. at 34; Staff Reply at 30. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See PFS Reply at 34.

d. Interest Payments

3.71 The State also takes issue with the PFS failure to estimate the costs of any construction debt financing. According to the State, PFS has taken this position because the decision to debt finance the construction portion of the storage fee belongs to the customer and will not be resolved until the service agreements are signed. See State Findings at 39. The State also argues that while PFS has assumed that the non-equity portion of the construction costs will be paid for under the service agreements, PFS has not produced any evidence for the record to support this assumption. See id. Because LC-1 affords PFS the option to debt finance construction costs, the State insists that these costs must be included in the O&M cost estimates. See id. at 40.

3.72 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxx See PFS Reply at 34; Staff Reply at 31. PFS claims that it will not incur any construction debt of its own. See PFS Reply at 34. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxx See Staff Reply at 32.

6. Omitted/Underestimated Costs

3.73 The State alleges that PFS has omitted or underestimated a number of costs from its O&M estimates.

a. Pass-Through Costs

3.74 According to the State, PFS fails to provide estimates for some costs it designates as "pass-through" costs because PFS confuses revenue with costs. See State Findings at 40. In the State's view, however, pass-through costs are operating costs regardless of whether PFS characterizes a cost as a pass-through. See id. Thus, the State asserts, PFS must provide actual reasonable estimates of the costs PFS intends to pass-through to its customers, which constitute xxxxxxxxxxxxxxxxxxx percent of the total O&M budget. See id. at 41. The State maintains that PFS has failed to provide estimates for certain pass-through costs, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See State Reply at 18.

3.75 PFS responds by pointing to the Commission's decision in Monticello, which held that an applicant may rely on pass-through provisions that bind a third party to pay the costs and be relieved of having to provide actual estimates of those costs, so long as there is

reasonable assurance that the third party will pay its obligations to the applicant. See PFS Reply at 35 (citing CLI-00-14, 52 NRC at 49-50). Furthermore, PFS contends, it has provided actual estimates of the xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, which together constitute xxxxxxxxxxx percent of PFS's O&M costs. See id.

3.76 For its part, the staff maintains that, contrary to the State's arguments, PFS has appropriately estimated the O&M costs that will be passed through to its customers. See Staff Reply at 31. In the staff's view, PFS has provided reasonable estimates of the canister and storage cask costs, railroad fees, and regulatory fees. See id.

b. Debt Financing

3.77 In addition to the interest payments PFS may have to make on the construction loans it may procure on behalf of its customers, the State argues that PFS must also include any debt financing costs at expected interest rates and principal repayments associated with the loans in its O&M cost estimates, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxx See State Findings at 41.

3.78 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See PFS Reply at 35; Staff Reply at 32. Moreover, the staff asserts, it would be unreasonable to require PFS to calculate interest and principal payments for customers who may not even secure their loans through PFS. See Staff Reply at 32.

c. Transportation Costs

3.79 The State argues that because some reactor sites do not have onsite rail access, casks at these reactors must be transported by barge or heavy haul truck to a railhead. See State Findings at 42. To the extent PFS is responsible for payment of transporting the casks to a railhead, the State insists that these costs also be included among PFS's transportation cost estimates. See id. In addition, the State asserts, PFS must make payments to the U.S. Bureau of Land Management (BLM) for annual compliance fees, lease payments, and a restoration bond for a right-of-way to construct either the GSLSR or an ITF near Rowley Junction. See id. These payments, argues the State, must also be included in PFS's O&M costs as transportation costs. See id. The State also contends that, in the event the all-rail alternative is chosen, the costs of rail line usage and fuel on the GSLSR must be accounted for as transportation costs. See id. at 43. On the other hand, if PFS opts for the ITF alternative, the State avers that the ITF operating costs must include ITF employee salaries and the costs of transporting casks by heavy haul truck down Skull Valley Road. See id.

3.80 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxx See PFS Reply at 36; Staff Reply at 33. All of the remaining costs referenced by the State, PFS and the staff maintain, have already been included in PFS's transportation cost estimates for O&M. See PFS Reply at 36; Staff Reply at 33-34.

3.81 In its reply to the proposed findings of fact submitted by PFS and the staff, the State counters that it is impossible to ascertain what is or is not included in the actual scope of the transportation cost estimates. See State Reply at 16. In the State's view, the following

expenses should all be considered part of the O&M costs relating to transportation: (1) security personnel for transporting the spent fuel; (2) security personnel at the ITF; (3) maintenance of the GSLSR; (4) maintenance of the locomotives; (5) transportation of welding equipment for spent fuel transfers; (6) transportation of empty canisters to the reactor sites; (7) transportation of the transfer casks and dry transfer system; (8) transportation of loaded casks from a reactor site to a railhead; (9) leases of public lands; and (10) operation of heavy haul trucks from the ITF. See id. According to the State, because PFS has made no effort to break out the xxxxx per kilogram of uranium transportation credit among the foregoing costs, the Board should consider all ten of the above costs to be missing from PFS's O&M cost estimates. See id. at 17.

d. Host Payments

3.82 The State argues that pursuant to a May 23, 2000 host benefit agreement between PFS and Tooele County, PFS will pay Tooele County $2,600 for each canister owned by a PFS member per year and $3,250 for each canister owned by a non-member per year. See State Findings at 43-44. However, because PFS's estimates are based only on the lower $2,600 member fee and it is unreasonable to assume that PFS members will own all the SNF stored at the Skull Valley site, see id. at 44, the State posits that PFS's host benefit payment estimates to Tooele County are understated by approximately $24 million, based on a reasonable estimate of amounts member and non-member fuel that may be stored onsite. See State Reply at 17.

3.83 In response, both PFS and the staff counter that additional payments to Tooele County for non-member fuel stored at the facility would be more than offset by the higher prices

that PFS will charge non-member customers for storage. See PFS Reply at 36; Staff Reply at 34-35.

e. Castle Rock xxxxxxxx

3.84 The State also challenges PFS O&M cost estimates on the basis of the PFS purported failure to include in its estimates payments xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See State Findings at 44. The State asserts that pursuant go an agreement with Castle Rock, PFS must xx. See id. at 44-45. Thus, the State argues, PFS's O&M cost estimates are unreasonable not only because PFS has not accounted for the xxxxxxxxxxxx, but also because the timing of the xxxxxxxxxxxxxxxxxxxx currently is unknown. See id. at 45.

3.85 PFS and the staff maintain that, contrary to the State's claim, xxxxxxxxxxxxxxxxxxxxxxxx are included in the O&M cost estimates. See PFS Reply at 37; Staff Reply at 35-36. PFS further argues that the timing of when xxxxxxxxxxxxxxxxxxxxxxxxxxx will come due is beyond the scope of the contention at bar. See PFS Reply at 37. Moreover, PFS avers, because xxxxxxxxxxxxxxxxxxxxxxxxx represent a mere xxxxxxxxxxx of PFS's total O&M costs, their timing is immaterial to the reasonable assurance determination. See id.

f. Bureau of Indian Affairs Bonds

3.86 According to the State, the United States Department of the Interior's Bureau of Indian Affairs (BIA) has the authority to require PFS to post a bond, and the costs of posting such a bond must be included as an operating cost in PFS's estimates. See State Findings at 45. In addition, the State insists that BIA bonding or other financial requirements must be included in the estimated O&M costs for the year in which the costs are expected to occur. See id.

3.87 In response, PFS argues that it is reasonable to omit the costs of a BIA bond from its estimates because BIA has not indicated that it will require PFS to post such a bond. See PFS Reply at 37. Moreover, PFS maintains, many of the items for which BIA has required bonds in the past are covered by other mechanisms PFS will have in place, such as onsite property insurance. See id.

3.88 For its part, the staff agrees with PFS that it need not account for the costs of posting a BIA bond, in light of provisions in the lease agreement between PFS, the Skull Valley Band, and the BIA that address this issue. See Staff Reply at 36. Pointing to the language of the lease, the staff indicates that the Skull Valley Band and the BIA waive any obligation of PFS to post a surety bond, unless PFS fails to make its lease payments. See id. Thus, argues the staff, it is reasonable for PFS to exclude these costs from its O&M estimates. See id.

g. Skull Valley Band Bonds

3.89 The State claims that because the Skull Valley Band has the option to require PFS to obtain additional insurance or bonding, PFS must include these costs in its O&M cost estimates for the year in which the costs are expected to occur. See State Findings at 45.

3.90 In its reply to the State's proposed findings of fact, PFS maintains that it need not include the cost of a bond in its estimates because the Skull Valley Band has not indicated that it would require PFS to post such a bond. See PFS Reply at 37. In the staff's view, the matter is resolved in light of the lease agreement's waiver provisions that relieve PFS of its obligation to post a surety bond. See Staff Reply at 36.

7. Staff Review of O&M Costs

3.91 The State also takes issue with the staff's endorsement of PFS's treatment of pass-through costs in its O&M estimates. See State Findings at 45-46. In particular, the State disputes the staff's opinion that PFS's use of pass-through costs is reasonable because many businesses charge on a cost-plus basis beyond a certain base cost. See id. at 45. The State insists that because a cost is a cost, regardless of how revenue will be collected to pay it, PFS must provide reasonable and complete actual cost estimates for pass-through costs, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, rather than relying on whether there will be sufficient revenue to offset those costs. See id. at 46.

3.92 In response, PFS reprises its argument that the Commission sanctioned such use of pass-through costs in its Monticello decision. See PFS Reply at 38. The staff, on the other hand, argues that xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, PFS has provided reasonable estimates for canister and cask costs, transportation costs, and regulatory fees based on its Memorandum of Understanding with Holtec, an average shipping distance, and the Commission's fee schedule, respectively. See Staff Reply at 37.

8. License Conditions

3.93 The State seeks the imposition of a license condition that would require PFS to make an additional showing of its financial qualifications after the facility begins initial operations. See State Reply at 12-13. Because the staff will review PFS's O&M cost estimates just once under LC 17-2, the State is concerned that the staff has no enforceable mechanism to review PFS's future and ongoing O&M costs once operation is underway, particularly in light of PFS's lack of assets and reliance on storage fees to fund its O&M expenditures. See id. at 13. According to the State, a single staff review of O&M costs for the initial capacity facility does not satisfy the requirement that PFS will be financially qualified to operate a 40,000 MTU facility for twenty or forty years. See id.

F. Insurance

3.94 With respect to onsite property insurance, the State contends that rather than committing to obtain a specific amount of coverage, PFS has committed only to obtaining the amount of coverage that can be purchased with a premium of **xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx** See State Findings at 46-47. If, in the future, the amount of coverage that a **xxxxxxxx** premium will buy falls below $70 million, the State criticizes PFS's approach, which will be to either continue to carry $70 million in coverage or perform a consequences assessment to calculate the coverage necessary. See id. at 47. The correct approach, argues the State, would be to first conduct a risk assessment and consequences analysis and then determine the appropriate amount of coverage based on the analysis. See id. at 48.

3.95 Unless required by a future NRC regulation, the State notes that under no circumstances would PFS obtain an amount of coverage if the insurance were not available at a reasonable cost and on reasonable terms. See id. at 47. This, according to the State,

demonstrates that PFS is less concerned with having adequate onsite property insurance than it is with its "bottom line." See id. The State avers that because PFS has not related the financial ramifications of a major accident to any risk or consequences analysis, there is nothing in the record to support PFS's assertion that the anticipated amount of coverage will be adequate. See id. at 48.

3.96 Relying on 10 C.F.R. §§ 72.40(a)(5) and (6) and 72.22(e), the State contends that the Commission would be derelict in its duties to protect public health and safety by ensuring that ISFSI applicants are financially capable of engaging in their proposed license activities if the agency were to defer to PFS's business judgment as to what constituted the adequate amount of insurance coverage for the facility. See id. at 48-49. The State insists that the appropriate amount of insurance coverage PFS must retain is either xxxxxxxxxxxx or the maximum amount of onsite insurance PFS can obtain from national or international commercial nuclear insurers. See State Reply at 20.

3.97 In response, PFS notes that pursuant to 10 C.F.R. § 50.54(w), even reactor licensees are not required to obtain more insurance than is available at reasonable costs and reasonable terms from commercial sources. See PFS Reply at 38. PFS further asserts that its commitment to maintain a minimum of $70 million in coverage is based on two factors. First, the NRC has been requiring shut down reactors with spent fuel in their spent fuel pools to maintain no more than $50 million in onsite insurance coverage. See id. at 38-39. Second, a report by the Brookhaven National Laboratory indicates that the cost of recovery from a bounding ISFSI accident would amount to only $6 million. See id. at 39. Thus, PFS argues, there is a clear link between accident recovery cost assessments and the minimum level of coverage it has committed to maintaining. See id.

3.98 For its part, the staff observes that there exists no regulatory requirement or guidance under Part 72 that would require any onsite property insurance for an ISFSI. See Staff Reply at 38. In the staff's view, therefore, PFS's commitment goes far beyond what is mandated by NRC regulations. See id. That notwithstanding, the staff considers it appropriate and in accordance with sound business practice that PFS acquire onsite insurance coverage. See id. Given the language of section 50.54(w), the staff deems PFS's commitment to obtain the maximum amount of onsite nuclear property insurance available at reasonable terms and at a reasonable cost to be sufficient. See id. at 39. Moreover, the staff asserts, pursuant to the Commission's directive in CLI-00-13, PFS's commitment will be reflected in a license condition. See id.

IV. FACTUAL FINDINGS AND LEGAL CONCLUSIONS

A. Findings Regarding the PFS Application and Proposed ISFSI Facility

4.1 PFS filed an application with the NRC in June 1997 pursuant to 10 C.F.R. Part 72 for a license that would allow it to construct and maintain an ISFSI for an initial twenty-year period with the possibility of renewal for an additional twenty years. The PFS license application includes, among other things, a safety analysis report (SAR) and an emergency plan. The proposed ISFSI is designed to accommodate up to 4000 concrete storage casks containing sealed metal canisters holding as much as 40,000 metric tons of uranium in the form of SNF from commercial nuclear reactors. See Staff Exh. A, encl. at 1-1 (Dec. 15, 2000 [NRC Staff] Safety Evaluation Report of the Site-Related Aspects of the [PFS ISFSI] (as revised Jan. 4, 2000) [hereinafter Staff SER]. The planned facility is to occupy 820 acres within the confines of the 18,000 acre reservation of the Skull Valley Band in Tooele County, Utah. See

id. While there are no large towns within a ten-mile radius of the proposed ISFSI, the thirty-resident Skull Valley Band reservation village is located about 3.5 miles east-southeast of the PFS site. See id. PFS plans to fund the construction, operation, and decommissioning of the facility through equity contributions of its owners and by service agreements with member and nonmember customers.[9] See id. at 17-3.

B. Findings and Conclusions Regarding the Parties' Witnesses

4.2 In section III.A. above, we described in detail the qualifications of each parties' witnesses, which we incorporate as part of our findings herein. We turn now to the weight to be accorded to each witness' testimony relative to the matters at issue.

4.3 When the qualifications of a witness are challenged, the party sponsoring the witness has the burden of demonstrating his or her expertise. See Pacific Gas & Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-410, 5 NRC 1398, 1405 (1977). A witness' expertise can be established by showing relevant knowledge, skill, experience, training, or education. See Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 NRC 453, 474-75 (1982) (citing Fed. R. Evid. 702).

4.4 To support its challenge to PFS's financial qualifications, the State proffered the testimony of Dr. Michael Sheehan. PFS challenges Dr. Sheehan's qualifications as an expert based on his lack of experience in estimating construction or operating costs for nuclear facilities or large industrial projects. See PFS Findings at 11; PFS Reply at 4-5. With regard to the issue of onsite property insurance coverage, PFS also claims that Dr. Sheehan has had no

[9] Although, as is apparent from our decision today on the post-CLI-00-13 remand aspects of PFS financial qualifications, the details of the mechanisms by which funding will be obtained has changed from what had been described by PFS at the time of the June 2000 evidentiary hearing, see LBP-05-20, 62 NRC at __ (slip op. at 5-14), the basic source of that funding, i.e., PFS member and nonmember customers, remains the same.

experience or particular knowledge in the area of nuclear insurance or with estimating the probabilities or consequences of potential radiological accidents. See PFS Findings at 14; PFS Reply at 5. For its part, the State asserts that Dr. Sheehan's education, knowledge, and experience as an economist are more than sufficient to evaluate the reasonableness of PFS's cost estimates and to identify omissions and uncertainties therein, as well as the reasonableness and availability of PFS's onsite property insurance. See State Findings at 5. Thus, the State asks that the Board give Dr. Sheehan's testimony "the appropriate weight due him as a highly trained and experienced expert." Id. at 6.

4.5 The witnesses presented by PFS provide somewhat of a contrast to Dr. Sheehan by reason of their experience relating directly to cost estimation and nuclear property insurance. As we noted above, PFS witness Gase's experience as a construction engineer and a cost engineer includes estimation work on large-scale construction projects. See Gase/Takacs Testimony at 1-2 & attached resume. Mr. Takacs, who also testified on behalf of PFS, has a degree in construction engineering and serves as the principal cost engineer in Stone & Webster's Denver office. See Gase/Takacs Testimony at 2-3 & attached resume. PFS witness Parkyn has experience in estimating construction costs for nuclear power plants and activities associated with the operation of nuclear facilities, as well as knowledge of the costs of nuclear insurance for nuclear reactors. See Parkyn Construction Testimony at 1-3 & attached resume; Parkyn/Kaptiz O&M Testimony at 4; Parkyn Insurance Testimony at 3. Mr. Kapitz, who testified on behalf of PFS on O&M costs, has over twenty years of experience in the nuclear power industry as a nuclear engineer and is responsible for the overall project management of Northern States Power's Prairie Island ISFSI. See Parkyn/Kapitz O&M Testimony at 1-2 & attached resume. Mr. Pickerl has fifteen years of experience in the nuclear insurance industry

procuring and administering insurance for nuclear industry clients. See Pickerl Testimony at 1-2 & attached resume.

4.6 Staff witnesses McKeigney and Wood also possess impressive knowledge and expertise directly relevant to the determination of an applicant's financial qualifications. As part of his duties as a Financial Analyst in the NRC's Office of Nuclear Reactor Regulation, Dr. McKeigney determines whether the financial assurances provided by applicants are in compliance with the agency's regulations. See McKeigney/Wood Testimony at 1-2 & attached resume. Mr. Wood, who has nearly thirty years of experience with the NRC, serves as a Senior Level Licensee Financial Policy Advisor. See id. In this capacity, Mr. Wood develops and implements NRC policies on nuclear property insurance and the financial qualifications of NRC licensees. See id.

4.7 The Board is cognizant of Dr. Sheehan's skills and twenty years of experience as an economist, see Sheehan Testimony at 1-4 & attached resume, as well as his admitted lack of experience in the areas of cost estimation and nuclear property insurance. See Tr. at 2202-07, 2219-22, 2492, 2505-08. In this regard, we find Dr. Sheehan to be well-qualified as an expert in the field of economics and accord his testimony appropriate weight commensurate with its merits. We also find that PFS and the staff have established the expertise of their witnesses relative to cost estimation and nuclear property insurance.

C. Findings and Conclusions Regarding Applicable Legal Standards

1. Construction and Operating Cost Estimates

4.8 As we observed in section III.B.1 above, pursuant to 10 C.F.R. § 72.22(e), an applicant for an ISFSI license must submit information sufficient to demonstrate that it is financially qualified to carry out the activities for which the license is sought. In this regard,

> [t]he information must show that the applicant either possesses the necessary funds, or that the applicant has reasonable assurance of obtaining the necessary[ ] funds or that by a combination of the two, the applicant will have the necessary funds available to cover the following:
>
> (1) Estimated construction costs; [and]
>
> (2) Estimated operating costs over the planned life of the ISFSI . . . .

10 C.F.R. § 72.22(e).

4.9 As the applicant, PFS bears the ultimate burden of proof in this licensing proceeding. See 10 C.F.R. § 2.732. Furthermore, to prevail on each factual issue, the PFS position must be supported by a preponderance of the evidence. See Pacific Gas & Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-763, 19 NRC 571, 577, review declined, CLI-84-14, 20 NRC 285 (1984). Therefore, relative to contention Utah E/Confederated Tribes F, PFS must demonstrate by a preponderance of the evidence that it has established the requisite reasonable assurance in connection with its estimated construction costs and the estimated operating costs over the planned life of the facility. Thus, the meaning of "reasonable assurance" becomes central to our determination of PFS compliance with NRC regulations, a matter to which we look to the Commission for guidance.

4.10 In CLI-00-13, 52 NRC at 31, in clarifying what a showing of "reasonable assurance" would entail for an ISFSI applicant, the Commission acknowledged that outside of the Part 50 reactor licensing context, while the financial qualifications of the applicant would still be considered, the Commission would not hold the applicant to the specific requirements of showing financial capability under Part 50. Nonetheless, as the Commission noted:

> Even when evaluating financial assurance under Part 50,
>
> > The Commission will accept financial assurances based on plausible assumptions and forecasts,

> even though the possibility is not insignificant that things will turn out less favorably than expected. Thus, the mere casting of doubt on some aspects of proposed funding plans is not by itself sufficient to defeat a finding of reasonable assurance.

See id. (quoting Seabrook, CLI-99-6, 49 NRC at 222). Further, the Commission confirmed that in the context of an ISFSI licensing proceeding, license conditions could be an acceptable method for providing reasonable assurance of an applicant's financial qualifications under 10 C.F.R. Part 72. See id. at 29.

4.11 The Seabrook language referenced above concerned a reasonable assurance finding relating to funding plans and revenue. Contention Utah E/Confederated Tribes F, however, is concerned with the adequacy of PFS cost estimates, rather than with its funding plan per se. Nonetheless, all parties apparently agree that the Seabrook principles apply to PFS cost estimates. See PFS Findings at 19; PFS Reply at 7; Staff Reply at 11; State Findings at 8; State Reply at 3. That is, the parties agree that the Commission will accept cost estimates based on plausible assumptions and forecasts, and that merely casting doubt on some aspects of the estimates will not be adequate to preclude a finding of reasonable assurance.

4.12 In addition, in the decommissioning context, the Commission has provided what we perceive as useful guidance regarding challenges to an applicant's cost estimates, albeit in the context of determining what a petitioner must establish to gain admission of a contention contesting an applicant's decommissioning plan cost estimates. In the Yankee Rowe proceeding, the petitioners claimed before the Licensing Board that the applicant's decommissioning cost estimate was inadequate because it was based on unreasonable assumptions, allowed for a grossly inadequate contingency factor, and was missing certain costs. See Yankee Atomic Electric Co. (Yankee Nuclear Power Station), LBP-96-2,

43 NRC 61, 81 (1996). In approving the Licensing Board's rejection of the petitioners' contention, the Commission observed that "a contention challenging the reasonableness of a decommissioning plan's cost estimate provisions should not be litigable if the only relief available would be a 'formalistic redraft of the plan with a new estimate.'" Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-96-7, 43 NRC 235, 259 (1996) (quoting Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-96-1, 43 NRC 1, 9 (1996)). The Commission noted, however, that if the petitioners could show a "gross discrepancy" in the decommissioning cost estimate, that might suffice to establish a litigable issue.[10] Id. at 260.

4.13 Bearing in mind this Commission guidance, we find that to demonstrate reasonable financial assurance, PFS must provide reasonable cost estimates based on plausible assumptions and forecasts, and estimates that "rely on assumptions seriously at odds with governing realities" will not be acceptable. Seabrook, CLI-99-6, 49 NRC at 222. We also find that to succeed on the merits of its contention, the State must demonstrate that "relevant uncertainties significantly greater than those that usually cloud business outlooks" exist. See id. In addition, the Board will not entertain what amounts to a State request for a "formalistic redraft" of the PFS plan with new cost estimates, but rather is concerned as to whether the State demonstrates there are "gross discrepancies" in those estimates. Yankee Rowe, CLI-96-7, 43 NRC at 259, 260.

---

[10] In earlier guidance, the Commission had explained that to prevail, the petitioners would have to demonstrate "not only that the estimate is in error but that there is not reasonable assurance that the amount will be paid." Yankee Rowe, CLI-96-1, 43 NRC at 9. As we have previously indicated, however, the manner in which PFS costs will be covered generally is outside the scope of the portion of this contention concerning the reasonableness of PFS cost estimates that was the subject of the June 2000 evidentiary hearings.

4.14 Also in controversy is the level of precision required in the accuracy of PFS cost estimates. While the State argues that PFS must provide "hard" cost estimates that are "reasonably firm and precise," Tr. at 2224; see State Reply at 8; Sheehan Testimony at 8, PFS and the staff assert that the Commission's use of the term "hard" in its Claiborne decision appears to describe cost estimates relative to items such as physical structures, rather than "soft" costs, such as interest and financing costs. See PFS Findings at 32; Staff Findings at 26. In our view, the Claiborne decision does not support the State's interpretation of the term "hard construction costs," which we conclude refers to the category of costs covered by the estimates rather than the level of precision required for each and every estimate, regardless of its type. Thus, we do not believe PFS need await the actual contract "bid" information Dr. Sheehan maintained was necessary, see Tr. at 2233, before preparing its cost estimates for Part 72 financial assurance purposes.

2. Onsite Property Insurance Coverage

4.15 As was noted above in section III.B.2, NRC regulations require operating reactor licensees to "take reasonable steps to obtain insurance available at reasonable costs and on reasonable terms from private sources." 10 C.F.R. § 50.54(w). Part 50 further mandates that reactor licensees maintain a minimum coverage of $1.06 billion, or the amount generally available from private sources, whichever is less. See id. § 50.54(w)(1). By contrast, there is no similar requirement under Part 72 for ISFSI licensees to procure insurance. PFS, however, has committed to maintaining onsite property insurance coverage in the maximum amount "available at reasonable costs and at reasonable terms from private sources." See Parkyn Insurance Testimony at 4. While the amount of coverage PFS should obtain is disputed by the parties (a factual determination that we discuss below in section IV.G), the legal question of

whether PFS must maintain insurance at all was resolved by the Commission in CLI-00-13. In that decision, the Commission required PFS to obtain onsite insurance in an amount to be determined at hearing as a condition on its ISFSI license. See CLI-00-13, 52 NRC at 36.

3. Impacts of CLI-00-13

4.16 As we noted in section II above, in addition to endorsing the use of license conditions in CLI-00-13, the Commission approved the use of LC-1, a revised license condition LC-2, and staff memorialization of six additional conditions. CLI-00-13, 52 NRC at 32, 36. The Commission further instructed the Board to require PFS to provide a sample customer service agreement that met these financial assurance license conditions and to give the State an opportunity to address the adequacy of the sample agreement. See id. at 35.

4.17 Pursuant to the Commission's directives, we ordered PFS to submit a sample service agreement for review by the Board and the other parties. See Licensing Board Order (Schedule for Submission of Sample Service Agreement) (Aug. 16, 2000) at 1-2 (unpublished). Additionally, as is described in section II above, the Board also requested that the parties address the impacts of CLI-00-13 upon the matters that were the subject of the June 2000 evidentiary hearings, which the parties did. Relative to the portions of contention Utah E/Confederated Tribes F that were the subject of those hearings, we resolve the matters raised in the parties' filings, to the degree they are not dealt with below, in the context of our separate decision today on the pending PFS dispositive motion regarding the adequacy of its MSA in meeting the PFS financial assurance obligations. See LBP-05-20, 62 NRC __ (May 27, 2003); see also supra note 7.

D. Findings and Conclusions Regarding General Standards that Apply to PFS Cost Estimates

1. Project Planning Deficiencies as Affecting Cost Estimates

4.18 Before considering the individual components included in the construction and O&M cost estimates, we first address the State's general concern that substantial uncertainty about many of the important planning elements such as what is to be built, when it is to be built, how much it will cost to build, and where will the money come from are critical because "[e]ven a five percent error in estimation due to [an] insufficiently specified project design could result in a multi-million dollar shortfall during construction or operation of the ISFSI," which the State suggests could in turn induce PFS to "cut corners" on safety. State Findings at 9.

4.19 Given the PFS cost estimate focus of this contention as it was subject to litigation before the Board in June 2000, the relevance of the various planning factors the State seeks to interpose is not apparent, other than to the extent they are interposed as a specific concern in connection with a particular cost estimation element. Moreover, consistent with the Commission's decision in Yankee Rowe, there is an element of materiality that must be considered, i.e., evidence that indicates some "gross discrepancy" relative to a cost estimate item or items. See CLI-96-7, 43 NRC at 260. As is explained below in further detail, to the extent the State has sought to raise these planning items relative to particular cost estimate elements, we find that it has not identified any material errors in the PFS cost estimates that would render them unreasonable.

2. Pass-Through Costs

4.20 The State also claims that by labeling certain expenditures as "pass-through costs" that PFS will pass directly to its customers, PFS and the staff have grossly

underestimated the overall costs of the proposed facility. See State Findings at 12. The State insists that PFS account for these pass-through costs in its estimates. See id. at 12-13. Relying on the Commission's decision in Monticello, CLI-00-14, 52 NRC at 49-51, however, PFS argues that it need not provide specific estimates of the costs it plans to pass through to customers. See PFS Reply at 15.

4.21 As we explain today in our ruling on the PFS dispositive motion, see LBP-05-20, 62 NRC at __ (slip op. at 62-65), in accordance with the Commission's guidance in Monticello, see CLI-00-14, 52 NRC at 51, we find that PFS's use of pass-through provisions in its MSA offers reasonable assurance that its construction and O&M costs will be covered by incoming revenue. Relative to the contention at issue, however, which concerns only the reasonableness of the estimated costs of the proposed facility, although Monticello might well relieve PFS of its obligation to provide a specific estimate of the costs it intends to pass through to its customers, see id. at 50, as will be discussed further below, we find that PFS has nonetheless appropriately accounted for these pass-through costs in its estimates.

4.22 With these general considerations in mind, we now assess the reasonableness of PFS's construction and O&M cost estimates.

E. Findings and Conclusions Regarding Construction Cost Estimates

1. Total Construction Costs

4.23 Construction of the PFS facility is expected to occur in three phases. See Parkyn Construction Testimony at 4-5. During Phase I, the structures, systems, and components necessary for the operation of the minimum planned initial capacity storage facility – 10,000 MTU – will be constructed. See id. Included in Phase I are costs associated with: (1) 130 concrete storage pads and the associated site work, yard lighting, perimeter fence, and

security system; (2) the CTB; (3) the Balance of Facility -- water supply, waste disposal, site access road, Security and Health Physics Building, Administration Building, and Operations and Maintenance Building; (4) the Low railroad line (assuming that PFS, as currently planned, selects the all-rail transportation alternative); and (5) railroad transportation equipment and other equipment. See id. PFS estimates the cost of construction for Phase I to be xxxxxxxxxxxxxx (in fourth quarter 1999 dollars), see id. at 5, plus an additional xxxxxxxxxx for associated administrative costs during this phase, see Tr. 1962, 1979-83, for a total cost of xxxxxxxxxxxxxx for Phase I (in fourth quarter 1999 dollars).

4.24 Phase II of the construction will include all site work, concrete work, lighting, and perimeter fence necessary to add 120 additional storage pads, which will increase the facility's capacity to 20,000 MTU, as well as the purchase of additional railroad transportation equipment. See Parkyn Construction Testimony at 5. According to PFS, the cost of Phase II construction is estimated to be xxxxxxxxxxxxx (in fourth quarter 1999 dollars). Id.

4.25 Phase III construction costs include all site work, concrete work, lighting, and perimeter fence necessary to add the final 250 storage pads, which would bring the facility to its maximum storage capacity of 40,000 MTU. Id. PFS estimates the cost of Phase III construction to be xxxxxxxxxxxxx (in fourth quarter 1999 dollars). Id. Thus, according to PFS estimates, total construction costs for the facility are approximately $172.3 million (in fourth quarter 1999 dollars).

2. PFS Methodology

4.26 The cost estimates for the structures and site work at the facility -- including the four buildings, the Low rail line, and structures at the ITF -- were based on preliminary and structural drawings and design criteria. See Gase/Takacs Testimony at 4; PFS Exh. K.

Included in the structures and site work construction estimates are the costs of labor and materials for constructing the structures, as well as the cost of procuring all of the equipment to be used to operate the facility (except for the casks and canisters, which are included in the O&M estimates). See Gase/Takacs Testimony at 4; PFS Exh. D (PFS Construction Estimate). The estimates for the structures and site work were priced using the Means' and Richardson's cost manuals, Stone & Webster's construction cost database, past studies done on this and other recent projects, and vendor quotations. See Gase/Takacs Testimony at 4-5. The Means' and Richardson's data relied on by PFS's witnesses are generally accepted throughout the construction industry. See id. In addition, the Stone & Webster database is constantly being updated and, as part of a major update in 1999, every single item in the database was reviewed. See Tr. at 1701-02.

4.27 Estimating judgment and experience were used to develop "allowances" for specific components of the facility for which detailed information was not available. See Gase/Takacs Testimony at 5. According to PFS, these allowances are conservative estimates based on typical requirements for a project prior to the availability of design drawings. See id. It is standard engineering practice to use allowances in preparing cost estimates for those aspects of a project whose design is still in the conceptual stage. See id.

4.28 To estimate the costs for rail and other transportation equipment, other loading system equipment (such as transfer casks and miscellaneous equipment), the dry transfer system, the cask hauler, the visitor's center, and other capital expenses associated with the facility, PFS relied upon information generally available in the rail industry, bids and other information from vendors, and actual and projected costs from other facilities. Parkyn Construction Testimony at 6. Experience and engineering judgment were used to scale up or

down costs of pieces of equipment similar to that which will be used at the PFS facility (e.g., spent fuel transfer casks and dry transfer equipment). See id. at 8-9, 11; Tr. at 1879-80, 1917-20.

4.29 In addition, PFS included a ten percent contingency in all construction cost estimates to account for changes in design and unanticipated project costs. See Gase/Takacs Testimony at 5. A contingency of ten percent is consistent with standard estimating practice for the level of detail of this cost estimate for this type of work. See id.

4.30 The State nonetheless expressed concern that PFS could have underestimated the cost of construction by as much as fifteen percent. See State Findings at 17. During the hearing, Mr. Takacs speculated that the range of accuracy in the cost estimates he and Mr. Gase arrived at would range from minus fifteen to plus twenty-five percent. See Tr. at 1707. He also testified that for a budget or preliminary estimate, the minus fifteen to plus twenty-five percent range is considered by the American Association of Cost Engineers to be an approximate range of accuracy, and that he expected the actual construction costs of the facility to be lower than what he and Mr. Gase had projected. See id. at 1749. On the basis of this testimony, we find the methodology used by PFS in deriving its construction cost estimate to be reasonable.

4.31 PFS's construction and administrative cost estimates for Phase I of the proposed facility are broken out by category as follows:

Construction Cost Category	Total	% of Total
Site Work	xxxxxxxxxx	xxx
Yard Electrical Work	xxxxxxxxxx	xxx
Security Equipment	xxxxxxxxxx	xxx
Canister Transfer Building	xxxxxxxxxxx	xxxx
Concrete Storage Pads	xxxxxxxxxxx	xxx
Water and Sanitary	xxxxxxxx	xx
Roads and Parking	xxxxxxxxxx	xxx
Security and Health Physics Building	xxxxxxxxxx	xxx
Administration Building	xxxxxxxxxx	xxx
Operations and Maintenance Building	xxxxxxxxxx	xxx
Low Railroad	xxxxxxxxxxx	xxxx
Rail and Other Transportation Equipment	xxxxxxxxxxx	xxxx
Other Loading System Equipment (Transfer Casks and Miscellaneous Equipment)	xxxxxxxxxx	xxx
Dry Transfer System	xxxxxxxxxx	xxx
Cask Hauler	xxxxxxxxxx	xxx
50-ton Mobile Crane	xxxxxxxx	xx
Visitor's Center	xxxxxxxx	xx
Other Capital Expenses	xxxxxxxx	xx
Contingencies	xxxxxxxxxx	xxx
Administrative Costs	xxxxxxxxxx	xxx
Total	xxxxxxxxxxxx	xxxxx

See PFS Findings at 23-24 (citing Gase/Takacs Testimony at 7-19, Parkyn Construction Testimony at 6-12); Parkyn Construction Testimony at 13-15; Tr. at 1962.

3. State Concerns

4.32 The State does not challenge the following components of the PFS Phase I construction cost estimate -- (1) site work; (2) yard electrical work; (3) security equipment; (4) cask storage pads; (5) water and sanitary; (6) roads and parking; (7) Low railroad construction; (8) cask hauler; (9) visitor's center; (10) other capital expenses; and (11) administrative costs. Thus, we do not discuss those categories in depth. We have examined the bases of the estimates proffered by PFS for the above eleven categories, see PFS Findings at 24-31, and find them to be reasonable. The State does, however, dispute certain aspects of the remaining nine components, and we consider these in further detail below.

a. Canister Transfer Building and Crane Seismic Qualification Costs

4.33 The State argues that because the particular seismic code under which the CTB and fifty-ton mobile crane are qualified is unknown, and because no additional funds have been set aside for potential seismic design upgrades, PFS's construction cost estimates are uncertain. See State Findings at 15.

4.34 Relative to the CTB, PFS witness Takacs testified that seismic information, reflected in the amount of concrete and reinforcement required, was incorporated into the structural drawings he used to derive his cost estimate for the building. See Tr. at 1711. Mr. Takacs further testified that the vendor had seismically qualified the crane before quoting the price to Stone & Webster. See id. at 1750. Because seismic considerations were contemplated in both the CTB and crane estimates and the State did not proffer any evidence concerning the extent to which the cost estimates would be impacted materially if seismic

design upgrades were necessary,[11] we find the construction cost estimates for the CTB and the crane reasonably take into account seismic concerns.

b. Building Estimates Based on Preliminary Information

4.35 The State objects to the use of conceptual renderings, which represent the earliest stage of the design process, by Mr. Gase and Mr. Takacs in their preparation of the construction cost estimates for most of the proposed buildings. See State Findings at 15-17.

4.36 During the design process, the level of detail represented in a drawing becomes progressively more precise in the following general order: conceptual, structural, preliminary, detailed, and finally, construction drawings. See Tr. at 1696-97. Mr. Gase and Mr. Takacs testified that the cost estimate for the CTB was based on structural drawings, which include the floor plan, exterior elevations, electrical one-line diagram, and design criteria for the building. See Gase/Takacs Testimony at 10; see also PFS Exh. K. With regard to the facility's three remaining proposed buildings, although PFS's witnesses initially labeled the drawings used in the estimates as conceptual drawings, see Gase/Takacs Testimony at 14-17, Mr. Takacs later characterized them as preliminary drawings. See Tr. at 2612-13, 2615. Mr. Takacs further testified that the drawings and dimensions of the four proposed buildings given to him were adequate for him to determine the quantities of material and labor necessary to construct the buildings. See id. at 1748. According to PFS, the construction costs estimated for the four proposed buildings are not only reasonable when compared against construction industry cost data for buildings of similar types on a dollar per square foot basis, see Gase/Takacs Testimony at 11, 15-17, but are also likely to be over-conservative. See Tr. at 2611.

---

[11] Mr. Takacs, on the other hand, testified that buildings requiring seismic considerations would cost "a little bit more" than those in non-seismic areas. Tr. at 1710.

4.37 Although the State took issue with the lack of detail in the drawings, rather than pointing to a specific deficiency in the cost estimates it merely suggested that the lack of detail led to little confidence in the estimates. See State Findings at 17. Based on the testimony of Mr. Takacs and Mr. Gase, we find that the construction cost estimates for the CTB, the Security and Health Physics Building, the Administration Building, and the Operations and Maintenance Building are reasonably derived from structural and preliminary drawings.

c. Rail Equipment

4.38 The State also takes issue with the PFS plan to acquire used or refurbished rail equipment. See State Findings 21. Although the State points out that new rail equipment costs substantially more than used or refurbished rail equipment, see State Findings at 21-22, that fact alone does not invalidate the PFS cost estimates. The estimates for the used rail equipment were derived from the cost to purchase and refurbish a unit currently in service. See Parkyn Construction Testimony at 7-8. To the extent the State suggests that used equipment may require additional maintenance or replacement over the term of the facility's license, Mr. Parkyn testified that used locomotives were highly reliable, see Tr. at 1862, and, with proper maintenance, could be operated indefinitely, see id. at 1891-92. Mr. Parkyn further testified that PFS did not anticipate replacing its rail equipment over the term of the facility's license. See id. at 1893. Moreover, Mr. Parkyn declared there is no increased safety risk associated with the use of refurbished equipment as opposed to new equipment. See id. at 1875, 1893. The State did not challenge or refute Mr. Parkyn's testimony on any of these points.

4.39 In addition, the State insists that any costs for maintenance, upkeep, and fueling of the rail equipment – xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx – must be included in the PFS cost estimates. See State Findings at 22-23. Mr. Parkyn testified that

maintenance and fueling costs for the locomotives are considered transportation costs. See Tr. at 1862, 1971, 2072. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxx, PFS estimated the costs associated with the transportation of SNF to the facility to be xxxxxxxxxxxx over a forty-year license term. See Parkyn/Kapitz O&M Testimony at 13. These estimates are proportional to the actual distance shipped and were developed based on discussions with staffs of the Union Pacific Railway and the Burlington Northern Railway, using a distance from a mid-west reactor site. See Parkyn/Kapitz O&M Testimony at 13-14.

4.40 The State also claims that the use of used rail cars as buffer cars appears to be inconsistent with PFS's "start clean, stay clean" philosophy, in that the cars may not be contaminant-free when purchased by PFS. See State Findings at 23. Mr. Parkyn testified, however, that the used cars would not have been exposed to radioactive material and would not have been used to transport hazardous material. See Tr. at 1873-74. Putting aside the fact that this State concern seemingly has nothing to do with the reasonableness of PFS cost estimates, we conclude that the PFS evidentiary presentation was adequate to establish the sufficiency of this aspect of its rail equipment cost estimates.

4.41 Thus, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, we find that PFS has appropriately accounted for and reasonably estimated the costs of rail equipment for the proposed facility.

d. Cask Transfer Systems

4.42 The State also challenges the PFS estimate for the cost of the spent fuel transfer cask, which it asserts is inadequate because it was based on a comparison with a spent fuel

transportation cask. See State Findings at 24. PFS estimates each transfer cask to cost xxxxxxxx, based on a comparison to the estimated cost of the transportation cask, which costs approximately xxxxxxxxxx. See Parkyn Construction Testimony at 9. Compared to the transportation cask, the transfer cask is a more simple shielding cask used onsite to transfer the loaded fuel canister from the shipping cask to the storage cask. See id. The State did not present any evidence showing that PFS's estimate for the transfer cask was inaccurate. Therefore, we find the PFS cost estimate for the spent fuel transfer casks to be reasonable.

4.43 The State did claim, however, that because the dry transfer system will need to be specially designed for the proposed facility, PFS must account for the costs of designing and licensing the system as part of its financial assurance showing. See State Findings at 24-25. Mr. Parkyn testified, however, that PFS was paying for the design and certification costs of the system out of precollected PFS member subscription fees as part of PFS pre-licensing activities, see Tr. at 1917, 1924, and that the design of the system would be completed well before the start of construction of the facility.[12] During the evidentiary hearing, the Board ruled that pre-construction activities are outside the scope of PFS's construction costs. See Tr. at 1742. Thus, we find that PFS need not include the design and licensing costs associated with the dry transfer system incurred during the pre-construction period.

---

[12] See Tr. at 1921-23. The State introduced into evidence a letter from Holtec International stating that Holtec has yet to identify two PFS member reactor sites that perform fuel loading in the same manner. See State Exh. 20 (Letter from Stephen Agace, Operations Manager, Holtec International, to Dr. Max DeLong, Executive Engineer, Northern States Power Co. (Dec. 12, 1998)). According to the State, this letter demonstrates that the design of the dry transfer system will be complicated and, contrary to Mr. Parkyn's testimony, may not be completed during the pre-construction period. See State Findings at 26. Mr. Parkyn testified, however, that Holtec's claim about reactor fuel loading requirements was overstated given that the letter was intended to gain authorization to conduct studies to determine what utility cask loading practices already existed, see Tr. at 1911-13.

e. Omitted Construction Costs

i. Design Drawings

4.44 The State also asserts that PFS must include the costs of the design drawings for the facility in its construction cost estimates. See State Findings at 14. As we noted above, during the course of the hearing, the Board ruled that pre-construction costs are outside the scope of the financial assurance regulations and the contention. See Tr. at 1742. In this regard, 10 C.F.R. Part 50 specifically allows an applicant to engage in pre-construction activities such as site exploration and the procurement or manufacture of facility components before obtaining a construction permit. See 10 C.F.R. § 50.10(c)(1), (2). In addition, the Part 72 regulation that requires an applicant to demonstrate reasonable financial assurance refers only to "construction costs," and not to "pre-construction costs." See id. § 72.22(e).

4.45 The State also relies on the Commission's Claiborne decision, in which the Commission observed that the construction costs of the facility included "owners' costs back to the beginning venture phase." See CLI-97-15, 46 NRC at 306 n.16. The Claiborne decision does not, however, require the applicant to include costs going back to the venture phase of the project. Rather, as we read it, the Commission was merely recounting what items the applicant had included in its cost estimate, which was not in controversy.[13] Therefore, we find that pre-construction costs, such as the costs of the design drawings of the PFS facility,[14] fall outside the

[13] See id. ("Hard construction costs of the [facility] are in 1992 dollars and include the cumulative construction costs of the centrifuges, and owners' costs back to the beginning venture phase. The amount does not include the interest accrued during construction, escalation costs, financing costs, and decommissioning costs.")

[14] We note also that, notwithstanding the Board's offer to allow proffers regarding pre-construction costs, see Tr. at 1762, the State did not provide any evidence quantifying those costs so as to establish their materiality.

scope of contention Utah E/Confederated Tribes F and need not be included in the PFS cost estimates.

ii. Capital Renewal Costs

4.46 The State claims that PFS's construction cost estimates are inadequate in that they do not take into account the cost of capital renewal. See State Findings at 14. Mr. Takacs testified, however, that any necessary replacement of capital equipment would be an O&M expense. See Tr. at 1746. In this regard, PFS has estimated that the costs of maintenance and replacement of parts will amount to **xxxxxxxxxxx** over a forty-year license term. See Parkyn/Kapitz O&M Testimony at 16. The State did not challenge the maintenance and parts portion of PFS O&M cost estimates. We find, therefore, that PFS having appropriately and reasonably estimated the costs for capital renewal, albeit as a component of O&M costs, did not need to include these as a construction cost element.

iii. Breached or Defective Canister Overpacks

4.47 The State challenges the PFS plan to deal with breached or defective storage canisters. Specifically, it objects to the omission of two breached canister overpacks from the most recent PFS construction budget and to the potential safety and/or regulatory consequences of storing defective canisters on-site. See State Findings at 19-20.

4.48 PFS witness Parkyn testified that the canister overpacks were eliminated from the construction budget because there was not regulatory requirement for such an overpack. See Tr. at 1898, 1900. In the event of a breached canister, PFS intends to house the breached canister in one of the six Hi-Star transportation casks -- which it considers a stronger containment vessel than a canister overpack (see id. at 1903) -- it plans to purchase. See id. at 1899. Mr. Parkyn testified that if it were necessary, a Hi-Star cask could be taken out of

service and used to store the breached canister as long as needed. See id. at 1899-1900. If necessary, PFS would purchase an additional transportation cask, estimated at xxxxxxxxxx each, see Parkyn Construction Testimony at 7, using funds from its ten percent contingency fund. See PFS Reply at 21; see also Tr. at 1940-41 (noting contingency funds not allocated for any specific purpose and can be used for any unexpected expenditure). Based on the evidentiary record, the PFS plan to deal with breached canisters appears reasonable so that the elimination of canister overpacks from the construction cost estimate likewise was reasonable.[15]

iv. Interest During Construction

4.49 The State also argues that all interest payments that PFS makes during the construction period on loans that PFS may procure for its customers must be included in the construction cost estimates. See State Findings at 27. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See Parkyn/Kapitz O&M Testimony at 24-25; Tr. at 1935, 2077-78. xxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

---

[15] With regard to the possible regulatory implications of storing breached canisters at reactor sites, we find that the State's concern falls outside the scope of this contention, which is narrowly focused on the reasonableness of the PFS cost estimates and amount of onsite property insurance coverage.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx[16] We thus find the exclusion of interest payments from PFS construction cost estimates to be reasonable.

f. Contingencies

4.50 The State contends that the ten percent contingency PFS has allotted in its construction cost estimate will not be sufficient to cover unanticipated costs or costs caused by delays during construction. See State Reply at 11-12. Mr. Parkyn testified that the contingency estimate for PFS is comparable to those of general construction projects in which most of the work is pre-bid. See Parkyn Construction Testimony at 12. Furthermore, because the majority of the expenditures for the proposed facility are conventional activities, bids can be acquired prior to construction, decreasing the amount of uncertainty in the costs. See id.; Tr. at 2008. In addition to the ten percent contingency, PFS asserts that additional unexpected costs will be absorbed by conservatism in the cost estimates. See Tr. at 2012-13. We find that PFS's contingency estimate, coupled with the built-in conservatism in the cost estimates, is a reasonable means of dealing with unanticipated costs arising during the construction period.

---

[16] xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

g. Additional License Conditions

4.51 The State seeks the imposition of five additional conditions on the license for the proposed facility that would: (1) prohibit PFS from commencing construction until it may lawfully do so after issuance of the license; (2) specify the three phases of construction; (3) commit PFS to using the Low railroad transportation option; (4) prohibit PFS from shifting construction or operating costs to the GSLSR; and (5) include administrative costs incurred during the construction period in PFS's construction cost estimates. See State Reply at 5-11.

4.52 In a different context in this proceeding -- relative to contention Utah R, Emergency Plan -- the State sought license conditions that would incorporate certain fire safety commitments made by PFS as express conditions of PFS's license. See LBP-00-35, 52 NRC 364, 409-10 (2000), petition for review denied, CLI-01-9, 53 NRC 232 (2001). In declining to impose the requested license conditions, this Board noted that the conditions at issue were statements made by PFS in the course of its proposed findings, based on statements made by its witnesses under oath before the Board or as part of its application. See id. at 410. We were satisfied that those statements indicated a commitment on the part of PFS to comply with the relevant fire safety standards and saw little purpose in repeating those assurances as license conditions. See id. In denying the State's request for review of the Board's ruling, the Commission rejected the notion that all commitments made by the licensee must be memorialized as express license conditions in order to be enforceable. See CLI-01-9, 53 NRC at 235. Regarding its ruling in CLI-00-13 relative to financial assurance, the Commission explained that when PFS sought to establish its financial qualifications through customer service agreements, certain provisions were appropriately incorporated as conditions in the license to simplify staff review of compliance. See id. In the same vein, the Commission

advised that its decision in CLI-00-13 "should not be read to suggest that promises and representations made to NRC Staff and NRC hearing boards are meaningless if they are not reiterated in the license." Id.

4.53 In this light, we find that additional license conditions are unnecessary, based on statements made by PFS under oath and/or on the record during the hearing process. For example, counsel for PFS stipulated -- and the State accepted -- on the record that PFS would not begin construction on the facility until after the issuance of the license. See Tr. at 1978. In addition, Mr. Parkyn testified that the construction phases would consist of 10,000 MTU capacity in each of Phases I and II and of 20,000 MTU in Phase III. See Parkyn Construction Testimony at 4-5. With respect to cost shifting, PFS construction and O&M cost estimates have included rail and other transportation-related charges that might conceivably be incurred by the GSLSR in those phases. See Gase/Takacs Testimony at 18; Parkyn Construction at 6-8; Parkyn/Kapitz O&M Testimony at 13-14. Furthermore, Mr. Parkyn testified that PFS would not shift construction costs to the railroad. See Tr. at 1965. Mr. Parkyn also testified that administrative costs incurred during the construction period would be part of the PFS showing to the staff under LC-1 and would, therefore, be considered construction costs. See Tr. at 1962. Based on the foregoing statements and testimony, we are satisfied PFS has made commitments and representations that cover these items and that those commitments are such that license conditions are unnecessary relative to any future staff enforcement.

4.54 In connection with the State's requested transportation license condition, PFS witnesses testified that PFS would construct and operate either the Low rail line or the ITF, with the Low rail line being the preferred alternative. See Tr. at 2104; Gase/Takacs Testimony at 18. PFS witnesses also testified that its construction and O&M estimates include the costs

associated with the Low rail line option, which is the more expensive alternative. See Gase/Takacs Testimony at 18; Tr. at 2155-56. Because we find, based on this showing, that the PFS transportation costs estimates are reasonably conservative, at this time we likewise find it unnecessary to impose a license condition on PFS requiring it to choose a transportation alternative.

h. Staff Review of Construction Cost Estimates

4.55 The State also challenges the staff's evaluation of PFS's construction cost estimates, taking issue with what it views as the staff's "wholesale acceptance" of PFS's estimates. See State Findings at 28, 29. We note, however, that the adequacy of the staff's safety review is not relevant to the issue of whether a license application should be approved. See Curators of the Univ. of Missouri (TRUMP-S Project), CLI-95-1, 41 NRC 71, 121 (1995). Because it is the applicant, rather than the staff, that bears the burden of proof with respect to safety issues, "in adjudications, the issue for decision is not whether the Staff performed well, but whether the license application raises health and safety concerns." Id. CLI-95-8, 41 NRC 386, 396 (1995).[17]

[17] Be that as it may, staff witnesses Dr. McKeigney and Mr. Wood testified they spent a combined 600-700 hours over the three years prior to the hearing reviewing PFS's financial qualifications. See Tr. at 2602-03. During that time, they reviewed the cost of nuclear facilities and other ISFSIs to compare the key parameters of costs and steps that PFS had identified. See id. at 2603-04. In addition to performing a confirmatory review of the Stone & Webster construction estimates to determine whether major components were included, the staff also reviewed the mathematical calculations involved. See id. at 2605. Dr. McKeigney and Mr. Wood also considered information submitted in PFS's most recent cost estimates for the fourth quarter 1999. See id. Thus, notwithstanding the Commission's guidance in Curators of the Univ. of Missouri, we find no basis to call into question the staff's review of the PFS construction cost estimates.

4. Summary of Construction Cost Estimates

4.56 In sum, the Board finds that, in accord with 10 C.F.R. § 72.22(e)(1), PFS has provided reasonable estimates of the costs to construct the proposed facility. The estimates are based on reasonable methodologies and are adequately supported by the preponderance of the evidence in the record, including the testimony of several witnesses with nuclear facility cost estimating expertise. Pursuant to the Commission's order in CLI-00-13, we find that PFS may not commence construction before obtaining funding commitments in the amount of xxxxxxxxxxxx (to be escalated (1) from fourth quarter 1999 dollars to present day value, and (2) per the factors specified in MSA Schedule 5).

F. Findings and Conclusions Regarding Operating and Maintenance Cost Estimates

1. Total Estimated O&M Costs

4.57 PFS's total O&M costs for the proposed facility are estimated at $2.88 billion (in 1997 dollars) over a forty-year period,[18] for an average of about $72 million per year (in 1997 dollars). See Parkyn/Kapitz O&M Testimony at 6. This figure assumes two twenty-year license terms and the storage of 40,000 MTU. See id. If PFS were to store 10,000 MTU (1,000 casks) at the facility, rather than the 40,000 MTU (4,000 casks) maximum, the primary effect would be to substantially reduce the O&M costs incurred for storage casks and canisters, which represent over sixty percent of the O&M budget. See id. at 7. PFS submits that the remaining costs would not change significantly in that many of them are either not overly sensitive to the number of canisters on-site or constitute a relatively small proportion of the O&M costs for a 40,000 MTU facility. See id.

[18] This total cost figure excludes depreciation as another generalized cash flow item that does not affect a PFS operating cost or revenue. See Tr. at 2140-41.

4.58 PFS's O&M cost estimates are broken out by category as follows:

O&M Cost Category	Total	% of Total
Labor	xxxxxxxxxxx	xxx
Operations Support	xxxxxxxxxxx	xxx
Canisters	$1,302,200,000	45.2
Overpacks	$608,800,000	21.1
Rail Fees	xxxxxxxxxxxx	xxx
Transportation and Storage Consumables	xxxxxxxxxxx	xx
Maintenance and Parts	xxxxxxxxxxx	xxx
Regulatory Fees	xxxxxxxxxxx	xx
Quality Assurance/Radiological/Environmental Fees	xxxxxxxxxx	xx
Utilities	xxxxxxxxxxx	xx
Low-Level Radioactive Waste Disposal	xxxxxxxxxx	xx
Visitor's Center	xxxxxxxxxx	xx
Radiological Decommissioning	xxxxxxxxxxx	xxx
Non-radiological Decommissioning	xxxxxxxxxxx	xx
Host Payments	xxxxxxxxxxxx	xxx
Castle Rock xxxxxxxx	xxxxxxxxxx	xx
Utah Sales Tax	xxxxxxxxxxxx	xxx
Contingencies	xxxxxxxxxxx	xx
Total	**$2,883,493,125**	**100.0**

See PFS Findings at 39-40 (citing Parkyn/Kapitz O&M Testimony at 6-7; Tr. at 2153-54.).

4.59 Relative to contention Utah E, the State does not challenge the following components of the O&M cost estimate: (1) labor; (2) operations support; (3) overpacks; (4) transportation and storage consumables; (5) maintenance and parts; (6) regulatory fees; (7)

quality assurance, radiological, and environmental fees; (8) utilities; (9) low-level radioactive waste disposal; (10) visitor's center; (11) radiological decommissioning; (12) non-radiological decommissioning; (13) Utah sales tax; and (14) contingencies. We, therefore, do not discuss those categories in depth. The Board has examined the bases of the estimates submitted by PFS for the above fourteen components, see PFS Findings at 40-48, and finds them to be reasonable. Below, we consider in further detail the issues raised by the State.

2. State Concerns

a. Scope of O&M Costs

4.60 The State claims that because the planned capacity of the proposed facility is 40,000 MTU, PFS must show reasonable assurance of obtaining sufficient funds to cover the estimated operating costs for a 40,000 MTU facility. See State Findings at 30-31. We consider the State's concern to be resolved by CLI-00-13, in which the Commission modified LC-2 to prohibit PFS from commencing operation of the facility until it had service agreements in place with prices adequate to cover the O&M costs for the "life of the license." CLI-00-13, 52 NRC at 36; see id. at 32 ("entire term of the license"). Thus, under revised LC-2, PFS must demonstrate it has service agreements in place that will provide it with adequate funds to cover the O&M costs of the facility over a twenty-year license period.

b. Relationship of Costs to the License Conditions

4.61 The State argues that LC-2 requires PFS to provide the estimated O&M costs at the time they are expected to be incurred over the planned life of the facility. See State Findings 32-33. In the Board's estimation, such a requirement does not come from LC-2, which only requires PFS to show that its service agreements will have prices adequate to cover the total operating costs of the facility as determined at the hearing. LC-2 also does not, contrary to

the State's assertion, obligate PFS to break down its O&M cost estimates by year. Further, putting aside whether this issue of timing also falls outside the scope of the contention that only challenged the costs estimates as being "vague, generalized, and understated," see LBP-98-7, 47 NRC at 252, requiring PFS to provide estimates for each year of operation appears to exceed Part 72 financial assurance requirements, which only direct an applicant to demonstrate reasonable assurance of obtaining the necessary funds to cover the estimated operating costs over the planned life of the ISFSI. See 10 C.F.R. § 72.22(e). We find, therefore, that PFS, which provided an average yearly cost figure, need not provide estimated O&M cost estimates broken down by the year in which they are expected to occur to fulfill the requirements of section 72.22(e).

4.62 In this regard, we likewise reject the State's argument that PFS must take into account when costs associated with the shipment of SNF to and from the facility, see State Findings at 35-36, and the costs of canisters and storage casks, see id. at 36-37, will be incurred.[19]

c. Unsupported Cost Estimates

4.63 The State also asserts that because PFS has failed to describe or support the basis of its O&M cost estimates, it has failed to establish the reasonableness and reliability of its estimates. See State Findings at 33. We find no basis for the State's assertion. For each of the eighteen categories comprising the O&M budget, PFS has provided the bases and assumptions underlying its cost estimates. See Parkyn/Kapitz O&M Testimony at 5-27.

---

[19] We note also that, as a factual matter, the premises of the State's concerns do not appear to be correct given the record information on potential cask production, see Tr. at 2090-94, and the need for PFS to purchase a second train to achieve the receipt rate of 2000 MTU per year, see Tr. at 2132-34.

d. Assumptions

4.64 The State contends that the PFS O&M costs must be estimated for the initial twenty-year license period, rather than on the anticipated forty-year term. See State Findings at 34. An additional State concern is that the staff will have no option but to renew PFS's license following the initial twenty-year term if a permanent repository is not available and the SNF cannot be returned to the owners. See id.

4.65 Section 72.22(e) requires an applicant to demonstrate reasonable assurance of securing sufficient funds to cover the "[e]stimated operating costs over the planned life of the ISFSI." 10 C.F.R. § 72.22(e) (emphasis added). Contrary to the State's argument, therefore, NRC regulations permit PFS to submit estimates based on the forty-year anticipated term of the facility. Moreover, again putting aside the question whether the State's concern relative to license renewal is within the bounds of the contention at issue, we consider it lacking as wholly speculative to the degree it is inappropriately based on uncertain events the applicant cannot prove would never happen. See Northeast Nuclear Energy Co. (Millstone Nuclear Power Station), CLI-01-3, 53 NRC 22, 27 (2001).

e. Transportation Costs

4.66 The State charges that rather than providing estimated operating costs for the two transportation alternatives, PFS has merely proffered a transportation credit based on the all-rail alternative from the LaCrosse, Wisconsin, reactor to Skull Valley. See State Findings at 38. In particular, the State argues that PFS has not produced any evidence establishing the operating costs for the ITF alternative. See id. The State also challenges the PFS plan to make the decision regarding which transportation alternative it will use only after the NRC issues PFS the license. See id.

4.67 PFS estimates the life-cycle O&M costs for the ITF to be xxxxxxxxxxxxx (in 1998 dollars), and the comparable costs for the all-rail alternative to be xxxxxxxxxxxxx (in 1998 dollars), based on a 40,000 MTU facility over a forty-year term. See State Exh. 17, at 19, 59 ([Stone & Webster], [PFSF] Transportation Study (Feb. 13, 1998)). Because the combined total life-cycle costs (construction and O&M costs) of the all-rail alternative are greater than the total life-cycle costs of the ITF option, PFS chose to incorporate the costs of the all-rail alternative into its broader xxxxxxxxxxxx transportation costs/railroad fees category. Tr. at 2146-47, 2155-56. While the Board recognizes that the bases provided by PFS for this category of O&M costs could have been more detailed, we note that the State has provided no evidence suggesting the PFS estimates are at all inaccurate.

4.68 In addition to its concern about the estimated costs of the ITF, the State also contends that PFS has omitted several cost components from its O&M transportation cost estimates. These costs include: (1) the cost to transport casks from reactors without onsite rail access by barge or heavy haul truck to a railhead; (2) payments to the BLM; and (3) the costs for rail line usage and fuel on the GSLSR if the all-rail alternative is chosen, or ITF employee salaries and costs of transporting casks by heavy haul truck down Skull Valley Road if the ITF option is used. See State Findings at 42-43.

4.69 Mr. Parkyn testified that reactor-to-railhead transportation costs, where necessary, were considered transportation costs and were included in the PFS estimates as such. See Parkyn/Kapitz O&M Testimony at 13; Tr. at 2146. Lease and restoration bond payments to the BLM amounting to xxxxxxxxxxxxxxxx per year and xxxxxxx per year, respectively, were also accounted for in the PFS transportation cost estimates. See Tr. at 2107-10. The PFS transportation cost estimates also account for costs, xxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxx, for usage of the GSLSR, see Tr. at 2064, 2072-73, as is fuel, see Tr. at 1991-92, in the event the all-rail alternative is used. If, on the other hand, PFS chooses the ITF option, ITF transportation employee salaries and truck transportation costs are also accounted for as transportation costs. See Tr. at 2042-43, 2105-07. Thus, we find that PFS has appropriately accounted for these cost components in its transportation cost estimates.

f. Costs for Construction Loans

4.70 The State asserts that PFS has failed to include costs for the interest payments and debt financing for loans that PFS may obtain on behalf of its customers who wish to finance their construction payments. See State Findings at 39-40, 41. As we noted above in our discussion of PFS's construction cost estimates in section IV.E.3.e.iv, this particular concern does not constitute a material item that must be included in the PFS O&M cost estimate in order for PFS to establish it is financially qualified.

g. Host Payments

4.71 The State claims that PFS has underestimated the host payments it must make to Tooele County because PFS has unreasonably assumed that all canisters stored at the facility will belong to member utilities, which are charged a lower annual storage rate per canister by Tooele County than are non-member utilities. See State Findings at 43-44. According to Dr. Sheehan's calculations, this assumption results in a $24 million understatement in PFS's host payment estimates. See State Exh. 37 (O&M Host Benefit Calculations for Skull Valley Band of Goshutes and Tooele County); State Reply at 17. Dr. Sheehan's calculation assumes that during the first twenty years of operation, the facility would receive 200 casks per year, and during the second twenty-year license term, 200 casks would be shipped out of the facility each year. See Tr. at 2652. He also assumed that the first 1,310

casks received and the last 1,310 casks shipped from the facility would be charged the lower member rate of $2,600 per cask per year, as opposed to the higher nonmember rate of $3,250 per cask per year. See State Exh. 37. Finally, Dr. Sheehan assumed that the annual storage capacity remained at a minimum of 500 MTU, and an annual base fee of $500,000 per year for a forty-year operating period. See id. Neither PFS nor the staff challenges Dr. Sheehan's assumptions or calculations.

4.72 Mr. Parkyn explained that PFS's calculations took into account only the lower member rate rather than the higher non-member rate because at the time the calculation was made, there were no signed agreements between PFS and Tooele County or between PFS and nonmember utilities. See Tr. at 2680. Although PFS maintains that the higher nonmember fees charged by Tooele County would be more than offset by the higher revenues that PFS would collect from the nonmember utilities, see Tr. at 2673-78, we find that the amount of incoming revenue is irrelevant to this contention, which is concerned only with the reasonableness of PFS's cost estimates.[20] The amount is relevant, however, as an O&M cost that must be accounted for in the total PFS O&M costs over the life of the license, which we do in section IV.F.3 below.

h. Castle Rock xxxxxxxx

4.73 The State contends that PFS's O&M estimates are deficient not only because PFS has omitted payments totaling xxxxxxxxxxxxxxxxxxxxxxxxxxx but also because the timing of the payments cannot be determined at this time. See State Findings at 44-45. Contrary to the State's assertion, however, PFS did include xxxxxxxxxx in its O&M estimate

[20] In this regard, however, we note that this fee would be covered as an O&M cost that would be xxxxxxxxxxxxxxxxxxxxxxxxxxxx under MSA section 13.4 and Schedule 4.

xxxxxxxxxxxxxxxxxxxxxxxxx over several years. See Parkyn/Kapitz O&M Testimony at 7. As we noted above in section IV.F.2.b, PFS need not specify when its costs will be incurred. Thus, we find that PFS has appropriately included xxxxxxxxxxxxxxxxxxxxxxxxxx in its O&M estimates.

i. BIA Bond

4.74 The State argues that because the BIA has the authority to require PFS to post a surety bond, PFS must include the cost of posting such a bond. See State Findings at 45. Mr. Parkyn testified that although the BIA had not determined whether they would require PFS to post a bond, most of the major issues for which the BIA would normally require bonding were considered by the BIA to be sufficiently covered by commitments PFS made its application. See Tr. at 2138-39. Furthermore, the lease agreement signed between the Skull Valley Band, the BIA, and PFS waives any obligation on the part of PFS to post a surety bond, unless PFS fails to make its lease payments as prescribed by the agreement. See PFS Exh. J, at 14 (Amended and Restated Business Lease between Skull Valley Band of Goshute Indians and Private Fuel Storage, L.L.C. (May 20, 1997)); Tr. at 2148. Thus, we find the PFS exclusion of the cost of a BIA surety bond from its O&M cost estimates to be reasonable.

j. Skull Valley Band Bond and Insurance

4.75 The State asserts that PFS must include the costs of additional insurance or bonding that the Skull Valley Band may require. See State Findings at 45. Mr. Parkyn testified that the Skull Valley Band had not indicated that it would ask PFS to post a bond. See Tr. at 2140. According to the signed business lease, the Skull Valley Band also waives any PFS obligation to post a bond to guarantee payment under the lease, unless PFS fails to make such

payments. See PFS Exh. J, at 14. The Board finds, therefore, that PFS need not include the cost of such a bond in its O&M cost estimates.

4.76 With regard to additional insurance that may be required, the lease agreement obligates PFS to obtain various types of insurance coverage, including, but not limited to, nuclear liability insurance, workers' compensation, contractor's insurance, fire and damage insurance, automobile insurance, contractual liability insurance, general errors and omissions insurance, directors' and officers' insurance, and business interruption insurance. See id. at 13. The costs appear to be covered under the estimated costs for operating support. See Parkyn/Kapitz O&M Testimony at 9. The lease further requires PFS to provide copies of the nuclear liability and workers' compensation coverage to the Skull Valley Band and to name the Band as an additional insured on certain policies where possible. See id. at 14. Thus, contrary to the State's assertion, to the degree the agreement provides the Skull Valley Band with the option to require PFS to obtain this additional insurance, the cost of this additional insurance has been included in its O&M cost estimates.

k. Staff Review of O&M Costs

4.77 The State's sole issue with the staff's review of the O&M cost estimates concerns the staff's acceptance of PFS's treatment of pass-through costs. See State Findings at 45-46. These costs include xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxx. See Parkyn/Kapitz O&M Testimony at 11, 13, 14, 25. Putting aside the principle, referenced in section IV.E.3.h above, that the adequacy of staff review is not the subject of adjudicatory consideration, as we have discussed previously PFS has in fact

provided reasonable estimates of all these items except for construction loan interest costs, a matter we have found does not require a cost estimate.

l. Additional License Condition

4.78 The State seeks the imposition of an additional license condition that would require PFS to submit to additional staff reviews of its ability to fund the operation and maintenance of the facility subsequent to the staff's review under LC-2. See State Reply at 12-13. As we observed above in section IV.E.3.g, commitments made during the hearing process, including those of the NRC staff, need not be memorialized as license conditions to be enforceable. Staff witnesses Dr. McKeigney and Mr. Wood testified under oath that following their initial review of PFS's ability to cover its O&M and decommissioning costs prior to commencement of operations pursuant to LC-2, they would conduct additional reviews if PFS were to later expand the capacity of the facility. See Tr. at 2580-84. Thus, we find the imposition of the State's requested license condition to be unnecessary.

3. Summary of O&M Cost Estimates

4.79 In conclusion, we find that in accordance with 10 C.F.R. § 72.22(e)(2), PFS has reasonably estimated the costs of operation and maintenance over the forty-year planned life of the facility, with the exception of a $24 million Tooele County, Utah host payment understatement. In accordance with the Commission's instructions in CLI-00-13, the Board finds that PFS may not commence operations before service agreements for the life of the license (i.e., twenty years) are in place with prices adequate to fund operations, maintenance,

and decommissioning[21] in the amount of xxxxxxxxxxxxxx (to be escalated from 1997 dollars to present day value) plus $12 million for Tooele County host payments.

G. Findings and Conclusions Regarding Onsite Property Insurance Coverage

1. Scope of PFS Nuclear Property Insurance Coverage

4.80 Generally speaking, nuclear property insurance indemnifies the policyholder for certain losses incurred from accidental damage at the insured premises. See Pickerl Testimony at 3. Except where excluded in the policy, all types of property are covered for all causes of loss. See id. Relative to nuclear property insurance, a key coverage provision is for accidental radioactive contamination and debris removal, subject to policy terms and conditions. See id.

a. Property Covered by PFS's Insurance Policy

4.81 Nuclear property insurance for the PFS facility in particular would cover property at the site, in addition to certain offsite property. See Tr. at 1773. PFS witness Mr. Pickerl testified that at the site, the policy would cover all buildings, storage casks, tools, equipment, machinery, and Skull Valley Band land to the extent that decontamination and cleanup were required for land damaged by radioactive contamination or accident debris. See id. at 1773-75. Coverage would also extend to the Low rail line or the ITF, depending on which transportation alternative PFS chooses. See id. at 1775. In addition, PFS "property in transit" – spent fuel canisters and casks in transit and railroad cars and equipment – would similarly be covered by

[21] Although we issue a separate decision today regarding the adequacy of the PFS efforts regarding decommissioning cost estimates, see LBP-05-22, 62 NRC __, __ (May 27, 2003) (slip op. at 41-52), per the table in section IV.F.1 above we incorporate the PFS decommissioning costs estimates in this figure to provide a unified figure as an aid to assessing future compliance with LC-2.

the policy. See id. at 1773-75. Vehicles licensed for highway use, however, such as the onsite ambulance and fire truck and heavy haul trucks from the ITF, would be covered under separate insurance, rather than under nuclear property insurance. See id. at 1773-74.

b. Causes of Loss Covered by PFS Policy

4.82 The PFS policy would cover damage resulting from earthquakes and floods. See id. at 1776. In the event of subsidence or settling of the land, while the policy would not cover the costs to restore the land to its pre-loss state, see Tr. at 1826, it would cover non-radiological damage to property (e.g., damaged cask) as well as the costs to clean up and remove radiological contamination caused by subsidence or settling. See Tr. at 1815-16, 1824-26. In addition, damage to property arising from routine military training exercises taking place at the Utah Testing and Training Range and the Dugway Proving Grounds would be covered. See PFS Exh. L, at 2 (June 26, 2000 Letter from David Ripsom, Vice President and General Counsel, Nuclear Electric Insurance Limited, to John Parkyn, Chairman, PFS). On the other hand, damage resulting from hostile or warlike activities or activities conducted to combat or defend against an impending or expected attack would fall under the policy's War Risk Exclusion and would, therefore, not be covered. See id.

2. Maximum Amount and Cost of Coverage Available to PFS

4.83 PFS has identified several potential providers of insurance for the proposed facility, including Nuclear Electric Insurance Limited (NEIL), the principal market for the provision of nuclear property insurance coverage, and several other nuclear insurers in London that would participate on a smaller scale. See Pickerl Testimony at 3. NEIL has indicated that it would be willing to provide a maximum onsite property coverage of **xxxxxxxxxxxx**, based on a review of the information concerning the design and operation of the proposed facility,

including the PFS license application, SAR and environmental report, and the staff's December 1999 partial SER. See id. at 4; PFS Exh. F, at unnumbered p. 2 (May 11, 2000 Letter from Lawrence Frantz, Senior Underwriter, NEIL, to John Parkyn, Chairman, PFS). The London companies would be willing to provide an additional xxxxxxxxxxx of coverage. See Pickerl Testimony at 4. Mr. Pickerl testified that in his opinion, xxxxxxxxxxxx represented the maximum amount of coverage available for the PFS facility at reasonable terms and conditions. See id. at 6. The State did not proffer any evidence disputing this amount. Thus, the Board finds that xxxxxxxxxxxx is the maximum amount of onsite nuclear onsite property insurance coverage available to PFS at reasonable terms and conditions.

4.84 NEIL has indicated that it would charge a premium of xxxxxxxx per year for xxxxxxxxxxxx of coverage. See PFS Exh. F, at unnumbered p. 2. The additional xxxxxxxxxxx in coverage offered by the London companies would be available to PFS at a xxxxxxx annual premium. See Pickerl Testimony at 4. Thus, as of June 2000 the combined xxxxxxxxxxxx in coverage was available for a premium of xxxxxxxx per year.

3. Adequacy of Coverage and PFS Commitments to Obtain Coverage

4.85 Based on the lower potential for damage associated with passive storage of SNF in sealed canisters as compared to the risks associated with an operating reactor, NEIL determined that xxxxxxxxxxxx of coverage would be more than adequate for the PFS facility. See PFS Exh. F, at unnumbered p. 2. The State does not challenge this conclusion.

4.86 PFS, however, asserts that as little as $70 million in coverage would be more than sufficient to cover damage to the site in the event of a radiological accident at the facility. See Parkyn Insurance Testimony at 4. The $70 million figure is apparently derived from an initial estimate given to Mr. Parkyn by Nuclear Liability Insurance, one of the insurance

companies affiliated with NEIL, see State Exh. 14, at 132-33 (Deposition of John D. Parkyn, May 3, 2000). Moreover, as further support for this figure Mr. Parkyn noted that given the greatly reduced risk presented by a shutdown reactor, the NRC has reduced its nuclear property insurance requirements for individual reactors undergoing decommissioning to amounts ranging from zero to $63 million. See id. at 6-7 (citing Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11, SECY-96-256 (Dec. 7, 1996)).

4.87 Although the State asserts that PFS has not justified that $70 million in coverage is adequate to cover potential property damage, see Sheehan Testimony at 54, it has not proffered any evidence suggesting that $70 million in coverage would be inadequate. Nonetheless, the State insists that PFS must retain the maximum amount of onsite insurance it can obtain from insurers -- currently, **xxxxxxxxxxxx** of coverage. See State Reply at 20.

4.88 Under NRC regulations, operating reactors are not required to retain the maximum amount of insurance coverage available without regard to the accompanying terms and conditions. Pursuant to 10 C.F.R. § 50.54(w), reactor licensees are required to "take reasonable steps to obtain insurance available at reasonable costs and on reasonable terms from private sources" and must maintain "a minimum coverage limit for each reactor station site of either $1.06 billion or whatever amount of insurance is generally available from private sources, whichever is less." Thus, the regulations neither mandate a specific amount of coverage nor demand the maximum amount of coverage available under any circumstance, but rather provide licensees with some degree of flexibility in demonstrating compliance with the NRC's insurance requirements. Moreover, as we observed previously, current NRC regulations do not require licensees of ISFSIs to obtain onsite property insurance.

4.89 As the Commission's directive in CLI-00-13 makes clear, however, PFS must obtain such insurance in an amount to be determined based on the Board's hearing. In this regard, PFS has committed to procuring the maximum amount of coverage that is currently available at reasonable terms and costs for the facility – xxxxxxxxxxxx for a total annual premium of xxxxxxxx – and the maximum amount of coverage it can obtain for xxxxxxxx (in 2000 dollars). See Parkyn Insurance Testimony at 4-5. In the future, however, if the amount of coverage that can be purchased with an annual premium of xxxxxxxx falls below $70 million (in 2000 dollars), PFS will either (1) maintain $70 million in coverage; or (2) conduct an accident consequences assessment and determine the onsite recovery cost that PFS would incur from the maximum credible radiological accident at the site. See id. at 5. If PFS opts to perform the consequences assessment and the costs are projected to be greater than $70 million, then PFS commits to obtaining additional nuclear property insurance to cover the increased costs. See id. PFS also indicates, however, that in no case will PFS obtain more nuclear power insurance coverage than (1) what is available at reasonable costs and at reasonable terms from private sources at the time PFS wants to obtain additional coverage; and (2) the amount of coverage the NRC subsequently can require of ISFSIs such as PFS. See id.

4. Summary of Onsite Property Insurance Coverage Findings

4.90 PFS has committed to pay an annual premium of xxxxxxxx to maintain at least $70 million in onsite property insurance coverage. Indeed, the amount of coverage this premium would buy likely would exceed $70 million, depending on the terms and conditions being offered by private insurers or on the results of the consequences assessment. Be that as it may, in light of the decreased potential for damage posed by ISFSIs as compared to operating nuclear power plants, the flexibility of NRC insurance requirements afforded to

reactor licensees, and the NRC's relaxation of minimum insurance requirements for reactors undergoing decommissioning, we find the PFS insurance commitments to be reasonable. Accordingly, pursuant to the Commission's directive in CLI-00-13, we find that absent an agency rulemaking that requires PFS to obtain additional insurance coverage, PFS must maintain onsite property insurance coverage of at least $70 million (in 2000 dollars), or the amount of coverage that a xxxxxxxx (in 2000 dollars) annual premium will purchase, whichever is greater.

V. SUMMARY FINDINGS OF FACT AND CONCLUSIONS OF LAW

5.1 Although the State has challenged various components of the PFS cost estimates as being understated, unreliable, or missing, with the exception of the O&M cost of $24 million for host payments to Tooele County, which is less than one percent of the total O&M costs for the facility over its forty-year life time, the State has not demonstrated to what extent these purported deficiencies render the PFS estimates unreliable. In short, because the State has not shown with any degree of specificity that the PFS estimates, as put forth in the evidentiary record before the Board, are understated by any significant amount, the State has not established that "relevant uncertainties significantly greater than those that usually cloud business outlooks" exist. Seabrook, CLI-99-6, 49 NRC at 222. What the State seeks is essentially a redrafting of PFS's construction and O&M plan with a new estimate without

demonstrating the existence of a gross discrepancy,[22] which the Commission deemed insufficient in Yankee Rowe. CLI-96-7, 43 NRC at 260.

5.2 Having considered all of the evidence submitted by the parties in this proceeding, including the parties' proposed findings of fact and conclusions of law, based on the findings and conclusions set forth in section IV above, the Board finds that PFS has met its burden under 10 C.F.R. § 72.22(e) to establish reasonable assurance that it is financially qualified to construct, operate, and maintain the proposed facility in that its construction and O&M cost estimates are based on "plausible assumptions and forecasts." Seabrook, CLI-99-6, 49 NRC at 222. Further, we find that PFS's commitments to obtain onsite property insurance coverage to be reasonable. Therefore, relative to the issues raised in subparts five, six, and ten of contention Utah E/Confederated Tribes F that were the subject of the Board's June 2000 evidentiary hearing, the Board finds that PFS has provided reasonable assurance of its financial

[22] Despite our acceptance of the State's argument that the Tooele County host payments are understated by $24 million over the facility's 40-year lifetime, this component represents a mere 0.8 percent of the total O&M cost estimate, rendering it immaterial to the overall cost estimate.

qualifications in compliance with 10 C.F.R. § 72.22(e), and thus subparts five, six, and ten of contention Utah E/Confederated Tribes F are resolved in favor of PFS.[23]

6.1 Pursuant to 10 C.F.R. § 2.760, it is this twenty-seventh day of May 2003, ORDERED, that this partial initial decision will constitute a final decision of the Commission forty (40) days from the date of issuance, or on Monday, July 7, 2003, unless a petition for review is filed in accordance with 10 C.F.R. § 2.786, or the Commission directs otherwise. Any party wishing to file a petition for review on the grounds specified in 10 C.F.R. § 2.786(b)(4) must do so within fifteen (15) days after service of this first partial initial decision. The filing of a petition for review is mandatory in order for a party to have exhausted its administrative remedies before seeking judicial review. Within ten (10) days after service of a petition for review, parties to this proceeding may file an answer supporting or opposing Commission review. Any petition for review and any answer shall conform to the requirements of 10 C.F.R. § 2.786(b)(2)-(3).

6.2 Given previous party positions suggesting that financial assurance-related information may include proprietary or other sensitive data, on or before Friday, June 20, 2003, the State, PFS, and the staff shall provide the Board with a joint filing outlining each (1) proposed redaction of any part of this partial initial decision to which there is no objection; (2)

---

[23] Recently, in the form of a motion for reconsideration of its decision in LBP-03-04, 57 NRC __ (Mar. 10, 2003), regarding State concerns over the probability of military aircraft accidents in connection with the Skull Valley facility, PFS has put before the separate Licensing Board chaired by Administrative Judge Farrar the possibility of authorizing initial construction and operation of a significantly smaller, 336-cask facility. Currently, the license application before this Board outlines plans for a very differently sized facility, and it is upon the basis of that application that we make our ruling today.

proposed redaction of any part of this partial initial decision to which there is an objection; and (3) proposed redaction of any part of the cross-examination plans submitted by the parties to the Board in connection with the evidentiary presentations on contention Utah E/Confederated Tribes F.[24] The particular word or phrase to be withheld from public release shall be specified for each proposed redaction; blanket requests for withholding are disfavored. Further, in accordance with 10 C.F.R. § 2.790, the party seeking the proposed redaction shall at the same time provide a separate submission that describes with specificity (as supported by any

[24] In addition, as was noted in above, see supra n. 6, pending before the Board are party pleadings regarding the disclosure of portions of the hearing transcripts, prefiled testimony, and exhibits from the June 2000 evidentiary hearing and a motion to adopt joint transcript corrections. It would be the Board's intention to rule upon those at the same time it makes a determination about public disclosure of all or parts of this decision, as well as of the summary disposition and contention Utah S decisions issued today.

necessary affidavits) the reasons for withholding each proposed redaction from the public.

Responses by any party objecting to a proposed redaction shall be filed on or before Monday, June 30, 2003.

THE ATOMIC SAFETY
AND LICENSING BOARD[25]

/RA/

G. Paul Bollwerk, III
ADMINISTRATIVE JUDGE

/RA/

Dr. Peter S. Lam
ADMINISTRATIVE JUDGE

Rockville, Maryland

May 27, 2003

---

[25] Pursuant to previous Board issuances on e-mail service of documents identified as potentially containing proprietary information, copies of this memorandum and order were sent this date by Internet e-mail transmission to counsel for PFS, the State, and the staff. In addition, this date a memorandum was sent by e-mail to all the parties to this proceeding advising them of the issuance of this decision and the Board's determination to afford this decision confidential treatment pending a response by PFS, the State, and the staff to the Board's inquiry under paragraph 6.2 above. See Licensing Board Memorandum and Order (Notice Regarding Issuances Concerning Contentions Utah E/Confederated Tribes F and Contention Utah S) (May 27, 2003) (unpublished).

Although agreeing with the result reached here, because of illness Judge Kline was unavailable to participate in the final preparation of this decision.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LBP-05-21-REDACTED VERSION OF LB PARTIAL INITIAL DECISION (CONTENTION UTAH E/CONFEDERATED TRIBES F, FINANCIAL ASSURANCE) have been served upon the following persons by deposit in the U.S. mail, first class, or through NRC internal distribution.

Office of Commission Appellate Adjudication
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
G. Paul Bollwerk, III, Chairman
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Sherwin E. Turk, Esquire
Laura C. Zaccari, Esquire
John T. Hull, Esquire
Darani M. Reddick, Esquire
Office of the General Counsel
Mail Stop - 0-15 D21
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Peter S. Lam
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Stephen L. Simpson, Esquire
Office of the Solicitor
Department of the Interior
Division of Indian Affairs
1849 C Street, NW, Mailstop 6456-MIB
Washington, DC 20240

Diane Curran, Esquire
Harmon, Curran, Spielberg & Eisenberg, L.L.P.
1726 M Street, NW, Suite 600
Washington, DC 20036

Joro Walker, Esquire
Director, Utah Office
Western Resource Advocates
1473 South 1100 East, Suite F
Salt Lake City, UT 84105

Martin S. Kaufman, Esquire
Atlantic Legal Foundation
205 E. 42nd St.
New York, NY 10017

Docket No. 72-22-ISFSI
LBP-05-21-REDACTED VERSION OF LB PARTIAL
INITIAL DECISION (CONTENTION UTAH E/CONFEDERATED
TRIBES F, FINANCIAL ASSURANCE)

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

Jay E. Silberg, Esquire
D. Sean Barnett, Esquire
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128

John Paul Kennedy, Sr., Esquire
David W. Tufts, Esquire
Confederated Tribes of the Goshute
Reservation and David Pete
Durham Jones & Pinegar
111 East Broadway, Suite 900
Salt Lake City, UT 84105

Richard Wilson
Department of Physics
Harvard University
Cambridge, MA 02138

Tim Vollmann, Esquire
3301-R Coors Road N.W., #302
Albuquerque, NM 87120

Paul C. EchoHawk, Esquire
ECHOHAWK LAW OFFICES
151 North 4th Avenue, Suite A
P.O. Box 6119
Pocatello, ID 83205-6119

Joseph R. Egan, Esquire
Martin G. Malsch, Esquire
Egan, Fitzpatrick, Malsch & Cynkar, PLCC
The American Center at Tysons Corner
8300 Boone Boulevard, Suite 340
Vienna, VA 22182

[Original signed by Evangeline S. Ngbea]

Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 12th day of August 2005

RAS 10296

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

LBP-05-20
DOCKETED 08/12/05

ATOMIC SAFETY AND LICENSING BOARD

SERVED 08/12/05

Before Administrative Judges:

G. Paul Bollwerk, III, Chairman
Dr. Jerry R. Kline
Dr. Peter S. Lam

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, L.L.C.	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	May 27, 2003

MEMORANDUM AND ORDER
(Rulings on Summary Disposition Motion and
Other Filings Relating to Remand from CLI-00-13)

[Note: Although this memorandum and order was originally issued in May 2003, it was treated as a non-public issuance pending review of challenges by intervenor State of Utah to claims by applicant Private Fuel Storage, L.L.C., that pursuant to 10 C.F.R. § 2.790 certain portions of the decision should be withheld from public disclosure as proprietary information. With issuance of the Commission's final decision on that matter, see CLI-05-16, 62 NRC __ (July 22, 2005), this decision is being publically released in a redacted form.]

-- PUBLICLY-AVAILABLE VERSION --

TABLE OF CONTENTS

– PUBLICLY-AVAILABLE VERSION –

-- PUBLICLY-AVAILABLE VERSION --

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

G. Paul Bollwerk, III, Chairman
Dr. Jerry R. Kline
Dr. Peter S. Lam

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, L.L.C.	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	May 27, 2003

MEMORANDUM AND ORDER
(Rulings on Summary Disposition Motion and
Other Filings Relating to Remand from CLI-00-13)

In CLI-00-13, 52 NRC 23 (2000), the Commission affirmed in part and reversed in part rulings made by the Licensing Board in LBP-00-6, 51 NRC 101 (2000), regarding a motion for partial summary disposition filed by applicant Private Fuel Storage, L.L.C., (PFS) relating to contention Utah E/Confederated Tribes F, Financial Assurance (hereinafter referred to as contention Utah E). As part of its reversal determination, the Commission directed that the Board (1) require PFS to produce a sample service contract outlining the agreements PFS would have with its customers relative to the services it would provide, and compensating payments it would receive, in connection with its proposed Skull Valley, Utah independent spent fuel storage installation (ISFSI); and (2) provide the intervenors to this proceeding, in particular the State of Utah (State), with an opportunity to address the adequacy of the sample service contract relative to the concerns raised in contention Utah E. PFS has provided such a model service agreement (MSA) that, in turn, has spawned additional party submissions, including a

State motion to reopen the evidentiary record and an additional PFS summary disposition request and related motion to strike.

For the reasons set forth below, we deny the State's motion to reopen the record and the PFS motion to strike and grant summary disposition in favor of PFS on contention Utah E relative to the MSA.

I. BACKGROUND

To place our holding on these various pending matters relating to the PFS sample service agreement in context, we describe below the procedural construct that brought these matters before the Board.

A. Licensing Board and Commission Rulings on PFS Dispositive Motion Regarding Contention Utah E

In LBP-00-6, 51 NRC at 106-08, we set forth in detail the procedural history of the admission of contention Utah E, which we will not repeat here. Also in that March 2000 decision, relative to the issues posited by the PFS dispositive motion at issue, the Board found that only two portions of this financial assurance contention needed to move forward to resolution in an evidentiary hearing: paragraph six, as it challenged the adequacy of the PFS-proffered facility construction and operation/maintenance cost estimates, and paragraphs five and ten, as they questioned the adequacy of PFS onsite liability insurance coverage. See id. at 137. In determining that summary disposition was appropriate relative to the other aspects of contention Utah E, the Board found reasonable assurance was provided by two staff-proposed license conditions and commitments by PFS to include various provisions in the service agreements that would have to be executed by its member and non-member

customers, both of which would be subject to staff oversight. See, e.g., id. at 116-17. Moreover, in doing so the Board found this determination warranted referral to the Commission for its immediate consideration. See id. at 136.

Following this summary disposition ruling, in June 2000 the Licensing Board conducted a four-day closed-session evidentiary hearing regarding the matters implicated by paragraphs five, six, and ten. Thereafter, on August 1, 2000, accepting the Board's referral, the Commission found the staff-proposed conditions acceptable and, indeed, directed that a number of the PFS commitments upon which the Board relied be incorporated as license conditions (LCs) as well. See CLI-00-13, 52 NRC at 32. As set forth by the Commission, id. at 27, 32, 36, the license conditions that the staff is to make applicable to the PFS facility, based on promises made by PFS during the licensing process, are as follows:[1]

> [LC-1. PFS shall] not commence construction before funding, in the amount to be determined at hearing, is adequately committed;
>
> [LC-2. PFS shall] not commence operations before service agreements for the life of the license, with prices adequate to fund operations, maintenance, and decommissioning, in the amount to be determined at hearing, are in place;[2]

---

[1] As the Board noted in LBP-00-6, 51 NRC at 137, the initial license conditions (LCs) were designated by the staff as LC17-1 and LC17-2 based on nomenclature that tied proposed license condition numbering to the section of its December 15, 1999 PFS facility safety evaluation report (SER) to which the condition related, e.g., SER section 17 concerning financial qualifications and decommissioning funding assurance. In this instance, for ease of reference we adopt the same numbering order as the Commission outlined in CLI-00-13, albeit noting that when actually incorporated into any PFS license these conditions may well be numbered differently.

[2] In CLI-00-13, 52 NRC at 32, relative to this license condition the Commission declared that

> proposed license condition LC 17-2 should be revised to read as follows: "PFS shall not proceed with the Facility's operation unless

(continued...)

> [LC-3. PFS shall] include provisions in service agreements requiring customers to retain title to the spent fuel stored and allocating liability among PFS and the customers;
>
> [LC-4. PFS shall] include provisions in the Service Agreements requiring customers to provide periodically credit information, and, where necessary, additional financial assurances such as guarantees, prepayment, or payment bond;
>
> [LC-5. PFS shall] include in the customer service agreements a provision requiring PFS not to terminate its license prior to furnishing the spent fuel storage services covered by the service agreement;
>
> [LC-6. PFS shall] obtain insurance for offsite liability in the amount of $200 million (the maximum amount commercially available); and,
>
> [LC-7. PFS shall] obtain insurance covering onsite liability in an amount to be determined at hearing.

The Commission, however, did not agree with the Board's determination that PFS commitments relative to its service agreements provided a sufficient basis for a reasonable assurance finding based on post-licensing staff inquiry. According to the Commission, without even a draft of the proposed service agreements, there was no basis for determining "within acceptable bounds, what the agreements' terms will be, how inviolate their provisions will be, and how easy it will be for NRC verification reviews to determine compliance." Id. at 34. Consequently, the Commission directed that

> the Board (1) require PFS to produce a sample service contract that meets all financial assurance license conditions, and (2) give Intervenors an opportunity to address the adequacy of the service contract to meet the concerns raised in Contention E. If

---

[2](...continued)

> it has in place Service Agreements covering the entire term of the license, with prices sufficient to cover the operating, maintenance, and decommissioning costs of the Facility for the entire term of the license."

> Intervenors do not raise further objections after reviewing the sample contract, or if the Board finds [I]ntervenors' objections insubstantial, then PFS would be entitled to summary disposition on Utah Contention E. Otherwise, the contention should be set for hearing.

Id. at 35.

B. PFS Model Service Agreement

In response to this Commission mandate and in accordance with Board orders that outlined a schedule for further party filings, including another PFS dispositive motion, see Licensing Board Order (Scheduling/Administrative Matters) (Aug. 4, 2000) (unpublished); Licensing Board Order (Schedule for Submission of Sample Service Agreement) (Aug. 16, 2000) (unpublished); on September 29, 2000, PFS submitted its MSA, see [PFS] Submission of Model Service Agreement (Sept. 29, 2000) [hereinafter MSA Pleading]. With that agreement, PFS made various, purported nonmaterial changes to the funding scheme it theretofore had proposed relative to its Skull Valley facility,[3]

---

[3] In its March 2000 summary disposition ruling, based on the information submitted by PFS in support of its December 1999 dispositive motion the Board described the then-existing PFS funding structure as follows:

> In its license application, describing itself as a limited liability company owned by eight United States utilities, PFS states that its financial qualifications for the requested Part 72 license are, among other things, based on its financing plan to obtain the necessary funds to construct, operate, and decommission the proposed Skull Valley facility. According to PFS, among the financing mechanisms it will use are equity contributions from PFS members pursuant to subscription agreements, preshipment customer payments pursuant to service agreements (through which member and nonmember customers commit to store their spent fuel at the PFS facility and PFS agrees to provide storage services), and annual storage fee payments pursuant to the service agreements. PFS also indicates that it reserves the option to obtain portions of needed construction funds through the

(continued...)

[3](...continued)
sale of debt securities secured by the service agreements. See [PFS], License Application for Private Fuel Storage Facility at 1-3 to -4 (rev. 0 June 19[9]7).

PFS then goes on to describe its phased approach to construction and operation. Under already completed Steps I-III, PFS undertook preliminary investigations, formed PFS as a legal entity, and prepared and submitted the license application, the last step being funded by direct payments from PFS members pursuant to the subscription agreements. Step IV, which includes this licensing proceeding, detailed design efforts, and bid specification preparations, is ongoing. The $10 million budgeted for this phase is being financed by PFS members payments pursuant to the subscription agreements. See id. at 1-5 (rev. 1 May 1998).

When and if a license is granted, Step V, the construction phase, will begin. This includes site preparation, construction of an access road and various administration, maintenance, and operations buildings and the cask storage pads, canister transfer and transport equipment procurement, and transportation corridor construction. Its $100 million budgeted cost (in 1997 dollars) is to be financed by $6 million dollars in equity contributions from PFS members pursuant to subscription agreements and, in larger measure, by the service agreements with PFS members and nonmember entities that call for payment spread out over the period of time from construction through spent fuel delivery. According to PFS, raising the nonequity portion of Step V costs through service agreements will allow it to avoid construction financing costs, although it retains the option to finance the nonequity portion of Step V costs through debt financing secured by the service agreements. According to the PFS application, no construction will proceed unless service agreements committing for spent fuel storage services in a nominal target range of 15,000 metric tons uranium (MTU) have been signed. See id. 1-5 to -6 (rev. 1 May 1998 & rev. 4 Aug. 1999).

The operational phase for the PFS facility, Step VI, is to be funded by the service agreements. The significant budgeted costs for this phase include procurement and/or fabrication of canisters ($432 million) and storage casks ($134 million), which will be obtained on an as-needed basis to coincide with

(continued...)

including:

1. Rather than relying upon a three-segment preshipment base storage fee and an annual storage fee, under the MSA (section 13.2) PFS would now rely largely on a cost-plus concept that would encompass, in place of the first base payment that was intended to cover construction costs by collecting a sum of $10 per kilogram of uranium (KgU) (in 1997 dollars) multiplied by the customer's agreed upon spent nuclear fuel (SNF) storage "reserved capacity," construction, rail and supplied equipment, and general administrative and operation costs funding would be based on **xxxxxxxxxxxxxxxxxxxxx** in an amount set at the greater of

---

[3](...continued)

fuel-moving schedules. According to PFS, all capital costs associated with spent fuel transportation and storage, including canister and storage cask procurement and/or fabrication, will be paid pursuant to the service agreements prior to PFS accepting customers' spent fuel. Also under the service agreements, customers will be required annually to pay ongoing operations and maintenance costs for spent fuel storage, estimated to be $49 million annually for a twenty-year facility operating life and $31 million annually for a forty-year life. These costs include labor, operations support, storage canisters, storage casks, transportation fees, transport and storage consumables, maintenance and parts, regulatory fees, quality assurance and other expenses, low-level radioactive waste disposal, contingencies, radiological and nonradiological decommissioning funds, and associated operating costs. PFS states that the service agreements will include escalators that are tied to specific costs of doing business at the site, including such items as labor rates and NRC and insurance fees. Also, according to PFS, service agreements, which must be signed by PFS members as well, will provide assurance of continued payment by requiring customers to provide annual financial information, meet creditworthiness requirements, and provide additional financial assurances (e.g., advance payments, irrevocable letters of credit, third party guarantees, or payment and performance bonds) as needed. See id. at 1-6 to -7 (rev. 0 July 1997 & rev. 4 Aug. 1999).

LBP-00-6, 51 NRC at 104-06.

(a) xxx per KgU multiplied by the number of KgU to be stored at the facility, or (b) xxxxxxxx multiplied by the number of canisters (assuming 10,000 KgU per canister). xxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, resulting in a pass through to customers of those costs. <u>See</u> MSA Pleading at 4-5.

2. In contrast to its previous indication that storage canister and cask payments to vendors would be made from the lump sum second base payment funds, with any cost increases passed through to the customers, under the proffered MSA (section 13.3) canister and storage cask vendor payments will be the responsibility of the customers, who will also be the owners of the canisters and casks. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx. <u>See</u> <u>id.</u> at 5-6.

3. The MSA (section 13.4) would provide for PFS customer annual payments to cover actual operational and maintenance costs, with each customer being responsible for its proportional share of those costs, which include but are not limited to xxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxx, a fixed equity return, and a return on investment. These payments would be due quarterly prior to the beginning of each quarter based on a PFS yearly operational costs estimate with the possibility of an additional payment or credit being assessed to cover a proportional share of any annual operation costs that exceed or fall short of estimated costs xx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxx See id. at 6-7.

4. Decommissioning costs would be borne by customers proportionally under the MSA *(section 13.5.1) in that sixty days prior to shipping its first cask during any delivery year*, a customer would be required to pay its allocated portion (on a per-canister basis) of the PFS facility's estimated radiological and nonradiological decommissioning costs (including spent fuel cask decommissioning) associated with each canister being shipped that year. The cost estimate is subject to annual adjustment based on inflation and other factors and the customer must pay the allocated portion of any increase within thirty days of receiving a PFS invoice. See id. at 8.

5. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See id. at 8-9.

6. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See id. at 9.

7. Although the MSA provides that the customer is the shipper of the spent fuel transported to the PFS facility (section 7), PFS can arrange for all rail transport to the Skull Valley facility, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, including those incurred for security and PFS operation and maintenance of (a) rail equipment and the Low Corridor rail line, and (b) ITP operation and maintenance and ITP transportation. See id. at 10-11.

8. In connection with PFS commitments relating to the PFS summary disposition motion and the Board and Commission decisions regarding that motion, the MSA incorporates provisions that (a) specify PFS cannot take any voluntary action to terminate its existence during the MSA term, which must continue until such time as PFS has completed its licensing and regulatory obligations nor can PFS or the customer terminate the agreement after the facility begins operation prior to the end of the MSA term (sections 23 and 24.3); (b) require title to the spent nuclear fuel remains at all times with the owner/customer (section 11.1), which must remove all the fuel at the end of the MSA term at its expense (section 24.4); (c) allocate legal responsibility between PFS and the customer for maintaining nuclear and nonnuclear insurance (section 17) and establish warranty and liability limitations, including limitations on liquidated damages (section 20); and (d) seek to ensure customer creditworthiness by providing for periodic customer financial submissions and an annual PFS customer assessment as well as additional measures, such as customer letters of credit and third-party guarantees, that PFS can invoke if additional financial assurance is necessary. See id. at 12-14.

In response to this PFS submission, by orders dated October 5 and 6, 2000, the Board set a schedule under which (1) PFS was to provide a listing and description of any additional

MSA provisions that embodied variations or changes from representations previously made to the Board about the service agreement in its dispositive motion or evidentiary presentations; (2) late-filed contentions or other submissions addressing the impact of MSA-related variations/changes upon prior Board summary disposition rulings or the evidentiary record of the June 2000 hearings were to be submitted; and (3) a PFS dispositive motion relative to the MSA was to be filed. See Licensing Board Order (Revising Scheduling Order and Granting Motion to Withdraw) (Oct. 6, 2000) at 1 (unpublished); Licensing Board Order (Scheduling Matters) (Oct. 5, 2000) at 1-2 (unpublished). Responding to that order, on October 17, 2000, PFS provided a listing of other changes or variations from previous representations, see [PFS] Identification of Additional MSA Provisions that Embody Changes from Previous Representations (Oct. 17, 2000) [hereinafter MSA Additional Provisions], which included:

1. Although the December 2000 PFS summary disposition filing indicated that (except to the extent debt financing was used) under the then-contemplated customer payment structure for a **xxxxxx** MTU facility, prior to spent fuel shipment it would receive **xxxxxxxxxxxx** out of a total of **xxxxxxxxxxxx** for its services over the twenty-year license term, **xxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx**, the percentage of funds it would receive up front would be "somewhat less."[4] Id. at 4.

[4] In making this representation, PFS noted that under the MSA it would receive full payment for canisters and storage casks, radiological and nonradiological decontamination funding, and transportation costs prior to receipt of spent fuel at the facility, costs that would constitute approximately **xx** per cent of the estimated **xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxx** O&M costs of the facility. Additionally, PFS declared that, unlike under the previously envisioned service agreement terms, it would receive O&M cost payments prior to receipt of customer spent fuel and that the MSA permitted it to reject a customer's spent fuel shipment if it has not made its MSA-required payments. See MSA Additional Provisions at 4 n.6.

2. In contrast to previous PFS statements that it would own the storage casks, the MSA (section 13.3) provides that the customer owns both the canister and the storage cask. Id. at 5.

3. Although PFS member investment, with interest, will still be paid only after PFS O&M costs are covered, under the shift to a cost-plus format, the MSA (section 13.4) provides for a return on investment (i.e., a return to members making initial project phase equity contributions) as well as a return of investment (i.e., the repayment of members' initial project phase equity contributions) for members. See id.

4. Although PFS made evidentiary hearing representations that the first base payment for construction would be subject to an escalation factor up to the time the payment was made, because under the MSA that amount is replaced by **xxxxxxxxxxxxxxxxxxxxxx** that is set at an amount expected to more than account for anticipated escalation through the start of construction, the MSA does not provide for escalation of the **xxxx** amount. The same is true relative to the annual storage fee O&M escalation provisions of the previously described agreement given that customers are now responsible for paying actual O&M costs. See id. at 5 & n.11.

5. In connection with transportation costs, although PFS previously stated that if costs for a given shipment were less than provided for in the third base payment allowance (i.e., **xxxxx** per KgU shipped) it would keep the difference, under the MSA (section 7.2.2) any difference between the customer payment made on the basis of the PFS yearly estimate of costs and the actual costs to PFS will be credited to the customer. See id. at 6.

6. The MSA provides for PFS payments that were not specifically culled out and identified as costs in PFS evidentiary presentations (albeit covered under a cost estimate amount for contingencies), including (a) liquidated damage payments to a customer for failure

to deliver timely PFS-supplied equipment (section 5.2); (b) sums billed to PFS by a customer for decontamination of PFS-supplied equipment prior to customer acceptance and use of the equipment (section 5.3.1); (c) reimbursements to customers for expenses incurred in correcting noncontamination-related defects and deficiencies in PFS-supplied equipment identified at the time the customer receives the equipment (section 5.4.1); and (d) customer expenditures arising from the cost of shipping fuel back to the customer if the fuel is rejected on route to or after it reaches the PFS facility because of (i) a force majeure (i.e., act of God) event that renders impossible or impracticable spent fuel storage or transportation; or (ii) a legal prohibition on PFS arranging for spent fuel transportation or storage (sections 6.4.3(d) and 6.4.4). See id. at 7, 8.

7. The MSA also provides for revenue sources PFS previously had not identified in its summary disposition pleadings or evidentiary presentations, including (a) customer liquidated damage payments for delay in loading canisters with spent fuel or shipping casks onto transportation conveyances (section 5.4.2); (b) customer reimbursement payments for replacing damaged PFS equipment (sections 5.4.2 and 5.4.3); and (c) a per customer xxxxxxxx service agreement execution fee. See id. at n.14.

In addition, PFS brought three MSA-related matters to the Board's attention: (1) although the facility would, as represented in the MSA provided to the Board in September 2000, be built in three phases, in contrast to the MSA declaration that each stage would have a 10,000 MTU capacity, the third phase would have a 20,000 MTU capacity, for a total capacity of 40,000 MTU; (2) the dollar amount for the upfront radiological and nonradiological decommissioning payment would be $40,000 per canister (in 1997 dollars), adjusted annually for inflation and any estimated decommissioning cost increases per MSA

section 13.5.1; and (3) an additional provision will be added to the MSA providing, as per PFS evidentiary representations, that set the fees for non-PFS members at a higher level than those charged to PFS members. See id. at 8.

C. State Filing Responding to the PFS MSA/State Motion to Reopen/PFS and Staff Responsive Filings

1. State Response to PFS MSA

On November 7, 2000, the State filed two pleadings relative to the PFS MSA. In the first, asserting that the MSA did not satisfy the Commission's remand or demonstrate PFS was financially qualified under 10 C.F.R. Part 72, the State outlined its objections to the MSA as including the following:

a. PFS has not demonstrated the inviolability of the MSA as required by the Commission in CLI-00-13, which requires that key provisions of the final version of the agreement be incorporated into the PFS license if PFS intends that it be utilized to establish its financial qualifications for a 10 C.F.R. Part 72 license. See [State] Objections to the Adequacy of the [PFS MSA] to Meet Part 72 Financial Assurance Requirements (Nov. 7, 2000) at 5-7 [hereinafter State MSA Objections].

b. The MSA contains representations that are different from, or contradictory to, those made before the staff, the Board, and the Commission during the previous ruling on the PFS dispositive motion, including a significant reduction in its pre-spent fuel receipt funds in hand, a lack of significant cash reserves or liquid assets relative to its potential liabilities, so that the summary disposition record must be vacated. See id. at 7-12.

c. The MSA terms are complex and ambiguous, particularly the concepts of "aggregate usage" and "term." Additionally, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx and its overall financial design affords the staff too much discretion, calls upon the staff to make overly complex judgments, and requires continuous staff monitoring of PFS. See id. at 12-23.

d. The PFS business model, which creates a shell that hides the entities that truly control the spent fuel at the Skull Valley facility, i.e., its member-customers, establishes a principal-agent relationship between PFS and its member-customers that require the PFS member utilities to be named as co-applicants for the facility's Part 72 license. See id. at 23-25.

2. State Motion to Reopen

Additionally, on that same date the State filed a motion to reopen the record of the June 2000 evidentiary hearing regarding contention Utah E, subparts five, six, and ten in light of the MSA. See [State] Motion to Re-open the Hearing Record on Contention Utah E (Nov. 7, 2000) [hereinafter State Reopening Motion]. According to the State, such a reopening is necessary because, as proffered by PFS in response to the Commission's remand to the Board, the MSA is inconsistent with the PFS testimony at the hearing as it relates to (1) debt financing of construction and equipment, particularly with regard to debt repayment and interest costs and the uncertainty created relative to the size of the loan amounts available under the MSA loan limit of xxx/KgU; (2) operating capital sufficiency, including cost estimation procedures and how

PFS will utilize the **xxxxxxxx** commitment fee; (3) adequacy of the PFS contingencies cost estimate to cover liquidated damage and force majeure costs; (4) newly-identified equity and investment return costs estimates; (5) apparent exclusion of dry transfer system costs; and (6) adequacy of nuclear property insurance, both as to amount and the liability assignment/apportionment "labyrinth" it creates. Id. at 5-18. Citing a Licensing Board decision in Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Units 1 and 2), LBP-84-10, 19 NRC 509, 530 (1984), in asserting that a less stringent reopening standard is warranted in view of its expense and resource commitment at the hearing and the "eleventh hour" PFS change in its financial assurance demonstration, the State also declared that it meets the 10 C.F.R. § 2.734 standards for reopening the record. Id. at 18-20. According to the State, its motion is timely in accordance with the Board's October 5 and 6 scheduling orders; its motion addresses a significant health and safety issue relative to the possibility under the MSA of significant PFS undercapitalization and a thin revenue stream that could result in "cutting corners" on safety; further consideration of the MSA could result in a materially different result relative to the evidentiary hearing that was held as to the various matters outlined above; and its motion is supported by a knowledgeable individual, Dr. Michael F. Sheehan, who presented testimony on behalf of the State during the June 2000 hearings. See id. at 20-23. Additionally, the State declared that the PFS proffer of its MSA with different representations than were made earlier entitles it to discovery. See id. at 23-24.

3. PFS/Staff Responses to State Motion to Reopen

On November 21, 2000, both PFS and the staff filed responses opposing the State's reopening motion. See [PFS] Response to [State] Motion to Re-open the Hearing Record for Contention Utah E (Nov. 21, 2000) [hereinafter PFS Reopening Response]; NRC Staff's

Response to "[State] Motion to Re-open the Hearing Record on Contention Utah E" (Nov. 21, 2000) [hereinafter Staff Reopening Response]. According to PFS, the scope of the June 2000 hearings on contention Utah E was limited to the issues of the adequacy of PFS construction and operating cost estimates and onsite property insurance coverage. PFS also declared that any prefiled testimony and discussion at the hearing regarding PFS service agreements was in the context of issues relating to cost escalation or the pass through of costs or cost increases to PFS customers, which it asserts was generally true for Dr. Sheehan as well. As such, according to PFS, except for these limited cost issues, its assertions provide no basis for reopening the record. Moreover, as to those noncost issues, PFS likewise declared reopening is inappropriate as these issues clearly would not have the requisite materiality effect on the outcome of the hearing. See PFS Reopening Response at 9-10, 24.

Specifically in this regard, on the matter of the use of debt financing for construction and equipment costs, citing the Commission's decision in Northern States Power Co. (Monticello Nuclear Generating Plant), CLI-00-14, 52 NRC 37, 49-50 (2000), PFS declared that the Commission has sanctioned the type of cost pass-through provision it envisions in the MSA. Further, according to PFS, the State's concern about the adequacy of the loan amount if construction is delayed is being addressed in a new MSA provision that the xxx/KgU amount for Phase I may be escalated by the industry sector specific indices described in PFS construction cost testimony at the hearing as being applicable to the first base payment under its former funding approach, which the State did not challenge, and by the fact that, even if later phase construction costs escalate beyond what can be covered by these escalators, under the first license condition imposed by the Commission, it cannot start Phase II and Phase III construction unless PFS obtains adequate funding. See id. at 11-17. As to the issues

regarding adequacy of operating capital, PFS maintained that the State's asserted MSA-related concerns about the adequacy of PFS O&M cost estimates are wholly speculative in light of the PFS cost estimate showing at the June 2000 evidentiary hearing and the MSA provision that allows PFS to recoup any costs that it accrues beyond the annual estimates that form the basis for customer xxxxxxxxx O&M payments. See id. at 17-18.

Also unwarranted, PFS declared, are State reopening concerns about liquidated damage and force majeure costs for, even putting aside that they would be covered under its contingencies estimate amount, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxx. The same is true for the return of equity and return on investment cost concerns posed by the State, according to PFS. See id. at 18-20. As to the dry cask system cost, although PFS declared it is covered under the MSA provision (section 1) regarding "Ancillary Equipment," it further stated that it will modify the MSA definition of "Transfer Cask" to include dry transfer casks. See id. at 20. Relative to the State's nuclear property insurance concerns, PFS observed that an MSA provision (section 17.1.2(b)) stated that it will obtain onsite insurance "in such other amount as may be required by the NRC," which in accordance with the Commission's CLI-00-13 license condition regarding onsite liability insurance and the Board's hearing determination would require it to obtain funding in the amount the State asserts. Moreover, PFS declared that the State's claims about a liability distribution "labyrinth" are without basis, as is apparent under the terms of the MSA, which were intended to be consistent with the standard Price-Anderson Act scheme for allocating liability. See id. at 21-23. Finally, PFS declared that, notwithstanding the State's contrary claims, the Board lacks jurisdiction to vacate its earlier summary disposition record, but must make any additional rulings regarding contention Utah E within the context of that ruling, as it was affirmed and

reversed by the Commission, and the evidentiary record that has been created in the June 2000 hearing. See id. at 24.

For its part, in responding to the State's reopening motion the staff asserted that the State's request for a more lenient reopening standard under the Comanche Peak decision misapplies this decision that, among other things, recognized that an applicant's request to reopen a record was not the same as an intervenor's given the procedural advantages afforded the latter to compensate for application of a higher reopening standard. See Staff Reopening Response at 6-7. Further, in assessing the section 2.734 standards, although agreeing that the State's request is timely, the staff declared that its submission lacked a showing of the requisite safety significance, being based only on unfounded conjecture that PFS will "cut corners." See id. at 8-9. Morever, the staff declared that the State had failed to demonstrate that its particular MSA-related concerns would lead to a materially different result given that none of the matters were relevant to or probative of the construction/operation cost estimate and onsite nuclear insurance issues that were the subjects of the evidentiary proceeding. See id. at 9-10.

In this regard, the staff likewise addressed the specifics of each of the State's MSA-related concerns. On the use of debt financing for construction and equipment costs, the staff declared that having established the validity of its cost estimates in the evidentiary hearing, it is apparent that the PFS approach xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx and the cost-plus basis upon which customers now are obligated to provide PFS with revenues to repay loan principal and interest, as well as any other operating cost increases over estimates, provide reasonable assurance that sufficient funds are available such that no issue exists that requires record reopening. The same is true relative to State concerns about the size of the case/canister manufacturing facility relative to early spent fuel

capacity declarations in the service agreements. Regarding the State's arguments concerning the fixed amount of construction and equipment cost funding, the staff asserted that the xxx/KgU figure is adequate in that it would make available xxxxxxxxxxxxxxxxxxxxxxxxxxx xxxx to cover an estimated xxxxxxxxxxxx in facility costs (in 1999 dollars), which includes a ten percent contingency factor. Nor is the State correct, the staff asserted, in declaring that the Commission-approved license condition requiring PFS to show it has adequate funding before beginning construction is flawed because it permits approval of the entire 40,000 MTU capacity based on xxxxxx amount fixed in year 2000 dollars, which may not provide sufficient future funding. According to the staff, PFS construction costs estimates must include an escalation factor that makes this concern irrelevant. Also irrelevant, the staff declares, are the State's concerns that xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxx, given the MSA provision (section 13.4) that requires customers to pay a proportional share of all PFS costs. Finally, the State claim that PFS will be precluded from having a satisfactory credit rating because it is xxxxxxxxxxxxxxxxxxxxxxxxxx provides no basis for reopening, according to the staff, in light of the fact that xxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. See Staff Reopening Response at 12-17.

In connection with the State's concerns about insufficient operating capital, like PFS, the staff noted the MSA requirement (section 13.4) that costs of service be paid by customers "without limitation." So too, the staff found immaterial as a ground for reopening the State's assertion that there is no basis for PFS costs of service estimates, given that this billing estimate is distinct from the long-range cost estimates that were at issue under contention

Utah E, and its concern that the **xxxxxxxx** commitment fee need not be credited against a customer's other costs, given that customers must pay their share of the costs in full, regardless of the refundability status of the commitment fee. Further, although the State contended that reopening is necessary to permit consideration of the cost of a force majeure event and liquidated damages resulting from events such as a PFS failure to deliver cask loading equipment on time, according to the staff, it has failed to demonstrate this item would compel a materially different result in light of the PFS cost estimate for contingencies or that cost recovery from customers for these items is unavailable, if they were ever incurred. And relative to the State's arguments regarding the MSA provisions (section 13.4.1; Schedule 4) providing for a return of equity and a return on investment, the staff claimed no showing of a materially different result had been made because the MSA does not change the approach outlined at the June 2000 evidentiary hearing whereby PFS would recover these items only after O&M costs were covered and, in any event, its customers are required to pay a proportional share of all costs, including any increase in actual costs above estimated costs. Relative to the State's assertion about the failure to include dry transfer system costs, according to the staff this likewise lacks the requisite materiality because the cost estimates already provided cover this item, which (like any number of other costs) is not required to be culled out specifically in the MSA. The staff concluded by declaring that the State concerns about insurance coverage also fail to establish there would be a materially different result on reopening, given that the MSA does not alter the insurance commitment made by Mr. Parkyn during the evidentiary hearing, or the cost of that insurance. The same was true for the State's assertion about the purported liability "labyrinth" created under the MSA, and its question about the availability of coverage in the face of legal action following an incident is the type of

conjecture that is wholly insufficient to support reopening and, indeed, is wholly outside the scope of contention Utah E, which concerned the amount of nuclear insurance rather than disputes regarding claim coverage. See Staff Reopening Response at 17-24.

D. PFS Summary Disposition Motion/State and Staff Responsive Filings/State Reply Pleading

1. PFS Dispositive Motion

On December 4, 2000, PFS submitted a response to the State's November 7, 2000 objections to the adequacy of its MSA and request for summary disposition relative to the contention Utah E matters remanded by the Commission in CLI-00-13 for further Board consideration, which it supported with a statement that sets forth twenty-one material facts not in dispute that PFS asserts entitle it to a merits ruling in its favor. See [PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements (Dec. 4, 2000) [hereinafter PFS Dispositive Motion]. As was the case with its earlier dispositive motion regarding contention Utah E, in support of this motion PFS provided the sworn statement of its Chairman, John Parkyn, to which are attached a revised MSA as well as a line-in/line-out version of the MSA that shows specific differences between the revised MSA and the MSA version submitted on September 29, 2000. See id. Declaration of John Parkyn (Dec. 4, 2000) [hereinafter Parkyn Declaration]; id. Parkyn Declaration exh. 1 (Model Agreement for Storage of Spent Nuclear Fuel By and Between [PFS] and ___ (Dec. 4, 2002)); id. Parkyn Declaration exh. 2 (line-in/line-out version of December 4, 2000 revised MSA).[5] According to PFS, the revised MSA contains

[5] Unless otherwise noted, references in this decision to particular provisions of the MSA (continued...)

changes committed to by PFS in its November 21 reopening motion response, as well as editorial and related changes, clarifications and corrections, and additional terms and conditions, none of which have any substantive effect on the MSA's financial assurance provisions as submitted in September 2000. See PFS Dispositive Motion at 3-4.

a. MSA Meets All Financial License Conditions

In its pleading, PFS first asserts that its revised MSA meets the license conditions mandated by CLI-00-13, see supra pp. 3-4. In connection with LC-1, which requires fully committed funding (equity, revenue, and debt) adequate to construct before any phase of construction is begun, PFS asserted that committed funding is not limited to customer service agreements. Although the MSA (section 13.2) does provide for xxxxxxxxxxxxxx sufficient to cover PFS estimated construction costs, contrary to State arguments, it can rely on other committed financing forms besides the xxxxxxxxxxxxxx described in the MSA. Relative to LC-2, which mandates that PFS have in place long-term service agreements with prices sufficient to cover its Skull Valley facility's O&M and decommissioning costs for the entire license term, PFS asserted that it fulfills this condition through MSA terms that (1) make customers directly responsible for canister and storage cask vendor payments and other payments (section 13.3); (2) provide for annual payments by PFS customers to cover all PFS costs in performing services and in operating and maintaining the facility, including but not limited to those identified in the MSA (Schedule 4), and otherwise meeting its obligations (section 13.4.1); xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

---

[5](...continued)
are to the version included as Exhibit 1 to the Parkyn Declaration submitted in support of the December 4, 2000 PFS dispositive motion.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx According to PFS, notwithstanding the State's arguments that this arrangement is inadequate because PFS will have no assets, it is in fact sufficient to establish the requisite reasonable assurance in that LC-2 only requires the agreements to have "prices sufficient to cover," costs, not cash or other assets in hand, which is consistent with the recent Commission Northern States Power precedent, and PFS will hold significant assets, such as its license and spent fuel storage contracts. See PFS Dispositive Motion at 4-5.

So too, PFS declared its MSA fulfills the other pertinent Commission-mandated license conditions. In connection with LC-5, under which PFS is not permitted to terminate its license before it has provided all agreed spent fuel storage services under its service agreements and completed its licensing and regulatory obligations, PFS maintained that it has fulfilled this condition through MSA terms that (1) declare PFS shall not take any voluntary action to terminate its existence during the service agreement term (section 24.3.4); (2) provide that the service agreement term shall continue until such time as PFS has completed its licensing or regulatory obligations under the license and the license is revoked or terminated (section 23); and (3) preclude either PFS or its customers from terminating the agreement from the beginning of facility operation through the end of the service agreement term (section 24.3.1). See id. at 6.

Regarding LC-3, which directs PFS to incorporate service agreement provisions that assign legal and financial responsibility between PFS and its customers, including an acknowledgment that each customer retains title to its spent fuel throughout the storage period,

this condition is fulfilled, PFS argued, given MSA provisions that (1) provide that the title to spent fuel remains with the customer at all times (section 11.1); (2) provide the customer is responsible at all times for cleanup costs of any contamination it causes (section 13.6); (3) make the spent fuel customer or owner responsible for removing all its fuel from the site at the end of the service agreement term at its sole cost and expense (section 24.4); (4) define the responsibilities of the service agreement parties to maintain nuclear and nonnuclear-related insurance (section 17); (5) identify PFS warranty and liability limitations (section 20); (6) provide that PFS liability for all claims arising under the MSA (other than liquidated damage claims as defined under MSA section 5.2) is not to exceed the amount PFS obtains under insurance policies for such claims (section 20.3). According to PFS, as it noted in its response to the State's reopening motion, the State's claim of a liability labyrinth is based on its misunderstanding of the terms and interrelationships between the various nuclear insurance policies. See id. at 6-7.

Finally, in connection with LC-4, which requires PFS to include service agreement provisions requiring customers periodically to provide credit information, and, where necessary, additional financial assurances such as guarantees, prepayment, or payment bond, PFS declared that MSA section 15, along with the schedules and exhibits it references, fulfill this requirement in that (1) customers are to provide annually specified financing information, including Securities and Exchange Commission (SEC) filings and independently audited financial statements (Schedule 3); (2) customers may be required to provide further financial assurances if (i) PFS evaluation of the submitted information indicates the customer's financial condition is unsatisfactory or presents a credible risk of not being able to meet its PFS financial obligations, (ii) PFS has not received the information it needs to make its evaluation, or (iii) the

customer meets any of the conditions in MSA section 15.2.1(c);[6] (3) a customer required to provide further assurance can do so by (i) making an advanced payment specified by PFS; (ii) having a standby irrevocable letter of credit, (iii) obtaining a third-party guarantee of the customer's payment and performance obligations by an entity acceptable to PFS, and (iv) getting a payment and performance bond from an entity acceptable to PFS; and (4) unless PFS specifies another amount, the amount of the customer assurance must be equal to the customer's total obligations to PFS, including any amount necessary to remove the customer's fuel from the PFS facility. See id. at 7-8.

b. PFS Response to State's MSA Objections

After detailing how the MSA fulfills the license conditions imposed by the Commission, in its pleading PFS goes on to address the four general objections to the MSA proffered by the State in its November 7 filing. On the first matter -- the purported lack of MSA "inviolability" and the need to incorporate the MSA into a license condition -- PFS asserted that the Commission's use of that term in CLI-00-13 was intended to denote a concern that an MSA not have loopholes that would allow PFS or its customers to avoid or break PFS commitments, such as permitting customers to avoid payments while leaving the fuel with PFS or PFS to voluntarily dissolve and leave the facility without an owner/operator. According to PFS, the State has not

[6] MSA section 15.2.1(c) indicates those conditions include (i) material adverse change in financial condition since entering into the service agreement; (ii) thirty days have elapsed since a failure to pay or perform a material obligation or a default under an agreement or document that evidences a customer indebtedness of more than ten million dollars; (iii) a customer having suspended or discontinued its business, generally failed to pay debts, filed for bankruptcy, applied for custodian appointment for its assets or property, become insolvent or subject to liquidation or debt reduction; (iv) customer transfer of a substantial portion of its assets to another person; (v) customer transfer or assignment to another person of its rights and obligations under the service agreement; (vi) failure to make any of the fee, loan, vendor or other payment due under sections 13 and 14 of the service agreement; and (vii) loss of customer authorization to possess spent fuel. See Parkyn Declaration, exh. 1, at 38.

argued that such loopholes exist in the MSA. Moreover, PFS contended that the use of the term "inviolate" was not intended to require MSA incorporation into the license. Instead, the MSA is intended to provide guidelines that are sufficient to allow the staff to ensure during the conduct of its verification review that the actual contracts meet the Commission's expectations as reflected in the license, similar to the model documents provided in Regulatory Guide 3.66 relative to the adequacy of material licensee bonds or letters of credit. Further, PFS asserted that State concerns that absent incorporation into the license, MSA terms will be only illustrative and subject to PFS revision at will fails to recognize the Commission's own statement that actual customer contracts did not have to "slavishly" follow the MSA and the fact that PFS changes would be subject to staff review. See id. at 8-11.

Relative to the second item – the need to vacate the Board's prior summary disposition holdings in light of the new MSA provisions – addressing first the purported legal deficiencies in the State's claim, PFS asserted that the matters before the Board on remand, as defined by the Commission in CLI-00-13, are whether the MSA meets (1) the financial assurance license conditions imposed; and (2) the concerns raised in contention Utah E. In this light, the mere fact there were changes to the MSA is irrelevant; instead, the focus must now be on whether there is any material factual dispute on whether the MSA, as revised, fails to satisfy either the license conditions or the concerns raised in connection with contention Utah E. PFS also declared that the State's argument in this regard is legally flawed as it attempts to read into CLI-00-13 a Commission intent to require that PFS must have an unspecified amount of cash on hand prior to beginning facility construction or operation. According to PFS, all that is required under LC-1 and LC-2 is that PFS have funding fully "committed" prior to construction and that its "prices" are sufficient to cover facility O&M and decommissioning costs, which are

consistent with the Commission's earlier determination. See GPU Nuclear, Inc. (Oyster Creek Nuclear Generating Station), CLI-00-6, 51 NRC 193 (2000). Finally, PFS asserted that as a legal matter, any contention Utah E issues that do not involve the PFS service agreements are outside the scope of the Commission's remand and thus not subject to further litigation. See id. at 11-12.

Also with regard to the second item, PFS asserted that the State's request to vacate the entire summary disposition record for contention Utah E likewise has faulty factual underpinnings. First among these is the State's concern that previously PFS had committed to having xxxxxxxxxxxx out of a total of xxxxxxxxxxxx on hand prior to receiving any spent nuclear fuel, but will now have only xxxxxxxx plus any contractual commitments and loans. In fact, under its previously outlined plan and as was testified to by Mr. Parkyn at the June 2000 evidentiary hearing, PFS would only have had in hand the first of the three base payments, amounting to xxx/KgU for the 10,000 metric tons involved (xxxxxxxxxxxx), while the second and third base payments, amount to xxx/KgU, would have come only prior to receipt of the specific canisters. PFS also pointed out that this assertion is inconsistent with arguments made by the State about the lack of an adequate PFS revenue stream in its proposed findings relating to the contention Utah E issues heard in June 2000. Yet most important, according to PFS, is the fact this argument fails to show that under the MSA, PFS costs will not be covered, given the legal obligation created by the MSA for customers to make regular, xxxxxxxxx payments to cover all PFS estimated costs, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxx, and to pay actual costs accrued beyond those estimates xxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxx. See id. at 12-16.

In connection with the third item -- claims about the inadequacy of MSA terms and provisions -- PFS noted first that although the State claims the MSA is "ambiguous," as to those terms about which the State raises a specific claim, the Commission's financial assurance requirements are met. Also unavailing, PFS maintained, is the State's challenge to the purportedly "complex" MSA because it relies solely on customer revenue and it requires the staff to engage in the type of post-review analysis that the Commission warned against in CLI-00-13. According to PFS, its reliance on revenue is not inconsistent with the Commission's finding of reasonable financial assurance relative to the reactor licensee in the Oyster Creek decision, and the State's claim about the complexity of staff review is entirely unsupported. See id. at 16-17.

Relative to the specific matters that the State declares ambiguous, although labeling meritless the State's claims about the terms "calculated based upon" and "term" as they are used to determine "aggregate usage" in MSA section 13.4.2 to calculate a customer's proportionate share of the PFS costs of service, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxx. As now revised, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, with the time a customer stores its fuel not being a computation factor. Another supposed uncertainty relating to the potential for customers to have to pay PFS after the customer's fuel has left the Skull Valley facility or after the customer has left the nuclear industry is also without substance, PFS maintained. As to the latter situation, PFS pointed to MSA section 15.2.1, which makes customers that experience a

material adverse change or are no longer authorized to possess spent nuclear fuel subject to MSA section 15.2.2 that requires such customers to provide additional assurance of their ability to cover their obligations. Further, with regard to the customer that is obligated to pay after its fuel has left the facility, PFS asserted that the State has provided nothing other than speculation to support its premise such an entity still in the nuclear business that otherwise did not trigger MSA section 15.2.1 would pose a default risk. See id. at 17-18.

Also claimed by the State to be inadequate, PFS noted, are xxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. Also groundless, according to PFS, is the State's claim that construction delay could cause costs to escalate beyond the MSA-provided xxxxxxxxxxxxxxxxxxx/KgU so as to cause PFS to cut corners, given the PFS Phase I cost estimate is xxxxxxxxxxxxxxxxxx less than the amount it will have available for construction and the PFS determination to place a xxxxxxxxxxxx escalator into the MSA. See id. at 18-19.

Another series of State-identified inadequacies PFS sought to address are those relating to customer responsibility for repaying PFS indebtedness. The State's concern that the PFS cost recovery scheme presumes a forty-year term is baseless, according to PFS, because it is a plausible assumption that PFS at the end of its initial twenty-year term will be able to

obtain a renewed license. Also without merit, PFS maintained, is the State's claim that linking a xxxxxxxxxxxxxxxxxxxxxxxxxx to its fuel delivery years builds in a normal operations revenue stream deficiency. Although asserting that the last sentence of MSA section 13.5.2 originally submitted to the Board would address this problem by covering any xxxxxxxxxxxxxxxxxxxxxx xxxxxxxx deficiency, PFS nonetheless indicated that it had revised that section to address this concern. Under this revision, regardless of PFS customer fuel delivery schedules, xxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xx. Further, PFS declared that a State concern that MSA section 13.5.2 is deficient because it does not consider the apportionment of costs when construction costs are not fixed at xxxxxxxxxxxx and does not allow a revenue shortfall determination is meritless because MSA section 13.2 covers PFS indebtedness, whatever it comes out as and without regard to the xxxxxxxxxxxx amount. <u>See</u> <u>id.</u> at 19-20.

State claims regarding PFS customer creditworthiness also were rejected by PFS as being without substance. Relative to the State's argument that PFS does not know its costs and the MSA lacks a term, PFS relied upon its evidentiary showing during the June 2000 evidentiary hearing and declared that the MSA customer storage schedule (MSA Exhibit A-1) does not allow a customer to store beyond two consecutive twenty-year license terms. Insubstantial as well, PFS declared, is the State's assertion that over time as customers decommission their facilities, sending the fuel back as a remedy for lack of payment or other defaults will become increasingly ineffective in light of MSA sections 15.2.1 and 15.2.2 that allow PFS to seek further assurance in the event of a customer's business changes or it

relinquishes its fuel possession license. Also lacking sufficiency, according to PFS, is the State's claim that the MSA is deficient in that PFS customers will be entities of various types, some without adequate assets of their own. This State argument, PFS asserted, does not recognize the MSA provisions (sections 15.1 and 15.2; Schedule 3) that allow PFS to evaluate the financial health of a potential customer before fuel delivery to ensure they can manage their financial obligations and provide the ability to impose further financial assurance requirements. Nor, for the same reason, did PFS find merit in the State's concerns about the ability of PFS to identify customers that are in failing financial health or to return spent fuel to a customer that becomes insolvent, particularly in light of the Commission's indication in CLI-00-13 that even a not insignificant possibility that financial assurance-related assumptions and forecasts will turn out unfavorably is not sufficient to negate a reasonable assurance finding. Finally, PFS again relied upon the Commission's Oyster Creek precedent regarding the use of operating revenues for a financial assurance finding as demonstrating the inadequacy of the State's assertion that the MSA is deficient because it allows PFS to operate on a "just-in-time" cost recovery basis with respect to its revenues. See id. at 20-22.

The last State-identified MSA deficiency addressed by PFS in its motion is the purported improper latitude the MSA affords the staff in the course of its post-licensing financial assurance review. This is clearly nothing more than speculation, according to PFS, given the clearly defined scope of the PFS project, its schedule, and its construction and O&M costs; its nonspeculative revenue stream as required by the license conditions affirmed by the Commission in CLI-00-13; its perfectly legal reliance upon operating revenues, guaranteed under contract, to provide assurance costs will be covered; and the established presumption

that the staff will not permit a material change in the MSA in contravention of any Board decisions or Commission directives. See id. at 22-23.

c. PFS Members as Licensees

As a final matter, PFS sought to deal with the State's legal claim that PFS members are really de facto owners of the Skull Valley facility and, as such, must be named as licensees. Besides asserting this claim should be struck as beyond the scope of contention Utah E, PFS declared it is clear that a limited liability entity like PFS can be the sole licensee of an NRC-licensed facility. According to PFS, this is true even when the limited liability entity is wholly owned by a parent corporation and the parent is providing a financial guarantee to support the financial qualifications of the limited liability entity, nor do the agency cases cited by the State in support of its argument sustain a contrary conclusion. PFS concluded that because the PFS members will have neither ownership interest in nor operating authority over the PFS facility, they are not licensees. See id. at 23-25.

2. State Dispositive Motion Response

In its December 22, 2000 response to this PFS dispositive motion, the State argued that a ruling in favor of PFS would be totally inappropriate, a position it supported with a statement that outlined thirty-eight relevant, material facts in dispute. See [State] Response to [PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E/Confederated Tribes Contention F (Dec. 22, 2000) [hereinafter State Dispositive Motion Response]. And, as was the case regarding the initial PFS summary disposition motion, in support for its response, the State provided the affidavit of Dr. Michael F. Sheehan. See id. Declaration of Michael F. Sheehan, Ph.D. (Dec. 22, 2000) [hereinafter Sheehan Declaration].

The State first declared that the substantive terms and conditions of the PFS service agreement must be made a license condition because, as the recent material changes in the PFS scheme for funding construction and O&M costs illustrate, it is an evolving document that contains the type of ambiguity the Commission eschewed in CLI-00-13. See id. at 7-9. Further, the State asserts that the MSA does not provide the requisite reasonable assurance in the following ways:

a. Cash Reserves

PFS assertions that it has no obligation to maintain any significant level of reserves, including cash reserves demonstrate clearly, the State maintained, that it lacks the requisite financial qualifications. According to the State, reserves are a mainstay of a prudent business operation. Without such reserves, the State contends PFS reliance on customer billing and the "price" it has set for its services is not adequate, particularly given the volatile power market and the near bankrupt status of some major utilities. Indeed, according to the State, even if all PFS customers paid their storage fees on time, PFS may have a deficiency that would not allow it to safely run the facility and its thin capitalization and nondiversified, single business line will preclude access to ready credit, all of which support a determination that PFS has failed to establish it is financially qualified. See id. at 11-12.

b. Change from "Aggregate Usage" to "Reserved Capacity"

The State also asserted that, although ostensibly to satisfy expressed State concerns, the PFS change from using "aggregate usage" to utilizing "reserved capacity" to allocate costs among its members illustrates the fundamental flaw of relying solely on contract drafting as a mechanism for establishing financial qualifications. PFS has failed to amend all MSA provisions to incorporate this change, the State declared, creating a situation in which it may

not be able to xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. Further, according to the State, if a customer decides to withdraw some or all of its stored SNF, although the MSA provides that the customer remains obligated for its proportional share of PFS costs for the remainder of its service agreement storage schedule, this does not recognize that in adopting the "reserved capacity" concept the agreement decouples cost allocation from a customer's storage schedule. Because such a withdrawal does not cause a proportional reduction in the cost of service and there is no change in the aggregate reserved capacity, there is no basis in the agreement for reallocation of this abandoned cost share to other customers, leaving PFS stuck with those abandoned costs, which could be substantial if customers departed for a DOE repository or monitored retrievable storage facility. <u>See</u> <u>id.</u> at 12-14.

c. Construction Loans

Although noting that PFS has provided that if there is a delay in Phase I construction, an escalator (MSA Schedule 5) would become applicable to increase loan allocation of xxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, the State considered this inadequate because (i) xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx; and (ii) there is no escalator for Phase II and Phase III construction costs. The State asserted that a reasonable assurance finding can be made only if customers will be responsible for actual construction

costs, particularly given that PFS will have a junk bond credit rating with unsecured loans and no capital or liquid assets and any promissory notes from its members or customers will not demonstrate any PFS ability actually to obtain funds in light of the current general instability in the energy market and utility operator finances. See id. at 14-15.

d. Adequate Operating Revenues

In connection with the PFS legal arguments that the Commission's Oyster Creek and Vermont Yankee decisions permit it to rely on operating revenues guaranteed under a customer contract in making its financial assurance showing, the State argued that these cases are inapposite because they apply to nuclear power plant operators, which have a product to sell -- electricity -- and an assured market or rate base to provide revenues. In contrast, the State maintained, the only PFS product is the storage of another entity's liabilities -- spent nuclear fuel -- and it has an assured rate base that is no better than its ability to obtain payments for fee defaults after protracted litigation. See id. at 15-17.

e. Cost Recovery and Customer Creditworthiness

The MSA, according to the State, is deficient in that it fails to disclose how PFS will recoup its multimillion dollar capital investment in developing and using its dry cask transfer system and contains an ambiguity regarding whether the intermodal transfer facility (ITF) or the Low rail line will be built. Further, the State asserted, the MSA provisions to address customers with financial difficulties, including advance payments, letters of credit, guarantees, and performance bonds are inadequate in that by the time PFS realizes there is a problem, it will be too late to effectively employ these mechanisms. Nor is the remedy of returning the fuel adequate. See id. at 17-18.

f. Other Concerns

Although PFS has indicated that cask and canister costs are now to be borne directly by PFS customers, according to the State, the MSA undermines this assertion because there are uncertainties about the relationship/contractual obligations between cask/canister supplier Holtec and PFS. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx Further, according to the State, the MSA assignment provision leaves open the possibility that fuel could come to PFS from another Part 72 licensee, thus creating questions about the utility's Price-Anderson Act coverage of the fuel that requires a re-evaluation of the MSA insurance provision. See id. at 18.

Also troubling to the State is the purported degree to which the MSA will require that the staff make the type of complex legal and discretionary judgments that the Commission purportedly eschewed in CLI-00-13. Initially, the State challenges the PFS declaration that service agreement changes would be subject to staff review, noting that the staff must be aware of such changes, must evaluate whether they are significant, and then determine whether they provide comparable reasonable assurance to the provisions of the MSA now before the Board. Moreover, according to the State, given the clearly evolving nature of the MSA and the fact the MSA itself contains a provision (section 13.2) that permits PFS and its customer to negotiate alternative provisions that provide comparable reasonable assurance, even if such a review were held it inevitably would require the staff to make the types of

judgments the Commission has declared inappropriate, unless a carefully crafted MSA that meets the State's concerns is included as a license condition. See id. at 18-20.

In conclusion, the State declared that, as these items and the lack of State discovery demonstrate, the record of this proceeding is incomplete, leaving various material factual disputes such that a Board grant of summary disposition in favor of PFS would be wholly inappropriate. See id. at 20-21.

3. Staff Summary Disposition Response

In its December 20, 2000 response to the PFS summary disposition motion, which was supported (as was the case with the first PFS summary disposition motion regarding financial assurance matters) by the affidavit of Financial Analyst Alex F. McKeigney and Senior Level Licensee Financial Policy Advisor Robert S. Wood, the staff reached a different conclusion. See NRC Staff's Response to "[PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements" (Dec. 20, 2000) [hereinafter Staff Dispositive Motion Response]; id. Affidavit of Alex F. McKeigney and Robert S. Wood Concerning Utah Contention E (Financial Assurance) (Dec. 20, 2000) [hereinafter McKeigney/Wood Affidavit]. In this regard, the staff began, as had PFS, by analyzing the revised MSA relative to each of the non-insurance related license conditions outlined by the Commission in CLI-00-13.

Concerning LC-1 regarding construction funding, the staff asserted that the combination of funding mechanisms provided by the revised MSA are consistent with that condition. The staff pointed to the fact that, in addition to the **xxxxxxxx** nonrefundable commitment fee required of each customer shortly after service agreement execution, **xxxxxxxxxxxxxxxxxxxx**

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. Noting also that the LC-1 terms do not limit PFS to the service agreements as the only source of committed funding, the staff concluded that the revised service agreement is consistent with that license condition. See id. at 6-7.

Relative to LC-2, the staff asserted that the revised MSA fully implements this provision by indicating that a service agreement will cover the entire term of any PFS license from the date the agreement is executed to the date the PFS license is terminated or revoked, subject only to conditions pertaining to the ability of PFS to begin initial facility operation. Further evidence of compliance with LC-2 is evident, according to the staff, by the agreement's provisions covering facility O&M and decommissioning costs that require customer payments associated with transportation, storage cask and canister vendor payments, facility operations/performance of services, customer loans, and decommissioning. See id. at 7-8.

LC-3, which concerns SNF ownership and liability allocation, is appropriately implemented by the revised MSA, the staff declared, with its provisions that require customers/owners to retain title to the SNF at all times and delineate responsibility between PFS and its customers for decontamination expenses, insurance, and indemnification/liability and defenses limitations. So too, the staff maintained, LC-4 relating to customer creditworthiness is properly implemented by the revised MSA provisions requiring at least annual (and more frequently if conditions warrant) customer submission of, and PFS determinations regarding, financial/creditworthiness information, and furnishing PFS with authority to require additional customer financial assurances, including advance payments,

irrevocable letters of credit, third-party guarantees, and performance bonds. Finally, the staff asserted that the revised MSA makes it clear that PFS will not voluntarily terminate its responsibility for the Skull Valley facility before providing all agreed spent fuel storage services under its customer agreements and completing its licensing/regulatory obligations under its license, thus fully implementing LC-5. See id. at 8-9.

In its response, the staff also assessed the PFS motion as it attempts to address the State's objections to the MSA and indicated it agrees with the views expressed by PFS on each of those matters. Regarding the purported need to make the MSA inviolable by incorporating its provisions as license conditions, the staff declared that while the Commission in CLI-00-13 made clear the importance of the wording of the sample service agreement provisions, it also indicated that each contract did not have to incorporate the same wording "slavishly." The staff further noted that although the Commission could have ordered such incorporation, it instead referred to the existing staff materials license decommissioning financial assurance guidance that sets forth sample contract language, indicating a clear intent that license incorporation of the MSA was not required and establishing that this State argument is meritless. See id. at 10-11.

Addressing next the State's assertion that the incorporation of MSA provisions that were not part of the record previously before the Board renders its prior summary disposition ruling in LBP-00-6 wholly inoperative so as to require vacation, the staff declared that a determination to set aside summary disposition would require that any differences be shown to be relevant and probative to the issues upon which summary disposition was granted. As to the State's specific claim that change from using member contributions, i.e., cash in hand, as the source of construction funding to PFS reliance on debt financing constituted a material change, the staff

noted that in its response to the earlier PFS dispositive motion it indicated such financing was an acceptable means of satisfying LC-1 and that it had declared it considers a contractual obligation would fulfill the license condition requirement that funding be "fully committed" before construction begins. Further, the staff found without substance the State's concerns that PFS will never have significant cash reserves or liquid assets relative to its liabilities, will have very little cash flow, and will not have on hand a previously identified sum of **xxxxxxxxxxxx** before any SNF was shipped. According to the staff, the State's concerns about cash reserves and cash flow are without merit given the MSA provisions that require its customers to pay all facility operating and maintenance costs, while the State's **xxxxxxxxxxxx** figure, as PFS asserted in its motion, misrepresents the now-superseded PFS plans, which would have required customer payments for each canister to be received prior to shipment of that canister. See id. at 11-13.

As to other asserted MSA deficiencies, the staff did not agree with the State's concerns about the ambiguity and complexity of certain MSA terms. With regard to the term "aggregate usage," the staff declared it unambiguous, noting that the State's sole interpretation correctly defined it, and asserted that the State's concern ultimately is irrelevant because in refining the MSA PFS has substituted the term "reserved capacity" that comports with the State's definition. Nor did the staff agree with the State that the definition of "term" is complicated given the definition of "aggregate usage," but again finds this concern irrelevant given the definition of "reserved capacity" that has been incorporated into the revised MSA. And as to the State arguments about the long term payment impacts of customers that withdraw their SNF from the facility and leave the nuclear industry, the staff found this wholly speculative in light of the MSA creditworthiness assessment/financial assurance provisions so as not to provide a basis for denying summary disposition. See id. at 14-16.

With regard to the various State claims about the inadequacy of the MSA provisions permitting xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, the staff indicated it agreed with PFS that the State has not explained the significance of the xxxxxxxx xxxxxxxxxxxxxxxxxxxx; that the MSA makes clear that, until new commitments for replacement capacity are obtained, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx; and that PFS has leverage because partial payment is required prior to the receipt of a customer's SNF. Additionally, the staff found insubstantial the State's concerns about the adequacy of the xxx/KgU amount of the loan in that such an amount would generate xxxxxxxxxxxx dollars in loans to cover xxxxxxxxxxxx dollars in construction costs and the revised MSA provides for an adjustment in the event construction is delayed. <u>See</u> <u>id.</u> at 16-17.

Also insubstantial, according to the staff, are the State's related arguments about the inadequacy of the MSA provisions regarding xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxx. Although noting the State questions the adequacy of the MSA xxxx provisions as they base repayment on "reserved capacity," which the State asserted depends on knowing the unknowable fact of how long the Skull Valley facility will operate, the staff declared that "reserved capacity," which reflects the total MTU to be shipped by that customer and is the basis for its principal repayment obligation regardless of actual usage, does not depend on knowing the facility operating term. Moreover, with regard to the State's assertion that cost recovery based on a forty-year facility life will under-recover principal if the facility only operates for twenty years, the staff maintained that even if the facility only operates for twenty years, the MSA requires that xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx the MSA contains a mechanism for recovering unforseen deficiencies during each operational year, and xxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. As to the State's concern that linking xxxxxxxxxxxxx to fuel delivery years will create an operating deficiency in some years, in addition to the declaration of Mr. Parkyn in support of the PFS motion indicating that PFS will accumulate sufficient funds xxxxxxxxxxxxxxxxxxxxxxxxx, the staff noted that the revised MSA addresses this argument adequately both by creating a formula whereby xxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxx. Finally, the staff maintained the State's assertions that the MSA does not apportion costs when construction costs are not fixed at xxxxxxxxxxx and does not allow a determination of revenue shortfall are insubstantial in that, as PFS notes, the provisions of the MSA make it clear that customer payment obligations are based on the amount of PFS indebtedness, not a fixed amount of xxxxxxxxxxx. See id. at 17-19.

The staff also addressed four State creditworthiness concerns. Responding to the State's claim that the MSA is deficient because it has an indeterminate term and no cost of services estimate, besides indicating it agreed with the PFS arguments that cost of services have been adequately addressed at the June 2000 evidentiary hearing and the planned facility life clearly is forty years, the staff maintained that the State failed to explain why it is important for ensuring that the MSA creditworthiness provisions are adequate for the MSA to include a

cap or estimation of services costs or specify the duration of the facility's term. Also not compelling, notes the staff, is the State's concern that because many customers may close and decommission their facilities after shipping SNF to PFS, the MSA provisions requiring customer take-back will not be effective to ensure payments. According to the staff, this claim is adequately addressed in the MSA provision that requires a customer that suspends or discontinues business to put in place financial assurances to cover amounts necessary to remove its SNF from the PFS facility. Also lacking an adequate explanation as to its impact on creditworthiness in light of the MSA's financial information disclosure and financial assurance provisions, according to the staff, are the State's concerns that PFS customers will include various entities, including rate regulated utilities, nuclear fuel leasing companies, or nuclear asset management companies, and that a customer approaching insolvency will attempt to mask its financial condition. Nor was the staff persuaded by the State's argument that the staff will need to constantly monitor the financial condition of PFS customers, indicating that under the applicable license conditions, the responsibility for making the annual creditworthiness evaluation would rest with PFS. See id. at 19-22.

Although recognizing the Commission's concern in CLI-00-13 that the staff not be involved in making complex post-licensing legal and factual determinations relative to any license conditions, the staff also labeled as insubstantial the State's assertions that the staff is called upon to make such judgments under the revised MSA. The staff agreed with PFS that the State's concern that (i) the timing and extent of construction was unknown is belied by the project scope, schedule, and cost estimate information provided by PFS; (ii) costs of service and the MSA term are open-ended is meritless given that the revenue inflow is not speculative and PFS may rely upon operating revenues; (iii) financial assurance can come only from a

speculative inflow of customers willing to sign the MSA is itself speculative; and (iv) staff may materially change the MSA is groundless given its responsibility to follow established regulatory provisions. See id. at 22-23.

Finally, the staff was unwilling to accede to the State's argument that each of the PFS member utilities must be named as a co-licensee because they are de facto licensees. In addition to being beyond the scope of contention Utah E and the Commission's remand, the staff noted that the State, despite citations to various MSA provisions, has not demonstrated that PFS is a shell over which its members exercise true control. Indeed, the staff declared, the State has ignored various MSA conditions that make it clear PFS is, in fact, in control of the facility. See id. at 23-24.

4. State Reply to Staff Summary Disposition Response

In a January 5, 2001 reply to the staff's response, with the observation that the staff's response basically mirrored the PFS motion, the State nonetheless made several comments regarding the staff's filing. See [State] Reply to the NRC Staff's Response to "[PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements" (Jan. 5, 2001) [hereinafter State Dispositive Motion Reply]. According to the State, the staff failed to recognize the problems inherent with the "evolving" nature of the PFS MSA, which has and could still be changed substantially. Moreover, even under the revised MSA, there are still significant problems, such as the anomalies created when PFS changed from "aggregate usage" to "reserved capacity" as its cost allocation methodology. In the State's estimation, the staff's inability to recognize the effects of these significant changes calls into serious question its ability to recognize when it is

acting beyond the Commission's directive in CLI-00-13 that its post-hearing review must be ministerial. See id. at 2-3.

In its reply, the State also challenged the staff's position that the substantive provisions of the MSA need not be incorporated into the license as conditions. The staff's position that the Commission's approach in CLI-00-13 in not requiring such license conditions is dispositive, the State declared, ignores the fact that at that time the Commission had no way of knowing that PFS would radically change its construction financing and O&M cost recovery schemes nor did it have before it the substantive concerns about those matters (and others) that the State has now raised. Also, the State declared, contrary to the staff's suggestion, it is asking only that substantive MSA provisions be incorporated to provide the necessary reliability and finality to PFS financial assurance commitments. See id. at 3-5.

With regard to its concerns about PFS use of debt-financing of construction costs, the State argued that the staff's earlier endorsements of such financing were in the context of xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. Indeed, the State asserted, the staff seems to have changed its mind regarding the prudence of such an arrangement, given the staff's response to an earlier admission request in which it stated:

> "PFS could have 100% debt financing[;] however, in practice the Staff would not expect this to occur, since 100% debt financing would create a large debt burden which is unlikely to be assumed under prudent business practices absent other compelling circumstances."

Id. at 6 (quoting NRC Staff's Objections and Responses to the "[State] Fourth Set of Discovery Requests Directed to the NRC Staff (Utah Contention E)" (Jan. 28, 2000) at 10). Additionally, according to the State, the PFS scheme is contrary to what the Commission was willing to

permit in its decision in Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-97-15, 46 NRC 294, 309 (1997) in which the Commission by license condition did not allow more than seventy percent debt financing of construction costs. Nor is the staff correct, according to the State, that there has been no showing of a clear need for having xxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx Finally, the State challenged the staff's argument that the State has not substantiated its claim that xxx/KgU is insufficient to cover construction costs, asserting that regardless of whether this figure would generate xxxxxxxxxxxx to cover xxxxxxxxxxxx in estimated costs, the MSA provision governing the conditions on customer loans does not require customers to loan PFS the actual costs of construction, thereby creating the possibility it will not have construction funding. See id. at 5-7.

With regard to the staff's arguments in connection with the MSA's creditworthiness provisions, the State first noted that at the June 2000 evidentiary hearing, xxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. The State then explained that, notwithstanding the staff's argument that there is no explanation of why the State asserts the MSA must include a cost cap or cost estimation for creditworthiness checks to be effective, for such a credit check to be useful, the scope of potential debt must be known. So too, the State

declared, the staff's similar argument regarding the State's creditworthiness-related claim that the MSA needs to specify a term of duration indicates the staff's lack of appreciation of the significant uncertainties that face PFS over the forty-year (or longer) term during which PFS must rely on MSA terms and conditions to generate all operating revenue in a rapidly changing industry in which PFS members, such as Southern California Edison, face bankruptcy and other market vicissitudes. Also, according to the State, equally troubling, and providing further support for including substantive MSA provisions as license conditions, is the staff's argument that post-licensing, the staff will not monitor or otherwise review the financial conditions and finances of PFS customers, thereby creating a situation that improperly leaves the public in the hands of PFS to ensure its customers' creditworthiness to provide PFS needed revenues in a turbulent energy market. Finally, the State expressed its disagreement with the staff's assertion that staff review of customer finances is not an issue within the scope of contention Utah E. Paragraph nine of that contention raises concerns about the financial assurance impact of a customer breaching a service agreement, becoming insolvent, or otherwise not making payments, which are concerns the State declared PFS has attempted to address through creditworthiness checks, the implementation of which must be subject to post-license reviews by the staff. See id. at 8-10.

Also unrebutted by the staff, the State maintained, is the State's assertion that the concerns it raises about the PFS financial plan will require the staff to make complex legal and factual judgments to assess PFS compliance with 10 C.F.R. § 72.22(e). Given the overly optimistic nature of the evolving PFS plan, which provides no cash reserves, creates the possibility of construction loans in amounts inadequate to fully fund actual construction costs, and depends on speculative customer inflow and operating revenues, the result can only be a

post-license staff review mired in the types of complex determinations in which the Commission in CLI-00-13 has indicated the staff should not be involved. See id. at 10-11.

E. PFS Motion to Strike/State Responsive Filing

1. PFS Motion to Strike

Also on January 5, 2001, PFS submitted a motion seeking to strike portions of the State's December 22, 2000 dispositive motion response. See [PFS] Motion to Strike Portions of [State] Response to [PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E/Confederated Tribes Contention F (Jan. 5, 2001) [hereinafter PFS Motion to Strike]. Such action is appropriate, according to PFS, for those matters that either should have been raised when the State filed its objections to the PFS MSA or are outside the scope of the Board's jurisdiction pursuant to the Commission's remand in CLI-00-13. In this regard, PFS asserted that the scope of the Commission's remand was limited to a determination of whether the MSA meets all financial assurance license conditions and is adequate to address the concerns raised in contention Utah E. Further, PFS maintained that the Commission's remand defining how objections to the MSA were to be raised and adjudicated contemplated that following State objections to the MSA, PFS would be entitled to demonstrate it was entitled to summary disposition in connection with those concerns, thus precluding the State from introducing new objections in its response to that motion when PFS would have no opportunity to address those concerns and demonstrate to the Board they precluded summary disposition. See id. at 4-6.

PFS claimed that seven matters fall into one or both of these categories and so should be stricken as a basis for the State's response. The first is the State's claim that the MSA does not contain provisions that create adequate cash reserves or provide adequate construction

and O&M funding over the life of the proposed Skull Valley facility. According to PFS, this argument is outside the scope of the remanded proceeding in that it directly challenges the sufficiency of Commission-approved LC-1 and LC-2, given that neither requires a cash reserve, but calls for construction funding to be "fully committed" prior to construction and "prices" to be sufficient to cover facility costs. <u>See</u> <u>id.</u> at 6-7.

Also meriting exclusion is the State's summary disposition response argument (and the accompanying portion of its statement of material facts in dispute), not raised in its objections, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxx. According to PFS, although the State did challenge the sufficiency of the MSA's creditworthiness provisions to identify customers with financial difficulties and address any resulting funding shortfall through financial assurance mechanisms, it did not claim a deficiency because the MSA failed to provide that a customer's default could be recouped xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. <u>See</u> <u>id.</u> at 7.

PFS declared exclusion is appropriate as well for the State's argument that the MSA creates a cost payment deficiency by providing that a customer, upon removal of its SNF from the PFS facility, is obligated to make service costs payments for such fuel only for the remainder of the storage period specified in the customer's storage schedule. According to PFS, although the State claims this deficiency arose when PFS changed the cost allocation basis from "aggregate usage" to "reserved capacity," in fact this argument was equally applicable under the "aggregate usage" cost allocation basis and so should have been raised in the State's objections to the MSA. In addition, PFS noted it now has changed the MSA to require expressly that a customer removing SNF from the PFS facility remains obligated to pay

its proportional share of the PFS service costs through the end of the service agreement term, which runs until PFS license termination. See id. at 8.

Purported MSA ambiguity regarding whether or how PFS will recoup its multimillion dollar capital investment in developing and using a dry cask transfer system is the fourth issue PFS asserted should be stricken from the State's response (and the corresponding portions of its statement of material facts in dispute) given that the State did not even mention the dry cask storage system in its objections. Also to be stricken (along with the corresponding portions of its statement of material facts in dispute) are State issues regarding the party responsible for SNF canister and cask costs and for transportation costs. PFS declared this appropriate because the State's concerns about xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxx. See id. at 9.

Finally, PFS sought to have expelled the State's argument (and the corresponding portions of its statement of material facts in dispute) regarding uncertainty about Price-Anderson Act liability coverage for SNF received from another Part 72 facility. According to PFS, this matter is outside the scope of the Commission's remand, having been addressed and dismissed by the Board in its summary disposition ruling and not having been the subject of any Commission discussion, and was not raised in the State's objections. See id. at 9-10.

2. State Motion to Strike Response

In a January 16, 2001 response, the State asserted that the PFS motion to strike is without merit in all respects. See [State] Response to [PFS] Motion to Strike Portions of [State] Response to [PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E/Confederated Tribes Contention F (Jan. 16, 2001) [hereinafter State Motion to

Strike Response]. Initially, the State asserts that a major premise of the motion is incorrect in that the Commission remand is not as circumscribed as PFS asserts. According to the State, the issue before the Commission in CLI-00-13 was whether the Commission's Claiborne "license conditions" approach under 10 C.F.R. Part 70 could be extended to a Part 72 ISFSI applicant like PFS. Thus, the Commission did not approve LC-1 and LC-2, but merely affirmed the Board's LBP-00-6 decision insofar as it approved the use of license conditions as part of the PFS financial assurance showing and remanded to the Board with a directive that PFS produce a sample service agreement meeting all financial assurance license conditions and that the State be afforded an opportunity to address the adequacy of the service agreement to meet its contention Utah E concerns. The motion to strike, the State declared, is an attempt by PFS to constrain the State from exercising the opportunity afforded by the Commission to address MSA adequacy to meet the State's contention Utah E concerns, an exercise that is all the more prejudicial to the State given the prior refusal of PFS to produce any MSA-related discovery documents. Certainly, the State declared, if in response to the Commission's remand, PFS decides to make substantive changes to the financial plan it previously has proffered to the Commission, the Board, and the parties, then the State must be given an opportunity to dispute that funding scheme, including the implementability of LC-1 and LC-2. See id. at 3-4.

The State also contended that, as a procedural matter, the PFS motion is misplaced. According to the State, a motion to strike is not to address the merits of a pleading as a reply would, but is to confine itself to the procedural sufficiency of the filing and any accompanying affidavits. In this instance, however, there were no procedural defects in the State's pleading given that the State addressed PFS MSA changes made after its objections or raised matters within the scope of the Commission's remand. Further, given that the State has had no

opportunity for discovery relating the MSA and so is forced to make its case based on the document itself, to permit PFS to use the procedural posture of this case to keep the State from raising relevant and material concerns amounts to an improper lessening of the PFS summary disposition burden. See id. at 5-6.

Turning to the specific points made by PFS in support of its motion to strike, in connection with the third issue proffered by PFS the State asserted that, contrary to the PFS claim that the State's argument regarding the lack of a mechanism to pass through service costs if a customer withdraws SNF before the end of the MSA term could have been made regardless of the MSA revision from "aggregate usage" to "reserved capacity," this problem as well as the second PFS issue of passing costs in instances when PFS is unable to collect all invoiced costs from customers arose because of PFS drafting changes that were provided to the other parties and the Board on December 4, nearly a month after the November 7 State objections. Alternatively, the State declared, PFS is attempting to use its motion as a vehicle for improperly making substantive reply arguments, as is evidenced by its statement advising the Board that PFS intends to change the MSA to expressly require that a customer that removes SNF from the facility will remain obligated to pay its proportional share of PFS service costs relative to such fuel through the end of the service agreement term, i.e., when the PFS license is terminated. See id. at 7-8.

So too, in addressing PFS issues four through seven, the State declared that these were raised in whole or in part in response to PFS drafting changes. In this regard, the State noted that the black-line version of the revised MSA attached to the PFS dispositive motion shows changes to the Schedule 4 list of cost components, including those relating to cask and canister costs and transportation costs. Additionally, according to the State, Schedule 4 is

silent concerning PFS return on dry transfer system capital investment and nuclear insurance coverage of shipments from a Part 72 facility. Again, the State asserted it would be inequitable to permit PFS to make drafting changes but not allow the State to comment on the effect of those changes. See id. at 9.

Finally, the State addressed the first PFS assertion that the State's arguments regarding the lack of cash reserves and sufficient construction and O&M funding under the MSA are outside of the scope of the proceeding. According to the State, these are arguments that the State has raised consistently relative to contention Utah E so as to be within the bounds of the Commission's remand and thus not subject to being stricken. Further, the issue of cash reserves highlights the shortcomings of the MSA in the current volatile power industry environment in which disruptions and bankruptcy are extant and should be considered in the context of evaluating the PFS dispositive motion. See id. at 9-10.

II. ANALYSIS

A. PFS Summary Disposition Motion/Motion to Strike

The chronology of the parties filings would suggest that the State's reopening motion be considered first. It is apparent, however, that a number of the concerns raised in support of that motion overlap with the matters at issue relative to the PFS dispositive motion. In this regard it has been noted that

> to justify the granting of a motion to reopen the moving papers must be strong enough, in light of any opposing filings, to avoid summary disposition. Thus, even though a matter is timely raised and involves significant safety considerations, no reopening of the evidentiary hearing will be required if the affidavits submitted in response to the motion demonstrate that there is no genuine unresolved issue of fact, i.e., if the undisputed facts establish that

> the apparently significant safety issue does not exist, has been resolved, or for some other reason will have no effect upon the outcome of the licensing proceeding.

Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 523 (1973) (footnote omitted). Given this parallel between summary disposition and reopening, we believe it is appropriate to look to the resolution of those issues, along with the others involved in the summary disposition motion and the related motion to strike, before considering the State's reopening motion.

1. Summary Disposition and Motion to Strike Standards

In numerous other instances in this proceeding, we have described the standard governing summary disposition as follows:

> Under 10 C.F.R. § 2.749(a), (d), summary disposition may be entered with respect to any matter (or all of the matters) in a proceeding if the motion, along with any appropriate supporting material, shows that there is "no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law." The movant bears the initial burden of making the requisite showing that there is no genuine issue as to any material fact, which it attempts to do by means of a required statement of material facts not at issue and any supporting materials (including affidavits, discovery responses, and documents) that accompany its dispositive motion. An opposing party must counter each adequately supported material fact with its own statement of material facts in dispute and supporting materials, or the movant's facts will be deemed admitted. See Advanced Medical Systems, Inc. (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102-03 (1993).

LBP-02-20, 56 NRC 169, 180 (2002). We again use these standards in evaluating the PFS dispositive motion regarding the sufficiency of its MSA relative to contention Utah E. Further, with regard to the PFS motion to strike, such a motion is an appropriate mechanism for seeking the removal of information from a pleading or other submission that is "irrelevant," Power

Authority of the State of New York (James A. FitzPatrick Nuclear Power Plant; Indian Point, Unit 3), CLI-01-14, 53 NRC 488, 514 (2001), or, in the context of summary disposition, portions of a filing or affidavit that contain technical arguments based on questionable competence, see Florida Power and Light Co. (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-85-29, 22 NRC 300, 305 (1985).

2. PFS Dispositive Motion

a. Scope of Remand/Sufficiency of Previous Summary Disposition Decision

Given that the matters now before the Board arose as a direct response to the Commission's August 2000 determination relative to the Board's referral of its March 2000 summary disposition ruling, we think it important to address initially the parties' related legal disputes regarding (i) the scope of that Commission remand; and (ii) the continued efficacy of that Licensing Board summary disposition determination relative to portions of contention Utah E.

In considering the first matter, we note that the Commission in CLI-00-13 made clear that in relying upon PFS service agreement language commitments in granting summary disposition in favor of PFS, the Board's shortcoming was in going "too far in putting evaluation of the legal effectiveness of service agreements into the hands of the NRC Staff without itself reviewing a sample service contract." See CLI-00-13, 52 NRC at 35. Further, to correct this deficiency the Board was to direct PFS to produce "a sample service contract that meets all financial assurance license conditions," including those specified in that Commission decision, and provide the State with an opportunity to address "the adequacy of the service contract to meet the concerns raised in Contention [Utah] E," with the caveat that PFS would be entitled to summary disposition relative to any State objections the Board determined were insubstantial.

Id. While the Commission's directions to the Board thus are clear, in resolving this matter, we nonetheless think it important to remember the context within which the Board made the initial summary disposition ruling that was the subject of this Commission review.

In LBP-00-6, the Board found that as to the ten paragraphs or subparts of contention Utah E, the two then-existing staff proposed license conditions and/or four stated PFS service agreement element commitments addressed sufficiently the substance of those State concerns such that summary disposition in favor of PFS was appropriate in whole or in part in on nine of those subparts, with the remaining cost estimate/onsite liability insurance matters subject to consideration at the June 2000 evidentiary hearing. In this light, and bearing in mind the Commission's directions as to what is before the Board for resolution vis a vis the MSA, we find of paramount interest in this remand the question of whether the PFS-provided sample service agreement adequately implements what are now the six non-onsite liability insurance Commission-directed license conditions so as to address adequately the nine contention Utah E subparts that were the subject of the Board's March 2000 dispositive motion ruling.

Having said this, it is apparent we do not accept the State's assertion that simply by reason of the changes introduced by PFS in the MSA, as compared to its previous representations regarding service agreement content, there is no basis upon which to proceed to summary disposition in this instance. To be sure, the extensive nature of some of the changes to the PFS financial qualifications scheme, which were proffered less than six months after the Board (or less than two months in the case of the Commission) had placed significant reliance on those terms was unexpected, to say the least. Nonetheless, to say those changes render the Board's decision a nullity that should be vacated is too sweeping. Rather, there

having been no change in contention Utah E that was the focus of that decision,[7] as we discuss below, in our estimation what the Commission's remand requires is that we revisit the matters at issue in that contention in light of what are now the changed circumstances arising from the PFS MSA.

b. Adequacy of PFS MSA to Implement the Commission's License Conditions Relative to Contention Utah E

In its summary disposition motion, PFS attempts to establish, relative to each of the six non-onsite liability insurance license conditions, that its MSA implements that condition in a way that is adequate to address any implicated contention Utah E concerns so as to warrant a ruling in its favor, a position the staff supports and the State opposes. We likewise consider each of the six, albeit in the context of the particular contention Utah E concerns it implicates.

i. Subpart 1 – Adequacy of PFS Ownership Information. In our initial summary disposition ruling, the Board found that this portion of the contention, which raised concerns about the ability or willingness of the original PFS members to fund construction, was amenable to summary disposition in favor of PFS because LC-1 would not allow facility construction to move forward unless sufficient funds, including equity contributions from PFS members, had been committed to the project. See LBP-00-6, 51 NRC at 119. There is now a dispute about the nature of sufficient funding given the MSA provisions that utilize **xxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx** as the basic source of construction funding, which we discuss in more detail in section II.A.2.b.ii below.

---

[7] Although the Board required that PFS outline what the changes the MSA made to any previous PFS financial qualifications representations to the Board and the other parties and subsequently provided an opportunity for the submission of late-filed contentions relative to the MSA, the State chose to rest on its existing contention, which remains the issue statement before us.

Nonetheless, with respect to this subpart the fact remains that, as was previously the case, inadequate funding in whatever form will preclude construction from going forward.

In connection with the MSA, however, as was noted in section I.C.1 above, the State now argues relative to the PFS member-customers that it is apparent the business model the MSA fosters, which includes MSA provisions that make member-customers liable for SNF sent to the facility (sections 11.1, 11.2, and 20.1); make them the owners of their storage casks and canisters (section 11.2); require them to add PFS to their insurance polices as an insured (section 17.1.1(c)); accept the PFS liability cap on insurance on the amount of insurance it will carry (section 20.3); and fund all PFS services (section 13.4), is one that establishes a principal-agent relationship between PFS and its member-customers. By creating a shell designed to obfuscate the fact that these entities have responsibility and control over PFS, the State declares that, in accord with the Appeal Board's Marble Hill precedent, Public Serv. Co. of Indiana, Inc. (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 198-202 (1978), the MSA establishes that PFS member-customers are required to be made co-applicants on the PFS license.

We cannot agree with this legal interpretation. Putting aside the not-inconsequential PFS and staff objections that this claim is beyond the scope of contention Utah E, see PFS Dispositive Motion at 23; Staff Dispositive Motion Response at 24, as well as the fact that the logical extension of the State's position (at least based on the MSA provisions cited) would be to make all PFS customers (members or otherwise) co-applicants, we find the Marble Hill precedent inapposite, given that the entities involved there were co-owners of the facility, which the PFS members here clearly are not. See Revised MSA § 11.4 (PFS has facility title at all times). More to the point are the Commission's endorsements of the limited liability corporation

as a stand-alone applicant/licensee in a number of recent reactor operating license transfer cases, including one in which the limited liability corporation also would hold an ISFSI license, which implicitly (if not explicitly) resolves this matter. See, e.g., Northern States Power Co. (Monticello Nuclear Generating Plant), CLI-00-14, 52 NRC 37, 57 (2000).

Thus, in connection with contention Utah E, subpart one, we find nothing in the State's objections relative to the MSA that creates a material factual dispute or otherwise precludes a ruling that summary disposition in favor of PFS on this subpart is again appropriate.

ii. Subpart 2 -- Adequacy of PFS Financial Base. In our earlier summary disposition ruling, we noted this contention Utah E subpart centers on claims about the adequacy of the PFS financial base to support construction and operation and the potential for facility termination prior to license expiration. See LBP-00-6, 51 NRC at 121. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxx

Regarding the PFS use of loans for construction funding, as was noted earlier, it is the State's position that the PFS plan, as reflected in its revised MSA, xxxxxxxxxxxxxxxxxxxxxx is inappropriate because xxxxxxxxxxxxxxxxxxx and, given the current financial instability and volatility in the energy markets, PFS is unlikely to be able to obtain funds from other sources; xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx; and PFS has no leverage to collect unpaid debts. Additionally, the State questions whether the xxxxxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx is adequate to cover any increased costs if there is a delay in Phase I construction if costs rise beyond the MSA Schedule 5 escalators and apparent lack of any escalators for Phases II and III. For the reasons set forth below, we find each of these objections insubstantial.

Regarding the general State challenge to the use of xxxxxxxxxxxxxx as the basis for financing construction as expressed in its reopening motion and its summary disposition responses, nothing in the Commission's jurisprudence or anything cited by the State prohibits such a financing arrangement or suggests a preference for the type of member equity funding/customer prepayment scheme that PFS indicated initially that it intended to utilize. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx[8] Relative to the seemingly related concerns about the xxxxxxxxxxxxxxxxxxxx and the energy market volatility and instability, aside from the point that an "[a]pplicant cannot be required to prove that uncertain future events could never happen," Northeast Nuclear Energy Co. (Millstone Nuclear Power Station, Unit 3), CLI-01-3, 53 NRC 22, 27 (2001), both turn on the unsupported assumption that one or more of the PFS members or customers, which by all indications would be entities subject to NRC

---

[8] xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See State Dispositive Motion Reply at 6.

financial assurance requirements, will inevitably fail to abide by the specific provisions of their service agreements regarding reimbursement to PFS, thus causing financial problems for PFS that it cannot address using the various MSA section 15 remedy mechanisms. Compare Northern States Power Co. (Monticello Nuclear Generating Plant), CLI-00-14, 52 NRC 37, 49-50 (2000) (cost pass-through contract with state-regulated utility adequate to establish financial qualifications).[9] By the same token, the availability of the MSA section 15 remedy mechanisms, along with the MSA provision (section 13.5.2) governing prior receipt of partial customer payments prior to PFS receipt of customer SNF, make it apparent that PFS has significant debt collection leverage. Finally, relative to the adequacy of the **xxxxxxxxxxxxxx xxxxxxx** in conjunction with any MSA Schedule 5 escalator factors in the event of a delay in Phase 1 construction, putting aside the fact that the amount to be collected under this figure exceeds Phase 1 construction cost estimates by some **xxxxxxxxxxxxxxxxxxxxxx**, the State has made no specific showing that the escalator factors used are inadequate or that other factors should have been employed, other than the blanket claim that anything less than stated

---

[9] Although the State has suggested that the complex structure of nuclear facility operating companies and their affiliates puts this matter in question, see State MSA Objections at 20, as PFS noted in its reply findings relating to the evidentiary presentations on contention Utah E/Confederated Tribes F, Financial Assurance, see [PFS] Reply to the Proposed Findings of Fact and Conclusions of Law of the [State] and the NRC Staff on Contentions Utah E/Confederated Tribes F, Utah R, and Utah S (Aug. 28, 2000) at 14 n.19, consistent with Monticello, the financial assurance required of PFS customers under MSA section 15 could be demonstrated by their status as electric utilities whose rate bases include costs to be paid to PFS. See also 62 Fed. Reg. 44,071, 44,077 (Aug. 19, 1997) (Commission policy statement on electric utility industry restructuring and economic deregulation noting that existing 10 C.F.R. Part 50 regulatory framework is sufficient to provide reasonable assurance of the financial qualifications of both electric utility and non-electric utility applicants and licensees). As it reviews the contents of the actual agreements negotiated by PFS with its customers, see CLI-00-13, 52 NRC at 35, customer financial assurance is an item we anticipate the staff would confirm.

customer responsibility for all construction costs leaves the potential for uncovered costs and so is inadequate. Similarly, the State's general claim that high levels of inflation and technology/regulatory-driven costs changes are not unknown so as to cause concern about the lack of denominated escalators for Phases II and III, Sheehan Declaration at 8, is insufficient to create a material factual dispute given the specific PFS showing that construction costs for these phases would need to escalate on the order of eighteen percent per year before exceeding the funds provided for under MSA section 13.2, see PFS Dispositive Motion at 19 n.40.

Regarding the efficacy of the MSA cost pass-through provisions, a matter also posited in the State's reopening motion and as part of the PFS motion to strike,[10] as our discussion above regarding xxxxxxxxxxxxx suggests, and as we have otherwise noted today in our decision regarding the efficacy of PFS construction and operational cost estimates relative to the Commission's financial qualifications requirements, see LBP-05-21, 62 NRC __, __ (May 27, 2003) (slip op. at 67), we see nothing fundamentally deficient with such an arrangement. To be sure, it may create a concern for PFS members/customers to the degree such an arrangement generates uncertainty about the costs and expenses associated with storing SNF at the facility, but those are matters they must assess in making a business decision whether to enter into the

[10] Although we deal with these and other reopening motion arguments in the context of the PFS summary disposition claim relative to contention Utah E, as we explain in section II.B below, our finding they are without substantive merit so as to require further adjudicatory consideration would be equally applicable to the State's reopening request.

MSA-defined contractual arrangement with PFS.[11] And, notwithstanding license issuance, under LC-1 and LC-2, it is whether enough customers are willing to accept such an arrangement that will control whether this facility will be built and operated. Moreover, to the degree the State has concerns about continued customer viability in the context of facility operation and the concomitant lack of a large PFS cash reserve to address this purported (albeit somewhat overstated) problem,[12] as we noted relative to the question of xxxxxxxxxxx xxxxxxxxxx above, general, undifferentiated concerns about the future viability of PFS customers are not adequate to establish a lack of compliance with the Part 72 financial assurance provisions, particularly when such concerns are expressed (1) relative to entities already subject to Part 50 financial qualifications requirements, see Monticello, CLI-00-14, 52 NRC at 51 (rate-regulated utilities presumed to have reasonable assurance of receiving sufficient revenue to fund safe operation of plants); and (2) in the face of MSA requirements for regular, xxxxxxxxx payments of all PFS estimated costs, xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxx,[13] plus a requirement to pay accrued actual costs

---

[11] xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx See PFS Dispositive Motion at 20 & n.42.

[12] As PFS notes, the State's concern in this regard was based largely on its misstatement that PFS would receive operational cost payments totaling some xxxxxxxxxxxx for all the first 10,000 metric tons of spent fuel prior to shipment, when in fact it would receive only about one-eighth of that figure prior to receipt of the specific canisters. See PFS Dispositive Motion at 12-14.

[13] Although the PFS hearing testimony as to the amount of this contingency figure would, in our estimation, constitute a commitment that provides a floor for such a cost figure, see PFS Dispositive Motion at 16 n.34, there apparently is nothing in the MSA that would preclude PFS from increasing that amount as an additional vehicle for covering unanticipated

(continued...)

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx. Thus, we find nothing in the "pass through" concept that is violative of the agency's financial assurance regulations.

Finally, under this subpart, the State also raises a concern about the continued operation of PFS through license expiration. LC-5 now states that the PFS customer service agreements must include a provision that requires PFS not to terminate its license prior to furnishing the spent fuel storage services covered by the agreement. Yet, as PFS points out, MSA sections 23, 24.3.1, and 24.3.4 cover this requirement by (1) defining the "term" of the agreement as continuing until such time as PFS has completed its licensing or regulatory obligations under its license and the license is terminated or revoked; (2) prohibiting PFS from taking any voluntary action to terminate its existence during the agreement term; and (3) precluding PFS or a customer from terminating the agreement between the time facility operation begins and the end of the term.

The State thus having interposed no material factual issues or shown there is a substantial deficiency in the MSA in connection with this portion of contention Utah E, summary disposition on this subpart is appropriate as well.

iii. Subpart 3 – Adequacy of PFS Funding Documentation, Including Business Plan and Subscription Agreements. In LBP-00-6, 51 NRC at 122-23, in granting summary disposition the Board found that the concerns reflected in this portion of the contention Utah E were addressed by then-proposed staff license conditions LC-1 and LC-2 and the fact that any facility

---

[13](...continued)
costs of whatever kind, including uncollected invoiced costs that the State claims raise a significant financial problem, see State Dispositive Motion Response at 13, and which PFS, in turn, maintains constitutes a newly-raised assertion that should be stricken, see PFS Motion to Strike at 7.

construction/operation cost aspects of this contention would be addressed in the June 2000 hearing on subpart six of the contention. Given the Commission's endorsement of those staff license conditions in CLI-00-13, 52 NRC at 36, and our separate decision today addressing the State's concerns about construction/operation cost estimates under subpart six, see LBP-05-21, 62 NRC at __ (slip op. at 58-101), we find that summary disposition regarding this subpart is once again appropriate.

iv. Subpart 4 -- Adequacy of PFS Documentation on Current Financial Status. The Board in LBP-00-6, 51 NRC at 124, found that this concern about whether "PFS will be permitted either to construct or operate the facility when there is an inadequate revenue stream to cover the costs reasonably involved in such activities" was addressed by what are now LC-1 and LC-2. While this remains true in the post-MSA context, there also are the various MSA provisions discussed with respect to subpart two above regarding construction loan adequacy and cost pass-through efficacy, all of which we find again provide an appropriate basis for summary disposition on this subpart.

v. Subpart 5 -- PFS Liability for Spent Fuel Casks. The Board's ruling in LBP-00-06, 51 NRC at 125-26, that summary disposition was appropriate for this contention subpart as it concerned the allocation of liability between PFS and its SNF customers was based on PFS commitments to (1) offer storage services only on the condition that each customer retain title to its fuel throughout the storage period; and (2) include in each customer agreement an assignment of legal and financial responsibility among customers, as SNF owners, and PFS. In CLI-00-13, 52 NRC at 36, the Commission made these commitments a license condition -- LC-3 -- that requires the PFS service agreement to include provisions addressing these matters. The MSA does so in several instances, including section 11.1, which mandates that

title to the SNF remain with the customer at all times; section 13.6, which makes a customer/owner responsible for any contamination clean-up costs it causes; section 24.4, which makes the customer/owner responsible for removing its SNF from the site at the end of the agreement term at its own expense; sections 17.1 and 17.2, which define the responsibilities of PFS to maintain nuclear and non-nuclear related insurance; and section 20, under which the PFS warranty limitations and limitation of liability are identified, including its liability for any and all claims under the MSA, other than section 5.2 liquidated damages for failure to timely provide PFS-supplied shipping and transfer casks and ancillary equipment, not to exceed the amount obtained by PFS under insurance policies for such claims.

Regarding these provisions, the State has claimed, albeit principally in the context of its reopening motion, that the section 5.2 liquidated damages clause, along with the provision in section 21 to cover force majeure (i.e., act of God) costs, do not adequately account for the costs involved while the section 17.1 provisions create a "monstrous labyrinth" of liability distribution between PFS and its customers that would allow insurers and insured to deny responsibility. With respect to the former claim, as PFS points out, to cover such costs (for which the State has not provided any specific estimates) it has both the xxxxxxxx per year contingency funding as well as the authority under MSA section 13.4 to pass such costs along to its SNF customers. And as to the supposed section 17.1 liability labyrinth, as was explained in the affidavit of PFS nuclear insurance expert Hanson Pickerl attached to the PFS reopening motion response, the Price-Anderson, nuclear worker insurance, nuclear property insurance, and supplier's and transporter's insurance policies that the customer owner and/or PFS are required to maintain have provisions defining the "insured" that are intended to allow "seamless transition of coverage from one insurance program to the next during the course of nuclear fuel

fabrication, use, shipment, and storage" and so avoid disputes among nuclear liability insurers about coverage. See PFS Reopening Response, Declaration of Hanson D. Pickerl at 2-5. Finally, as was noted in LBP-00-06, 51 NRC at 126, to the degree this contention subpart had implications for State claims relating to the adequacy of PFS offsite and onsite insurance coverage, our summary disposition finding relative to the former insurance was not disturbed by the Commission ruling in CLI-00-13 while the latter, in conformance with LC-7, is being dealt with today in our separate initial decision on contention Utah E, see LBP-05-21, 62 NRC at __ (slip op. at 96-101).

There thus being no material factual dispute relative to these matters, we find summary disposition in favor of PFS on this subpart of contention Utah E is again appropriate.

vi. Subpart 6 – Inadequate Cost Estimates. As we indicated in LBP-00-06, 51 NRC at 108, PFS did not seek summary disposition regarding this contention subpart concerning the adequacy of PFS construction and operations cost estimates, which was the subject of the June 2000 evidentiary hearing and the initial decision that we issue today, see LBP-05-21, 62 NRC at __ (slip op. at 58-101). Nonetheless, a number of the MSA-related concerns interposed by the State relative to the PFS summary disposition motion arguably relate to this subpart and, as such, we deal with them in this context.

One of these items, also raised in the State's motion to reopen, concerns costs associated with return on equity and return on investment, items that purportedly were identified by PFS during the June 2000 hearing as not being operational costs but which are now covered as such costs under the MSA. Putting aside the fact that, regardless of how they were previously treated, under MSA section 13.4 they are pass-through costs that will be accounted for through collection along with other costs, the materiality of these costs as financial

assurance deficiencies is not apparent given that MSA section 13.2 provides xxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx.

Another cost estimate item raised by the State is the question of dry transfer system cask costs, which is also the object of the PFS motion to strike. With respect to the State's question of whether dry transfer system costs are covered under the MSA, PFS has resolved that matter with a redraft of the definition of "Ancillary Equipment" under section 1. Regarding the related issue of whether the cost of the PFS capital investment in developing and using its dry cask transfer system should be included under the MSA, also a matter referenced in the State's motion to reopen, the Board today resolves that question in its initial decision regarding subpart six of contention Utah E, with its holding that such costs are considered pre-construction costs that need not be accounted for under the MSA, <u>see</u> LBP-05-21, 62 NRC at __ (slip op. at 77, 78-79), and so seemingly would be recoverable, if at all, as a return of investment under MSA Schedule 4.

Also raised as cost estimate concerns, and likewise subject to the PFS motion to strike, are purported MSA ambiguities regarding xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxx. Although the State asserts these items create a financial qualifications deficiency of a possibly unknown amount of unrevealed liabilities for PFS and its customers, we find these concerns lack materiality. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx It may well be that PFS and/or its customers will find cause to improve these MSA clauses to further outline which is the case; however, as this possible need for a refinement has been presented by the State, it does not create a financial qualifications deficiency that has any regulatory significance under Part 72.

Finally, in connection with the MSA, the State raises a concern about the viability of cost estimates given the failure of PFS to specify whether it will build the Low rail line or utilize an ITF as the method for getting SNF from the rail main line to its Skull Valley facility more than twenty miles away. A similar argument was posited in the context of the June 2000 evidentiary hearing and is disposed of today in favor of the PFS in our contention Utah E initial decision based on the fact that the estimated Low rail line costs envelop the ITF costs. See LBP-05-21, 62 NRC at __ (slip op. at 83-84). As such, that concern need not be considered further here.

Thus, to the degree the State has posited MSA-related cost estimate matters that are not dealt with in our initial decision today regarding contention Utah E,[14] we find there are no material factual issues in dispute and that summary disposition in favor of PFS on those matters in the context of this contention Utah E subpart is appropriate.

vii. Subpart 7 -- Adequacy of Existing Market Documentation. This contention Utah E subpart questions the need for PFS to document the adequacy of the existing SNF storage market through a showing of customer service agreement commitments sufficient to fund facility construction, operation, decommissioning, and contingencies. In LBP-00-6, 51 NRC

---

[14] In this regard, although principally in the context of its reopening motion, the State also raises a cost estimate concern about the need to account for xxxxxxxxxxxxx costs as part of the operating and maintenance expenses of the facility, a matter we resolve today in the context of our decision on contention Utah E, see LBP-05-21, 62 NRC at __ (slip op. at 91).

at 127, we found that the PFS commitments requiring PFS to demonstrate sufficient committed funding for construction and service agreements with prices to cover operation, maintenance, and decommissioning costs over the entire license term rendered claimed concerns about market adequacy immaterial to the requisite section 72.22(e) reasonable assurance finding. Given that those PFS commitments now are embodied in Commission-endorsed license conditions LC-1 and LC-2, we again find summary disposition in favor of PFS appropriate relative to this contention Utah E subpart.

viii. <u>Subpart 8 – Propriety of PFS Use of Debt Financing</u>. In LBP-00-6, 51 NRC at 128, we found that the debt amortization stream of revenue concern embodied in this contention Utah E subpart was resolved by the PFS commitments that now are the basis of LC-1 and LC-2. As we discussed in connection with subpart two above, however, xxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx. As we also discussed in that section, we do not find the State's objections to that funding mechanism either create material factual disputes or evidence financial assurance inadequacies. Accordingly, we again grant summary disposition in favor of PFS on this subpart of contention Utah E.

ix. <u>Subpart 9 – Adequacy of PFS Measures to Address Service Agreement Breach</u>. Relative to this contention Utah E subpart concerning cost coverage for service agreement breaches, in LBP-00-6, 51 NRC at 130, the Board found the PFS commitment that its service agreements would require customers to "(1) periodically provide pertinent financial information; (2) meet creditworthiness requirements; and (3) provide any necessary additional financial assurances (e.g., an advance payment, irrevocable letters of credit, third-party guarantee, or payment and performance bond)" provided the requisite reasonable assurance such that

summary disposition in favor of PFS was appropriate on this subpart. In CLI-00-13, those commitments were incorporated by the Commission into license condition LC-4, which in turn was addressed by PFS in MSA section 15, which among other things permits PFS to seek additional financial assurances if there has been any "material adverse change" in a customer's financial situation, and MSA Schedule 3.[15] The State, however, maintains that these measures are inadequate because they can only be employed once a financial problem has become apparent, at which time it is too late to utilize the various section 15 remedial tools. Moreover, the State declares, the potential remedy of returning the SNF to its owner is unsatisfactory if the customer is in bankruptcy, which could place the fuel under the control of a bankruptcy court and, if the situation is serious enough, cause the customer to lose its license to possess the fuel. Putting aside the fact this claim seems to suggest that LC-4 was deficient at its inception because that license condition declares financial assurance prepayment mechanisms, such as letters of credit, guarantees, and bonds, should be utilized only "where necessary," rather than ab initio for all PFS customers as the State now suggests, see Sheehan Declaration at 10, this concern also is wanting as once again it is based on the notion rejected by the Commission in the financial qualifications area that the possibility of uncertain financial events the applicant

---

[15] Also in the State-posited circumstance in which a PFS customer leaves the nuclear industry before the PFS license term is completed, see State MSA Objections at 15, these same financial assurance mechanisms would be applicable to address any concern about that customer's willingness to abide by its MSA financial commitments through the end of the MSA term, i.e., PFS license termination, see PFS Dispositive Motion at 17-18. Moreover, although the staff is not responsible per se for monitoring the financial conditions of each PFS customer, see Staff Dispositive Motion Response at 22, nonetheless by virtue of its SNF proprietorship each customer that undertakes this long-term storage commitment is subject to the responsibilities imposed by NRC regulations and staff oversight of its regulated activities, including any change in its proprietary interest such as the State-postulated situation in which Department of Energy ownership of fuel stored at the PFS facility becomes an issue, see State MSA Objections at 15 n.20.

cannot prove could never happen must be fully accommodated. See Millstone, CLI-01-3, 53 NRC at 27. As before, we find that there are no material factual issues in dispute and that summary disposition in favor of PFS on this subpart is appropriate.

x. Subpart 10 -- Adequacy of PFS Resources for Non-Routine Expenses. In connection with this contention Utah E subpart concerning a variety of non-routine expense matters, as was noted previously, the Board in LBP-00-6, 51 NRC at 131-33, found summary disposition appropriate as to this issue statement except as it raised questions about the adequacy of onsite liability insurance, a matter that the State raises again in its reopening motion and that we, in accordance with LC-7, resolve today in our initial decision regarding contention Utah E, see LBP-05-21, 62 NRC at __ (slip op. at 96-101). Relative to the MSA, the State seeks to raise again one matter that we addressed in the making this ruling: its concern about the availability of Price-Anderson Act coverage relative to spent fuel transfers between two Part 72 ISFSI facilities. Citing MSA section 12 that states service agreement rights and obligations may be assigned to 10 C.F.R. Part 50, 70, or 72 licensees that meet creditworthiness requirements, the State now asserts this shows PFS itself contemplates potential shipments between Part 72 licensees. Putting aside the PFS request to strike this matter as previously determined in LBP-00-6, 51 NRC at 132, this section in fact provides no support for the State's claim and, as such, affords no basis for the Board to revise its prior summary disposition ruling in favor of PFS on this matter.

c. Other Claims Regarding MSA Efficacy

In addition to the foregoing claims that appear to relate to specific portions of contention Utah E, the State interposes several other objections to the PFS MSA that PFS asserts are subject to summary disposition in its favor. First, the State declares that the terms of the MSA

are not sufficiently inviolate to satisfy the Commission's CLI-00-13 directive that key provisions of the service agreement be sufficient to guide subsequent staff review of individual contracts. In this regard, the State maintains that the MSA clearly does not fulfill this Commission mandate. According to the State, PFS declarations of the illustrative nature of the MSA and its reservation of the power to negotiate future individual service agreements with alternative provisions providing comparable reasonable assurance are inconsistent with this Commission directive. As a consequence, the State maintains, PFS should be required to identify those MSA provisions that are inviolate and, after considering party comments on MSA provision inviolability and sufficiency generally, any provisions found to merit this label, with appropriate revisions, should be incorporated into the PFS license. See State MSA Objections at 5-7.

In describing its expectations regarding the sufficiency of MSA provisions as a basis for post-licensing staff reviews of actual service agreement contracts negotiated by PFS, the Commission analogized this to the existing post-licensing review scheme for material licensees under which staff Regulatory Guide 3.66, Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72, provides sample contract language for financial assurance documents. See CLI-00-13, 52 NRC at 35 n.6. In this instance, the Commission indicated that a Board-sanctioned MSA would provide the requisite staff review guidance as the staff seeks to ensure subsequent negotiated service agreement contracts meet the Commission's expectations as reflected in the seven Commission-adopted license conditions. See id. Incorporating all (or even substantial portions) of the MSA into the PFS license clearly would not be consistent with this Commission-endorsed guidance-based approach.

In this regard, however, the State further suggests that the MSA is deficient as a guidance mechanism because the overall financial scheme the MSA creates is ambiguous in significant aspects, requires the staff to make judgments that are overly complex, and allows the staff too much discretion in its sufficiency review of individual agreements. This is a matter of concern here because, as the Commission indicated in CLI-00-13, 52 NRC at 34, the focus of the staff's post-licensing review process is verification that the Board-approved design is being adhered to. Nonetheless, the State's general complaint about ambiguity and the related complex and discretionary nature of staff reviews is not borne out by the few specific examples it provides.[16]

In addition to its claims regarding the uncertainty that accrues to the PFS loan and cost pass-through mechanisms for funding facility construction and operation, which we have addressed previously, the State asserts that the initial MSA use in section 13.4 of the concept of "aggregate usage," i.e., the ratio between an individual customer's aggregate usage (calculated by taking the sum for all years of the customer's SNF storage term of the number of MTU the customer will store during each year of that term, per the customer's MSA storage schedule) and all customers' aggregate usage, to determine a customer's proportional share of PFS service costs created significant ambiguity for the PFS cost recovery scheme. Although asserting this is not the case, PFS thereafter revised the MSA to allocate service costs using a ratio based upon "reserved capacity," i.e., the total quantity of fuel a customer commits to store

[16] In this regard, the State also seeks to leverage what it considers staff failures to recognize the problems with the "evolving" nature of the MSA into a basis for questioning the staff's ability to recognize the bounds of its authority to engage in post-hearing review of adjudicatory matters, an argument we find inharmonious with the recognized proposition that the adequacy of the staff's safety review is not relevant to the issue of whether a license application should be approved. See Curators of the Univ. of Missouri (TRUMP-S Project), CLI-95-1, 41 NRC 71, 121 (1995).

at the facility during the term of the customer's service agreement, thereby addressing a State concern about uncertainty over customer storage terms. Also, in the context of its motion to strike, PFS advised the Board that it was revising MSA section 13.4 to require that a customer removing fuel from the facility would remain obligated to pay its proportional service costs share for that fuel through the end of the service agreement (i.e., PFS license termination), thereby addressing a State concern that a failure to change some of the language of this section with the "reserved capacity" revision had created the possibility that PFS would be responsible for abandoned capacity costs if customer fuel departs before the end of the service agreement term. The State, however, continues to express a concern about the "reserved capacity" approach **xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx** based on the **xxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx** and as illustrating the ambiguity problem given the several MSA revisions that were involved. We, however, find neither of these concerns persuasive to negate the adequacy of the MSA under the agency's financial qualifications requirements or to foreclose the entry of summary disposition in favor of PFS, the former being another aspect of the cost pass-through scheme that we previously have found is not inconsistent with the agency's financial qualification requirements, see section II.A.2.b.ii above, while the latter (which resolves the problem identified by the State) is indicative of the first-of-a-kind nature of the PFS facility rather than any fundamental defect in the applicant's financial qualifications efforts.

Finally, the State identifies as an MSA deficiency the fact that the staff in its post-hearing verification review will need to make factual and legal judgments that will entail discretionary determinations and complex analyses of the type the Commission warned against in CLI-00-13, because the MSA does not prescribe what is to be built and when, or the extent of

PFS service costs or the MSA's term, and relies upon a speculative inflow of customers to establish the requisite financial assurance. Relative to the State's concerns about indiscriminate project planning and costing leading to an improper staff verification review process, as set forth in our initial decision today regarding contention Utah E, see LBP-05-21, 62 NRC at __ (slip op. at 84, 94-95), we find that PFS has provided the information necessary to show it has fulfilled its financial assurance responsibilities in this regard. Moreover, as we have noted in section II.A.2.b.ii above, the MSA mechanisms for funding facility construction and operation comply with the agency's financial assurance requirements. And to the degree those provisions create questions about the extent to which PFS will be able to find customers willing to contract with it for SNF storage services under the MSA, LC-1 and LC-2 make it clear that PFS bears the risk that its funding design will leave it unable to attract a sufficient number of customers and so be unable to receive authorization to construct and/or operate the facility. Also, as to the State's raised concern about the supposed indeterminate scope and length of the facility's operational term, whether this is for the two twenty-year periods of an initial license that would entail the receipt and storage of 4000 SNF casks or something somewhat less, as the staff has pointed out, using the "reserved capacity" concept for proportioning costs, the fuel storage space reserved by the customer, not the length of the facility operation, is the compelling factor.[17]

---

[17] Recently, in the form of a motion for reconsideration of its decision in LBP-03-04, 57 NRC __ (Mar. 10, 2003), regarding State concerns over the probability of military aircraft accidents in connection with the Skull Valley facility, PFS has put before the separate Licensing Board chaired by Administrative Judge Farrar the possibility of authorizing initial construction and operation of a significantly smaller, 336-cask facility. Currently, the license application before this Board outlines plans for a very differently sized facility, and it is upon the basis of that application that we make our ruling today.

Thus, as to these additional State concerns, we find no disputed material factual issues are involved and, further, that summary disposition in favor of PFS is appropriate as to these matters as well.

3. PFS Motion to Strike

As was noted in section I.E.1, in its January 2001 motion to strike, PFS requested that the Board exclude certain portions of the State's dispositive motion response and associated pleadings, essentially on the basis that it had failed to raise the claims in question as part of its previous MSA objections or reopening motion or, in one case, because the matter was previously ruled on and was not implicated by the Commission's remand. As we have noted above, we have dealt with each of the State's concerns implicated by the motion to strike in the course of our substantive discussion regarding the PFS dispositive motion and found those matters wanting as a basis for further proceedings. As such, we need not deal with the substance of the PFS motion, and thus deny it as moot.

B. State Motion to Reopen

There remains for our consideration the State's motion to reopen the closed evidentiary record relative to contention Utah E.[18] In this instance, although PFS and the staff have made various assertions regarding the State's compliance with the several requirements set forth in section 2.734,[19] we think one or the other of two matters is dispositive of the State's motion.

---

[18] At the end of the June 2000 hearings, the Board closed the evidentiary record regarding the issues considered during those sessions, subject to any transcript corrections. See Tr. at 2683.

[19] The standard for granting reopening is set forth in 10 C.F.R. § 2.734, which states in pertinent part:

> (a) A motion to reopen a closed record to consider additional evidence will not be granted unless the following criteria

(continued...)

First, as both PFS and the staff noted and as our separate initial decision today regarding contention Utah E makes clear, see LBP-05-21, 62 NRC at __ (slip op. at 66, 92), the scope and focus of the June 2000 hearings on contention Utah E concerned the issues of the adequacy of PFS cost estimates relating to construction and operating expenses under contention Utah E, subpart six, and onsite property insurance coverage under contention Utah E, subparts five and ten, not the how and why of the funding mechanisms PFS now proposes to use in its MSA to cover those cost items. As such, other than to the extent they relate to these limited "cost estimate" and onsite property insurance coverages issues, the State's claims provide no basis for reopening the record.

Additionally, under the Commission's reopening standard, the fact that newly proffered evidence relied upon as the basis for reopening is different from that set forth during the

---

[19](...continued)

are satisfied:

(1) The motion must be timely, except that an exceptionally grave issue may be considered in the discretion of the presiding officer even if untimely presented.

(2) The motion must address a significant safety or environmental issue.

(3) The motion must demonstrate that a materially different result would be or would have been likely had the newly proffered evidence been considered initially.

(b) The motion must be accompanied by one or more affidavits which set forth the factual and/or technical bases for the movant's claim that the criteria of paragraph (a) of this section have been satisfied. Affidavits must be given by competent individuals with knowledge of the facts alleged, or by experts in the disciplines appropriate to the issues raised. Evidence contained in affidavits must meet the admissibility standards set forth in § 2.743(c). Each of the criteria must be separately addressed, with a specific explanation of why it has been met. Where multiple allegations are involved, the movant must identify with particularity each issue it seeks to litigate and specify the factual and/or technical bases which it believes support the claim that this issue meets the criteria in paragraph (a) of this section.

hearing is, in and of itself, not enough. Instead, in an instance when an initial decision has not yet issued, the proponent bears a heavy burden to show, among other things, that had the evidence been considered, a materially different result, i.e., a different outcome, would likely have obtained. See Kansas Gas and Electric Co. (Wolf Creek Generating Station, Unit No. 1), ALAB-462, 7 NRC 320, 338 (1978). In this instance, we are unable to conclude that such would be the case. As to those bases for the State's motion that we discuss in connection with section II.A.2 above, reopening is inappropriate for the reasons discussed therein in which we find, in essence, that these MSA-related concerns clearly would not have the requisite material effect on the outcome of the hearing. Moreover, as to the one reopening issue that is not discussed in that context -- PFS utilization of the **xxxxxxxx** customer fee -- although it apparently falls outside the scope of the June 2000 hearing, it also lacks any substance given the PFS indication that nothing in MSA section 13 indicates those costs are to be returned or rebated to the customer, a statement we accept as a binding commitment not to make such a rebate. See PFS Reopening Motion Response at 18 n.38.

Accordingly, the State having failed to demonstrate that any of the items it proffered in support of its reopening request either fall within the scope of that evidentiary hearing or would have led to a materially different result, we deny its reopening request as well.

III. CONCLUSION

Acting in accordance with the Commission's directive in CLI-00-13, 52 NRC at 35, that (1) PFS be provided the opportunity to produce an MSA that meets the seven financial assurance license conditions adopted by the Commission; (2) intervenors be given an opportunity to address the adequacy of the MSA to meet the concerns raised in contention

Utah E; and (3) PFS be afforded to submit a dispositive motion relative to any intervenor objections that the Board was to assess, granting summary disposition relative to those that are insubstantial and providing an evidentiary hearing on the contention as to any others, the Board has assessed the MSA submitted by PFS and the State's objections thereto in light of the December 4, 2000 PFS summary disposition motion, the January 5, 2001 PFS motion to strike portions of the December 22, 2000 State's response to that motion, and the November 7, 2002 State motion to reopen the record of the June 2000 evidentiary hearing regarding contention Utah E. With regard to the State's objections to the PFS MSA, the Board has concluded that the PFS motion for summary disposition should be granted as to all subparts of contention Utah E. Further, the Board denies (1) the PFS motion to strike as being moot; and (2) the State's motion to reopen as based on matters falling outside the scope of the evidentiary hearing record it seeks to reopen and/or as failing to demonstrate that had the information it now proffers been considered, a materially different result, i.e., a different outcome, would likely have obtained in the hearing.

For the foregoing reasons, it is this twenty-seventh day of May 2003, ORDERED, that:

1. The December 4, 2000 PFS motion for summary disposition regarding contention Utah E/Confederated Tribes F is granted as set forth in section II.A.2 above;

2. The January 5, 2001 PFS motion to strike portions of the State response to the December 4, 2000 PFS motion for summary disposition is denied for the reasons set forth in section II.A.3 above;

3. The November 7, 2000 State motion to reopen the June 2000 evidentiary record regarding contention Utah E is denied for the reasons set forth in section II.B above; and

4. Given previous party positions suggesting that financial assurance-related information may include proprietary or other sensitive data, on or before Friday, June 20, 2003, the State, PFS, and the staff shall provide the Board with a joint filing outlining each (1) proposed redaction of any part of this memorandum and order to which there is no objection; and (2) proposed redaction of any part of this memorandum and order to which there is an objection. The particular word or phrase to be withheld from public release shall be specified for each proposed redaction; blanket requests for withholding are disfavored. Further, in accordance with 10 C.F.R. § 2.790, the party seeking the proposed redaction shall at the same time provide a separate submission that describes with specificity (as supported by any

necessary affidavits) the reasons for withholding each proposed redaction. Responses by any party objecting to a proposed redaction shall be filed on or before Monday, June 30, 2003.

THE ATOMIC SAFETY
AND LICENSING BOARD[20]

/RA/

G. Paul Bollwerk, III
ADMINISTRATIVE JUDGE

/RA/

Dr. Peter Lam
ADMINISTRATIVE JUDGE

Rockville, Maryland

May 27, 2003

---

[20] Pursuant to previous Board issuances on e-mail service of documents identified as potentially containing proprietary information, copies of this memorandum and order were sent this date by Internet e-mail transmission to counsel for PFS, the State, and the staff. In addition, this date a memorandum was sent by e-mail to all the parties to this proceeding advising them of the issuance of this decision and the Board's determination to afford this decision confidential treatment pending a response by PFS, the State, and the staff to the Board's inquiry under ordering paragraph four above. See Licensing Board Memorandum and Order (Notice Regarding Issuances Concerning Contentions Utah E/Confederated Tribes F and Contention Utah S) (May 27, 2003) (unpublished).

Although agreeing with the result reached here, because of illness Judge Kline was unavailable to participate in the final preparation of this decision.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LBP-05-20-REDACTED VERSION OF LB MEMORANDUM AND ORDER (RULINGS ON SUMMARY DISPOSITION MOTION AND OTHER FILINGS RELATING TO REMAND FROM CLI-00-13) have been served upon the following persons by deposit in the U.S. mail, first class, or through NRC internal distribution.

Office of Commission Appellate Adjudication
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
G. Paul Bollwerk, III, Chairman
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Sherwin E. Turk, Esquire
Laura C. Zaccari, Esquire
John T. Hull, Esquire
Darani M. Reddick, Esquire
Office of the General Counsel
Mail Stop - 0-15 D21
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Peter S. Lam
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Stephen L. Simpson, Esquire
Office of the Solicitor
Department of the Interior
Division of Indian Affairs
1849 C Street, NW, Mailstop 6456-MIB
Washington, DC 20240

Diane Curran, Esquire
Harmon, Curran, Spielberg & Eisenberg, L.L.P.
1726 M Street, NW, Suite 600
Washington, DC 20036

Joro Walker, Esquire
Director, Utah Office
Western Resource Advocates
1473 South 1100 East, Suite F
Salt Lake City, UT 84105

Martin S. Kaufman, Esquire
Atlantic Legal Foundation
205 E. 42nd St.
New York, NY 10017

Docket No. 72-22-ISFSI
LBP-05-20-REDACTED VERSION OF LB MEMORANDUM AND ORDER (RULINGS ON SUMMARY DISPOSITION MOTION AND OTHER FILINGS RELATING TO REMAND FROM CLI-00-13)

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

Jay E. Silberg, Esquire
D. Sean Barnett, Esquire
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128

John Paul Kennedy, Sr., Esquire
David W. Tufts, Esquire
Confederated Tribes of the Goshute Reservation and David Pete
Durham Jones & Pinegar
111 East Broadway, Suite 900
Salt Lake City, UT 84105

Richard Wilson
Department of Physics
Harvard University
Cambridge, MA 02138

Tim Vollmann, Esquire
3301-R Coors Road N.W., #302
Albuquerque, NM 87120

Paul C. EchoHawk, Esquire
ECHOHAWK LAW OFFICES
151 North 4th Avenue, Suite A
P.O. Box 6119
Pocatello, ID 83205-6119

Joseph R. Egan, Esquire
Martin G. Malsch, Esquire
Egan, Fitzpatrick, Malsch & Cynkar, PLCC
The American Center at Tysons Corner
8300 Boone Boulevard, Suite 340
Vienna, VA 22182

[Original signed by Evangeline S. Ngbea]

Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 12th day of August 2005

RAS 10298

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

LBP-05-23
DOCKETED 08/12/05

ATOMIC SAFETY AND LICENSING BOARD

SERVED 08/12/05

Before Administrative Judges:

G. Paul Bollwerk, III, Chairman
Dr. Jerry R. Kline
Dr. Peter S. Lam

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, L.L.C.	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	January 5, 2004

MEMORANDUM AND ORDER
(Granting in Part and Denying in Part Motion for Reconsideration and/or Clarification of Financial Qualifications Decisions)

[Note: Although this memorandum and order was originally issued in January 2004, it was treated as a non-public issuance pending review of challenges by intervenor State of Utah to claims by applicant Private Fuel Storage, L.L.C., that pursuant to 10 C.F.R. § 2.790 certain portions of the decision should be withheld from public disclosure as proprietary information. With issuance of the Commission's final decision on that matter, see CLI-05-16, 62 NRC __ (July 22, 2005), this decision is being publically released in a redacted form.]

-- PUBLICLY-AVAILABLE VERSION --

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

G. Paul Bollwerk, III, Chairman
Dr. Jerry R. Kline
Dr. Peter S. Lam

In the Matter of	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, L.L.C.	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel Storage Installation)	January 5, 2004

MEMORANDUM AND ORDER
(Granting in Part and Denying in Part Motion for
Reconsideration and/or Clarification of Financial Qualifications Decisions)

Pending with this Licensing Board is a June 6, 2003 motion filed by applicant Private Fuel Storage, L.L.C., (PFS) requesting clarification and/or reconsideration of the Board's May 27, 2003 memorandum and order ruling on a PFS summary disposition motion and other filings relating to the Commission's remand from CLI-00-13, 52 NRC 23 (2000), and a partial initial decision issued that same date regarding the merits of contention Utah E/Confederated Tribes F, Financial Assurance. The State of Utah (State), the lead intervenor on contention Utah E/Confederated Tribes F, opposes the PFS request, while the NRC staff supports the motion in part and opposes it in part. For the reasons set forth below, we grant the motion in part and deny it in part.

I. BACKGROUND

Although detailed descriptions of the events leading up to the two decisions that are the subject of the pending PFS reconsideration request are outlined in those issuances, to place the motion in context we note here that the object of this proceeding is the June 1997 application for a 10 C.F.R. Part 72 license through which PFS seeks agency permission to construct and operate an independent spent fuel storage installation (ISFSI) on the reservation of the Skull Valley Band of Goshute Indians (Skull Valley Band) in Skull Valley, Utah. Following a notice of opportunity for a hearing, see 62 Fed. Reg. 41,099 (July 31, 1997), the State and the Confederated Tribes of the Goshute Reservation (Confederated Tribes) filed petitions to intervene pursuant to 10 C.F.R. § 2.714, which the Board subsequently granted. See LBP-98-7, 47 NRC 142, 157, aff'd on other grounds, CLI-98-13, 48 NRC 26 (1998). In doing so, the Board admitted in part and consolidated two of these parties' financial assurance contentions into contention Utah E/Confederated Tribes F, with the State being designated as the lead intervenor for litigation of this contention. See id. at 187, 236; Licensing Board Memorandum and Order (Memorializing Prehearing Conference Rulings) (May 20, 1998) at 2 (unpublished).

PFS subsequently filed a motion requesting summary disposition on all portions of contention Utah E/Confederated Tribes F, except paragraph six. See [PFS] Motion for Partial Summary Disposition of Utah Contention E and Confederated Tribes Contention F (Dec. 3, 1999) at 3. The State opposed the motion, while the staff, in supporting the motion, outlined two proposed license conditions to implement financial assurance-related commitments made

by PFS.[1] See [State] Response to the [PFS] Motion for Partial Summary Disposition of Utah Contention E/Confederated Tribes Contention F (Dec. 27, 1999) at 3-14; NRC Staff's Response to [PFS] Motion for Partial Summary Disposition of Utah Contention E and Confederated Tribes Contention F (Dec. 22, 1999) at 4-5.

On March 10, 2000, the Board granted in part and denied in part the PFS dispositive motion and found that the license conditions proposed by the staff could appropriately be used to establish compliance with 10 C.F.R. § 72.22(e) financial assurance requirements. See LBP-00-6, 51 NRC 101, 113-117 (2000). The only contention Utah E/Confederated Tribes F-related issues thus remaining for further Board consideration in an evidentiary proceeding were (1) the adequacy of PFS's onsite property insurance coverage (paragraphs five and ten); and (2) the adequacy of the PFS construction and operating cost estimates (paragraph six). Also in connection with this determination, the Board referred to the Commission its ruling endorsing the application to Part 72 ISFSI facilities of the financial assurance standard for Part 70 uranium enrichment facilities, rather than that for Part 50 power

---

[1] Those proposed license conditions provided:

> "A. Construction of the [PFS] Facility shall not commence before funding (equity, revenue, and debt) is fully committed that is adequate to construct a Facility with the initial capacity as specified by PFS to the NRC [xxxxxxxxxx capacity]. Construction of any additional capacity beyond this initial capacity amount shall commence only after funding is fully committed that is adequate to construct such additional capacity.
>
> B. PFS shall not proceed with the Facility's operation unless it has in place long-term Service Agreements with prices sufficient to cover the operating, maintenance, and decommissioning costs of the Facility, for the entire term of the Service Agreements."

LBP-00-6, 51 NRC 101, 109 (2000) (quoting NRC Staff's Response to [PFS] Motion for Partial Summary Disposition of Utah E/Confederated Tribes F (Dec. 22, 1999) at 7).

reactor facilities, in accord with the Commission's decision in Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-97-15, 46 NRC 294 (1997). See id. at 136. The Board then held evidentiary hearings in Salt Lake City, Utah, during which eight witnesses testified on behalf of PFS, the staff, and the State on June 20-22, 27, 2000, regarding contention Utah E/Confederated Tribes F. See Tr. at 1673-2413, 2556-681.

Thereafter, in August 2000, the Commission ruled on the March 2000 referral of the Board's summary disposition order regarding contention Utah E/Confederated Tribes F. See CLI-00-13, 52 NRC 23 (2000). The Commission accepted the proposition that license conditions should be adopted to incorporate various PFS financial assurance-related promises, including those relating to funding commitments and in-place service agreements with prices adequate to finance operations and maintenance and decommissioning expenses for the life of the PFS license.[2] However, the Commission disagreed that, in the absence of a model service agreement (MSA), PFS commitments alone provided a sufficient basis for a reasonable assurance finding based on post-licensing staff inquiry. See id. at 32. As a consequence, the Commission directed that an MSA be provided by PFS that met all the PFS commitments relied upon by the Board in making its adequate financial assurance findings.[3] See id. at 34-36.

---

[2] The Commission indicated that LC 17-2 should read:

> PFS shall not proceed with the Facility's operation unless it has in place Service Agreements covering the entire term of the license, with prices sufficient to cover the operating, maintenance, and decommissioning costs of the Facility for the entire term of the license.

CLI-00-13, 52 NRC at 32.

[3] In this regard, the Commission directed that:

(continued...)

PFS filed its MSA on September 29, 2000, in accordance with the Board's scheduling order, along with a summary of the financial provisions and a request that proprietary information remain confidential. See [PFS] Submission of [MSA] (Sept. 29, 2000); Licensing Board Order (Schedule for Submission of Sample Service Agreement) (Aug. 16, 2000) at 1-2 (unpublished). The State then filed a motion to reopen the hearing record on contention Utah E/Confederated Tribes F and subsequently submitted objections to the MSA as unable to meet Part 72 financial assurance requirements. See [State] Motion to Re-open the Hearing Record on Contention Utah E (Nov. 7, 2000) at 1 (State Motion); [State] Objections to the Adequacy of the [PFS MSA] to Meet Part 72 Financial Assurance Requirements (Nov. 7, 2000) at 1. On December 4, 2000, PFS responded by moving for summary disposition on the ground that no genuine issue as to any material fact remained relative to the issues remanded by the Commission, a request PFS supported with an updated MSA and one which the State opposed and the staff did not. See [PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements (Dec. 4, 2000) at 1, 4-8; [State] Response to [PFS] Motion for Summary

---

[3](...continued)

> the Board (1) require PFS to produce a sample service contract that meets all financial assurance license conditions, and (2) give Intervenors an opportunity to address the adequacy of the service contract to meet the concerns raised in Contention E. If Intervenors do not raise further objections after reviewing the sample contract, or if the Board finds [I]ntervenors' objections insubstantial, then PFS would be entitled to summary disposition on Utah Contention E. Otherwise, the contention should be set for hearing.

Id. at 35.

Disposition on Issues Remanded by CLI-00-013 on Utah Contention E/Confederated Tribes Contention F (Dec. 22, 2000); NRC Staff's Response to "[PFS] Motion for Summary Disposition on Issues Remanded by CLI-00-13 on Utah Contention E and Confederated Tribes Contention F and Response to [State] Objections to the Adequacy of [PFS MSA] to Meet Part 72 Financial Assurance Requirements" (Dec. 20, 2000).

In a May 27, 2003 memorandum and order, the Board denied the State's reopening motion and granted the PFS dispositive motion regarding contention Utah E/Confederated Tribes F, but phrased the financial assurance license conditions LC 17-1 and LC 17-2 [hereinafter LC-1 and LC-2, respectively] differently than the staff's license condition language referenced by the Commission in CLI-00-13. See LBP-05-20, 62 NRC __, __ (May 27, 2003) (slip op. at 3-4); see CLI-00-13, 52 NRC at 27, 32. On the same day, the Board also ruled on contention Utah E/Confederated Tribes F itself, finding PFS had provided reasonable assurance of its financial qualifications in compliance with 10 C.F.R. § 72.22(e). See LBP-05-21, 62 NRC __, __ (May 27, 2003) (slip op. at 102). In accordance with LC-2, the Board stated that operations could not commence until service agreements were in place with adequate operations and maintenance (O&M), and decommissioning prices. See id. at 95. The total amount of the prices specified by the Board was based on costs for operating a full-capacity facility. See id. at 86, 95.

On June 6, 2003, PFS filed its motion requesting clarification/and or reconsideration of the Board's May 27 summary disposition determination and its contention Utah E/Confederated

Tribes F partial initial decision, to which the State and the staff responded on June 16, 2003. See [PFS] Motion for Clarification and/or Reconsideration of [Summary Disposition Decision and Contention Utah E Initial Decision] (June 6, 2003) [hereinafter PFS Reconsideration Motion]; [State] Response to [PFS Reconsideration Motion] (June 16, 2003) [hereinafter State Reconsideration Response]; NRC Staff's Response to [PFS Reconsideration Motion] (June 16, 2003) [hereinafter Staff Reconsideration Response]. PFS thereafter requested an opportunity to reply to the State's response to the PFS June 6 reconsideration motion, which the Board granted on June 19, 2003. See [PFS] Request to File a Reply to [State Reconsideration Response] to [PFS Reconsideration Motion] (June 19, 2003); Licensing Board Order (Granting Request to File Reply Pleading) (June 19, 2003) (unpublished). The PFS reply pleading was filed on June 24, 2003. See [PFS] Reply to [State Reconsideration Response] (June 24, 2003) [hereinafter PFS Reconsideration Reply].

II. ANALYSIS

A. Standard Governing Reconsideration Requests

Relative to the party arguments made in connection with the pending PFS reconsideration request, as we have noted elsewhere in this proceeding:

> A properly supported reconsideration motion is one that does not rely upon (1) entirely new theses or arguments, except to the extent it attempts to address a presiding officer's ruling that could not reasonably have been anticipated, see Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-97-2, 45 NRC 3, 4 & n. 1 (1997) (citing cases); or (2) previously presented arguments that have been rejected, see Nuclear Engineering Co. (Sheffield, Illinois Low-Level Radioactive Waste Disposal Site), CLI-80-1, 11 NRC 1, 5 (1980). Instead, the movant must identify errors or deficiencies in the presiding officer's determination indicating the questioned ruling overlooked or misapprehended (1) some legal principle or decision that

> should have controlling effect; or (2) some critical factual information. See Georgia Power Co. (Vogtle Electric Generating Plant, Units 1 and 2), LBP-94-31, 40 NRC 137, 140 (1994); Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), LBP-83- 25, 17 NRC 681, 687, rev'd and remanded on other grounds, ALAB-726, 17 NRC 755 (1983).

LBP-98-17, 48 NRC 69, 73-74 (1998). In addition, as we have observed on another occasion:

> Although a party may not base a reconsideration motion on new information or a new thesis, see LBP-98-10, 47 NRC [288,] 292 (1998) (citing Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-97-2, 45 NRC 3, 4 (1997)), a request to reexamine existing record material that may have been misunderstood or overlooked, or to clarify a matter that the party believes is unclear, is appropriate, see id. at 296-97 (citing Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), LBP-83-25, 17 NRC 681, 687 (1983)).

LBP-99-39, 50 NRC 232, 237 (1999). It is these general precepts we are called upon to apply in this instance.

B. PFS Clarification/Reconsideration Motion

In its motion pending before the Board, PFS seeks (1) clarification of the financial license conditions applicable to PFS; and (2) reconsideration and/or clarification of (a) the need to set a specific dollar amount for O&M costs, or in the alternative, (b) the specific O&M dollar amount established by the Board in ¶ 4.79 of the contention Utah E/Confederated Tribes F partial initial decision. See PFS Reconsideration Motion at 1, 6. We address each of these requests below.

1. Clarification of Terms of License Conditions LC-1 and LC-2. PFS first seeks clarification that license conditions LC-1 and LC-2 be applied to PFS as they were stated by the Commission in CLI-00-13.[4] PFS claims the Board's restatement of LC-1 and LC-2 in its

[4] As we previously have noted, see LBP-05-20, 62 NRC at __ (slip op. at 3 n.1), the initial (continued...)

summary disposition determination is significant because those license conditions, as approved or revised by the Commission in CLI-00-13, 52 NRC at 27, 32, in contrast to the Board's restatement of LC-1 and LC-2, see LBP-05-20, 62 NRC at __ (slip op. at 3-4),[5] permit PFS to (1) obtain funding in the form of equity, revenue, or debt; (2) obtain such funding on a phase-by-phase basis corresponding to the stage-by-stage construction of the facility; and (3) operate a facility at less than full capacity without being required to have service agreements in place with prices adequate to fund the exact dollar amount of O&M and decommissioning costs for a full-scale, 4,000-cask facility. See PFS Reconsideration Motion at 4-6.

While the State opposes the PFS motion for clarification and/or reconsideration in its entirety, it nonetheless proposes its own rewording of LC-1.[6] See State Reconsideration

---

[4](...continued)
license conditions were designated by the staff as LC17-1 and LC17-2 based on nomenclature that tied the numbering of the proposed conditions to a particular section of the staff's December 15, 1999 Safety Evaluation Report. For ease of reference, we adopted the same numbering order as the Commission outlined in CLI-00-13 for these and other Commission-directed license conditions, albeit noting that when actually incorporated into any PFS license these conditions could well be numbered differently.

[5] Neither the Board's summary disposition decision nor its contention Utah E/Confederated Tribes F partial initial decision has been issued publicly, pending the resolution of what portions of the record may be made available to the public and what portions should be withheld as proprietary information. Following receipt of the parties' views on redaction of this reconsideration motion decision, the Board anticipates making redacted versions of both Board rulings, as well as the Board's May 27, 2002 partial initial decision regarding contention Utah S, Decommissioning, and this reconsideration determination publicly available.

[6] Specifically, the State proposes that LC-1 should be rewritten to provide:

> In accordance with LBP-03-__, Findings ¶¶ 4.53 and 4.56, PFS shall not commence construction of the facility before funding (equity, revenue, and debt) is fully committed to construct a facility with a **xxxxxxxxxxxxxxxxx** capacity, in the amount **xxxxxxxxxxxx**. These costs are to be escalated from fourth

(continued...)

Response at 1, 4. For its part, the staff supports this aspect of the PFS motion. See Staff Reconsideration Response at 4-5.

We grant the PFS motion to the extent that it requests clarification of these license conditions with which it must comply. In quoting the Commission's directive to the staff to memorialize certain PFS commitments as license conditions as part of the background summary of our May 27, 2003 ruling, see LBP-05-20, 62 NRC at __ (slip op. at 3-4), the Board had no intention of either altering the language of LC-2, the one license condition explicitly set forth by the Commission, or altering the burden on PFS to demonstrate its financial qualifications. See also id. at 3 n.2 (acknowledging Commission's revision of LC-2). Thus, with respect to the construction and operation of its facility, the following license conditions, as endorsed or revised by the Commission in CLI-00-13, apply to PFS:

> LC-1. Construction of the Facility shall not commence before funding (equity, revenue, and debt) is fully committed that is adequate to construct a facility with the initial capacity as specified by PFS to the NRC. Construction of any additional capacity beyond this initial capacity amount shall commence only after funding is fully committed that is adequate to construct such additional capacity.
>
> LC-2. PFS shall not proceed with the Facility's operation unless it has in place Service Agreements covering the entire term of the license, with prices sufficient to cover the operating, maintenance, and decommissioning costs of the Facility for the entire term of the license.

---

[6](...continued)

> quarter 1999 dollars to present day value in accordance with the factors in Model Service Agreement Schedule 5.
>
> Construction of any additional capacity beyond Phase I shall commence only after funding (equity, revenue, and debt) is fully committed to construct Phase II (an additional 10,000 MTU capacity in the amount xxxxxxxxxxx) or Phase III (20,000 MTU in the amount of xxxxxxxxxxxxx). These construction costs are to be escalated as described for Phase I.

See State Reconsideration Response at 4 (footnote omitted).

2. Clarification/Reconsideration of MSA Pass-Through Mechanism. PFS next requests reconsideration and/or clarification of the Board's contention Utah E/Confederated Tribes F partial initial decision to reflect the pass-through mechanism established in its MSA to cover its O&M costs, which PFS argues is an appropriate method for showing adequate financial assurance pursuant to the Commission's Monticello decision. See PFS Reconsideration Motion at 6 & n.7 (citing Northern States Power Co. (Monticello Nuclear Generating Plant), CLI-00-14, 52 NRC 37 (2000)). PFS argues that because the Board's ruling requires PFS to demonstrate funding to cover a specific dollar amount of O&M costs, rather than allowing PFS to rely solely on the pass-through mechanism, the contention Utah E/Confederated Tribes F partial initial decision is inconsistent with Monticello. See id. at 6. Specifically, PFS proposes that the following language be substituted for the last sentence of ¶ 4.79 of the contention Utah E/Confederated Tribes F partial initial decision:

> PFS has met its financial assurance obligations with respect to O&M and decommissioning costs because of the cost pass-through nature of the MSA and the facts that PFS's customers will be subject to the Commission's Part 50 financial assurance requirements and the MSA's customer financial assurance provisions (i.e., license condition LC-4). This arrangement provides sufficient assurance of PFS's financial qualifications.

See id. at 8 (citations and footnote omitted).[7]

---

[7] This PFS suggested language would replace the following sentence in the contention Utah E/Confederated Tribes partial initial decision:

> In accordance with the Commission's instructions in CLI-00-13, the Board finds that PFS may not commence operations before service agreements for the life of the license (i.e., twenty years) are in place with prices adequate to fund operations, maintenance, and decommissioning in the amount of

(continued...)

In their respective responses to the PFS motion, both the State and the staff oppose reconsideration of this aspect of the Board's ruling in its contention Utah E/Confederated Tribes F partial initial decision. For its part, the State contends that because the PFS suggested change to ¶ 4.79 would authorize the pass-through of **xxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxx**, but all O&M costs, to its customers as a way of demonstrating PFS financial qualifications, the proposed language substitution constitutes a new argument that, despite having ample opportunity to do so, PFS has not yet presented in this proceeding. See State Reconsideration Response at 5-6. In addition to challenging the PFS reliance on Monticello as a basis for relieving PFS of having to demonstrate funding to cover specific O&M dollar amounts, both the State and staff argue that the Commission in CLI-00-13 clearly directed the Board to establish specific dollar amounts for construction and O&M cost estimates. See State Reconsideration Response at 6-8; Staff Reconsideration Response at 6-7.

We deny the PFS request for reconsideration and/or clarification on this point. Regardless of whether Monticello discharges PFS of its duty to demonstrate sufficient funding to cover a specific dollar amount of O&M costs, Monticello clearly does not discharge the Board of its duty to heed a Commission mandate issued in the instant Private Fuel Storage proceeding. In CLI-00-13, the Commission directed that a condition be included in the PFS license that would prevent PFS from commencing operations before having service agreements

---

[7](...continued)
xxxxxxxxxxxxxx (to be escalated from 1997 dollars to present day value) plus $12 million for Tooele County host payments.

See LBP-05-21, 62 NRC at __ (slip op. at 95-96) (¶ 4.79).

in place with prices, "in the amount to be determined at hearing," adequate to cover O&M and decommissioning costs. CLI-00-13, 52 NRC at 36 (emphasis added). Consequently, although we recognized in our contention Utah E/Confederated Tribes partial initial decision that the Commission's ruling in Monticello "might well relieve PFS of its obligation to provide a specific estimate of the costs it intends to pass through to its customers," LBP-05-21, 62 NRC at __ (slip op. at 68) (¶ 4.21), we also determined, "[i]n accordance with the Commission's instructions in CLI-00-13," that to satisfy LC-2, PFS could not begin operations without having service agreements in place that would cover O&M and decommissioning costs in the amount of **xxxxxxxxxxxxxx** (to be escalated from 1997 dollars to present day value).[8] Id. at 95-96 (¶ 4.79). Because substituting the PFS proposed language for the last sentence of ¶ 4.79 would eliminate the requirement for PFS to have funding in place prior to beginning operations sufficient to cover a specific dollar amount -- and, therefore, would be in direct contravention of the Commission's instructions in CLI-00-13 -- we decline to adopt the suggested PFS language.[9]

Seemingly acknowledging the possibility of an adverse Board ruling on its proposed language substitution, PFS alternatively requests that the Board reconsider and/or clarify its

---

[8] Although we issued a separate decision regarding the adequacy of PFS decommissioning cost estimates, see Licensing Board Partial Initial Decision (Contention Utah S, Decommissioning) (May 27, 2003), per the table set forth in ¶ 4.58 of the contention Utah E/Confederated Tribes F partial initial decision, see LBP-05-21, 62 NRC at __ (slip op. at 86), we incorporated the PFS decommissioning cost estimates into the O&M costs to provide a unified figure as an aid to assessing future compliance with LC-2.

[9] To be sure, the Commission's August 2000 CLI-00-13 directive regarding a determination relative to the amount necessary to fund O&M predates the September 2000 MSA O&M cost pass-through mechanism. Nonetheless, to the extent PFS now considers that mechanism a basis for negating the Commission's directive, this seems a matter best taken up with the Commission.

contention Utah E/Confederated Tribes F partial initial decision finding in ¶ 4.79 to require PFS to have service agreements in place sufficient to cover actual O&M and decommissioning costs for the size facility that it plans to build and operate, rather than a full-capacity, 4,000-cask facility. See PFS Reconsideration Motion at 6, 9. In this regard, PFS argues that the Commission's decision in CLI-00-13, and LC-1 in particular, does not mandate that PFS build and operate a 4,000-cask facility, but rather permits it to build either a smaller facility or a full-capacity facility in phases. See id. at 9. Thus, PFS submits an alternative formula for calculating its initial O&M funding requirement that would separate the variable costs of the overpacks/casks, canisters, and rail fees (calculated on a per-unit basis and divided by two to reflect each of the twenty-year license terms) from the fixed O&M costs (also divided by two to reflect the two license terms), so that the amount of funding required to be covered by the customer service agreements pursuant to LC-2 would vary depending on the actual size of the facility PFS proposes to build. Additionally, the formula submitted by PFS would allow a downward adjustment of PFS variable O&M costs for any casks and canisters independently purchased by its customers as well as its Tooele County host payments for member and non-member casks. See id. at 10 n.10. PFS thus requests that the Board modify finding ¶ 4.79 to reflect its proposed formula as follows:

> "PFS may not commence [operations before service agreements for the life of the license (i.e., twenty years) are in place with prices adequate to fund operations, maintenance, and decommissioning] in the amount of xxxxxxxxxxxx plus xxxxxxxx per spent fuel cask (not purchased by customers) to be stored at the facility ~~xxxxxxxxxxxxxx~~ (to be escalated from 1997 dollars to present day value) plus $12 million for Tooele County host payments (adjusted for member and non-member casks)."

Id. at 10 (footnotes omitted).

In its response opposing the PFS reconsideration motion, the State challenges this PFS alternative formula, arguing that the Board should not consider any adjustment for cask and canister costs purchased independently by PFS customers and urging that the Board reject calculating the variable O&M costs on a per-unit basis over two license terms. See State Reconsideration Response at 9-10. Instead, the State asserts that because the bulk of the cask and canister costs (totaling $1.911 billion for a 4,000-cask facility) would be incurred by PFS during the first twenty-year license term, LC-2 should be rewritten as follows:

> In accordance with LBP-03-__, Findings ¶¶ 4.58, 4.79, PFS shall not commence facility operations unless it has in place service agreements covering the entire term of the license, with prices sufficient to cover the operations, maintenance, and decommissioning costs in the amount of $1.911 billion (canisters and overpacks) plus xxxxxxxxxxxx (other operating and maintenance costs) plus $12 million (Tooele County host payments). All of these costs are to be escalated from fourth quarter 1997 dollars to present day value in accordance with the factors in the model service agreement, MSA Schedule 5.

Id. at 11.

For its part, the staff supports reconsideration and/or clarification of this aspect of the Board's contention Utah E/Confederated Tribes F partial initial decision. Declaring that because the Commission allowed PFS to construct its facility in phases and was aware of the possibility that PFS would choose not to utilize its full capacity under the license, the staff argues that PFS need only have service agreements in place adequate to cover O&M and decommissioning costs for the size facility that PFS plans to operate initially. See Staff Response at 8. While the staff agrees with the general PFS proposition that the O&M cost calculation should be revised to account separately for fixed O&M costs and direct unit-dependent costs for storage casks, canisters, and rail fees, it rejects what it considers a new PFS argument for further deductions from the required demonstration of funding with

respect to customers who ship their own casks and canisters and host fee payments. See id. at 9. The staff also rejects the halving of direct-unit dependent O&M costs, as these costs vary with the number of casks at the facility and not with the number of years of the license. See id. at 9-10 & nn.13-14. In the staff's view, the finding in ¶ 4.79 of the Board's partial initial decision should be revised to require funding of PFS's fixed and other O&M costs (for a twenty-year license term), plus its per-unit costs (i.e., cask, canister, and rail fees) for the size facility to be operated initially. See id. at 10 n.15.

All three parties are in unanimous agreement that the Board's finding in ¶ 4.79, which calculated the requisite level of O&M funding based on the estimated operating costs of a full-capacity, 4,000-cask facility over a single twenty-year license term, should be reworded in some manner. As PFS and the staff correctly note, we recognized in our contention Utah E/Confederated Tribes F partial initial decision that if granted, the PFS license would authorize, but not require, PFS to possess up to 4,000 casks and that the facility, even at full capacity, would be constructed in phases. See, e.g., LBP-05-21, 62 NRC at __ (slip op. at 68-69, 85, 95) (¶¶ 4.23-4.25, 4.57, 4.78). Thus, consistent with LC-1, we agree in principle that PFS need not demonstrate that it has sufficient funding to cover all of the costs associated with operating a 4,000-cask facility up front, if it indeed decides to build the facility in phases or decides to build a less than full-capacity facility. We therefore find it appropriate to consider the fixed and other O&M costs (totaling **xxxxxxxxxxxx** over a twenty-year license term)[10] separately from the cask, canister, and transportation costs that will vary depending on the

[10] We derive this figure from the O&M cost estimates provided by PFS, which estimated the costs of a 4,000-cask facility over the anticipated forty-year lifetime of the facility minus the canister costs ($1,302,200,000), the overpack costs ($608,800,000), and the rail fees (**xxxxxxxxxxxx**). See LBP-05-21, 62 NRC at __ (slip op. at 86) (¶ 4.58).

initial size of the facility. Accordingly, we calculate the cost (including cask, canister, and transportation costs) of each unit to be xxxxxxxx.[11] However, because the record before us is replete with references to PFS constructing a minimum initial capacity facility of xxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx relative to LC-1,[12] we find it appropriate to require PFS to have service agreements in place with prices to cover the O&M costs of, at a minimum, a xxxxxxxxxx facility. If PFS elects to specify a minimum initial capacity other than xxxxxxxxxx as part of its demonstration of compliance with LC-1, the requisite level of funding may be adjusted to reflect the actual initial size of the facility.[13]

---

[11] We likewise derive this figure from the O&M cost estimates provided by PFS, i.e., canister costs of $1,302,200,000 plus overpack costs of $608,800,000 plus rail fees of xxxxxxxxxxxx/4000 casks. See id. at 86 (¶ 4.58). We have elected not to divide this figure in half as PFS would have it because, as the staff points out, see Staff Reconsideration Response at 10, the per-unit costs vary with the number of casks used at the facility and not with the number of years of the license.

[12] See, e.g., Testimony of John Parkyn on [PFS Facility] Construction Costs -- Contention Utah E/Confederated Tribes F (fol. Tr. at 1845) at 4; Tr. at 2026, 2027; [PFS] Proposed Findings of Fact and Conclusions of Law on Contentions Utah E/Confederated Tribes F and Utah S (July 31, 2000) at 20 (xxxxxxxxxx minimum planned initial storage capacity).

[13] In this regard, we note that in the proceeding concurrently before the Licensing Board chaired by Administrative Judge Farrar involving contention Utah K, Credible Accidents, PFS filed a motion requesting reconsideration of LBP-03-4, 57 NRC 69 (2003). In that motion, PFS argued that the Farrar Board should have ruled that the license could be issued subject to a condition limiting the size of the facility such that the aircraft crash hazard would remain below the Commission's safety criterion (i.e., limiting the size to a 336-cask facility). During the oral argument on the motion, PFS indicated that its intention was to begin constructing a 336-cask facility as an interim step to continuing to pursue a license for a full-size, 4,000-cask facility. See Tr. at 13,757. The PFS motion was denied by the Board on procedural grounds without prejudice to PFS seeking such a sizing limitation through appropriate means. See id. at 13,857, 13,861; see also LBP-03-30, 58 NRC __, __ (slip op. at 1 n.1) (Dec. 31, 2003). Since the Farrar Board's May 2003 ruling on that reconsideration motion, PFS has not further pursued limiting the size of the facility to 336 (or any other number of) casks through a license application amendment or any other appropriate means.

Thus, we grant the pending PFS motion to the extent it requests reconsideration and/or clarification of the dollar amount specified in ¶ 4.79. We hereby revise ¶ 4.79 of our contention Utah E/Confederated Tribes F partial initial decision in its entirety to read as follows:[14]

> In conclusion, we find that in accordance with 10 C.F.R. § 72.22(e)(2), PFS has reasonably estimated the costs of operation and maintenance over the forty-year planned life of the facility, with the exception of a $24 million Tooele County, Utah host payment understatement. In accordance with the Commission's instructions in CLI-00-13, the Board finds that PFS may not commence operations before service agreements for the life of the license (i.e., twenty years) are in place with prices adequate to fund operations, maintenance, and decommissioning[21] for an initial **xxxxxxxxxx** capacity facility in the amount of **xxxxxxxxxxxx**. This figure reflects **xxxxxxxxxxxx** for cask, canister, and rail costs (**xxxxxxxx** per unit x **xxxxxxxxxxx**), plus **xxxxxxxxxxxx** for fixed and other O&M costs over a twenty-year license term, plus $12 million for Tooele County host payments. All costs are to be escalated from 1997 dollars to present value. Should the initial capacity of the facility as appropriately specified by PFS differ from **xxxxxxxxxx**, the above amount may be adjusted according to the actual number of casks to be used.

---

[21] Although we issue a separate decision today regarding the adequacy of the PFS efforts regarding decommissioning cost estimates, see LBP-05-22, 62 NRC __, __ (May 27, 2003) (slip op. at 41-52), per the table in section IV.F.1 above we incorporate the PFS decommissioning costs estimates in this figure to provide a unified figure as an aid to assessing future compliance with LC-2.

III. CONCLUSION

Finding sufficient justification to warrant (1) clarification of license conditions LC-1 and LC-2 applicable to PFS so as to adopt the wording as endorsed or reworded by the

---

[14] Because the PFS request for further adjustment of the Tooele County host payment to reflect member and non-member casks constitutes a new argument not previously presented to the Board, we decline to permit any deduction from the $12 million figure.

Commission in CLI-00-13; and (2) reconsideration of the O&M dollar amount specified in ¶ 4.79 of our May 27, 2003 partial initial decision regarding contention Utah E/Confederated Tribes F, we grant the pending PFS reconsideration/clarification motion in those respects. Further, because we find that not establishing a specific dollar amount that the PFS service agreements must cover would be inconsistent with the Commission directive in CLI-00-13, 52 NRC at 36, we deny the PFS motion in that regard.

For the foregoing reasons, it is this fifth day of January 2004, ORDERED, that:

1. The June 6, 2003 PFS motion for reconsideration/clarification of the Board's May 27, 2003 summary disposition ruling, LBP-05-20, 62 NRC __ (May 27, 2003), and its partial initial decision that same date regarding contention Utah E/Confederated Tribes F, LBP-05-21, 62 NRC __ (May 27, 2003), is granted in part and denied in part in accordance with the Board determinations set forth in section II.B of this memorandum and order.

2. Given previous party positions suggesting that financial assurance-related information may include proprietary or other sensitive data, on or before Tuesday, January 20, 2004, the State, PFS, and the staff shall provide the Board with a joint filing outlining each (1) proposed redaction of any part of this memorandum and order to which there is no objection; and (2) proposed redaction of any part of this memorandum and order to which there is an objection. The particular word or phrase to be withheld from public release shall be specified for each proposed redaction; blanket requests for withholding are disfavored. Further, in

accordance with 10 C.F.R. § 2.790, the party seeking the proposed redaction shall at the same time provide a separate submission that describes with specificity (as supported by any necessary affidavits) the reasons for withholding each proposed redaction. Responses by any party objecting to a proposed redaction shall be filed on or before Friday, January 30, 2004.

THE ATOMIC SAFETY
AND LICENSING BOARD[15]

/RA/

G. Paul Bollwerk, III
ADMINISTRATIVE JUDGE

/RA/

Jerry R. Kline
ADMINISTRATIVE JUDGE

/RA/

Peter S. Lam
ADMINISTRATIVE JUDGE

Rockville, Maryland

January 5, 2004

[15] Pursuant to previous Board issuances on e-mail service of documents identified as potentially containing proprietary information, copies of this memorandum and order were sent this date by Internet e-mail transmission to counsel for PFS, the State, and the staff. In addition, this date a memorandum was sent by e-mail to all the parties to this proceeding advising them of the issuance of this decision and the Board's determination to afford this decision confidential treatment pending a response by PFS, the State, and the staff to the Board's inquiry under ordering paragraph two above. See Licensing Board Memorandum and Order (Notice Regarding Issuance Concerning Reconsideration/Clarification Motion) Contentions Utah E/Confederated Tribes F and Contention Utah S) (January 5, 2004) (unpublished).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LBP-05-23-REDACTED VERSION OF LB MEMORANDUM AND ORDER (GRANTING IN PART AND DENYING IN PART MOTION FOR RECONSIDERATION AND/OR CLARIFICATION OF FINANCIAL QUALIFICATIONS DECISIONS) have been served upon the following persons by deposit in the U.S. mail, first class, or through NRC internal distribution.

Office of Commission Appellate Adjudication
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
G. Paul Bollwerk, III, Chairman
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Sherwin E. Turk, Esquire
Laura C. Zaccari, Esquire
John T. Hull, Esquire
Darani M. Reddick, Esquire
Office of the General Counsel
Mail Stop - 0-15 D21
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Administrative Judge
Peter S. Lam
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Stephen L. Simpson, Esquire
Office of the Solicitor
Department of the Interior
Division of Indian Affairs
1849 C Street, NW, Mailstop 6456-MIB
Washington, DC 20240

Diane Curran, Esquire
Harmon, Curran, Spielberg & Eisenberg, L.L.P.
1726 M Street, NW, Suite 600
Washington, DC 20036

Joro Walker, Esquire
Director, Utah Office
Western Resource Advocates
1473 South 1100 East, Suite F
Salt Lake City, UT 84105

Martin S. Kaufman, Esquire
Atlantic Legal Foundation
205 E. 42nd St.
New York, NY 10017

Docket No. 72-22-ISFSI
LBP-05-23-REDACTED VERSION OF LB MEMORANDUM
AND ORDER (GRANTING IN PART AND DENYING IN PART
MOTION FOR RECONSIDERATION AND/OR CLARIFICATION
OF FINANCIAL QUALIFICATIONS DECISIONS)

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

Jay E. Silberg, Esquire
D. Sean Barnett, Esquire
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128

John Paul Kennedy, Sr., Esquire
David W. Tufts, Esquire
Confederated Tribes of the Goshute
Reservation and David Pete
Durham Jones & Pinegar
111 East Broadway, Suite 900
Salt Lake City, UT 84105

Richard Wilson
Department of Physics
Harvard University
Cambridge, MA 02138

Tim Vollmann, Esquire
3301-R Coors Road N.W., #302
Albuquerque, NM 87120

Paul C. EchoHawk, Esquire
ECHOHAWK LAW OFFICES
151 North 4th Avenue, Suite A
P.O. Box 6119
Pocatello, ID 83205-6119

Joseph R. Egan, Esquire
Martin G. Malsch, Esquire
Egan, Fitzpatrick, Malsch & Cynkar, PLCC
The American Center at Tysons Corner
8300 Boone Boulevard, Suite 340
Vienna, VA 22182

[Original signed by Evangeline S. Ngbea]

Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 12th day of August 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

RAS 7312

DOCKETED 02/05/04
SERVED 02/05/04

COMMISSIONERS

Nils J. Diaz, Chairman
Edward McGaffigan, Jr.
Jeffrey S. Merrifield

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

CLI-04-04

MEMORANDUM AND ORDER

In response to the Commission's order of November 13, 2003,[1] Utah and Ohngo Gaudadeh Devia (OGD) filed their Petitions for Review presenting numerous issues for our consideration. We have considered each issue to determine whether it meets our standards for review under 10 C.F.R. §2.786. For the reasons we give below, we deny review for the most part, but grant review and request further briefs on two issues.

The Commission always has discretion whether to accept review of issues raised in our licensing proceedings. Our rules say that the Commission may grant review based on "any consideration" it "deems to be in the public interest."[2] Review is particularly appropriate where there is a possibility that the Board's ruling made a clear error as to a material fact, where a legal

[1]CLI-03-16, 58 NRC 360 (2003).

[2]*See* 10 C.F.R. § 2.786(b)(4).

conclusion therein is without precedent or conflicts with existing precedent, or where the ruling raises an important policy issue that the Commission should consider itself.[3]

With these standards in mind, below we consider the petitions for review filed by Utah and OGD.

II. UTAH'S POINTS OF ERROR

A. Security Related Contentions:

Utah initially challenged PFS's physical security plan with nine contentions, Utah Security A through Security I. Utah now asks review of portions of Utah Security A (inadequate staffing), Security G (inadequate protection against terrorism and sabotage), and Security J (no documented relationship with local law enforcement authority).

1. The Board Did Not Err In Applying Not-Yet-Effective Regulations

Utah's petition complains that the Board improperly applied regulations that were not yet effective. At the time the Board considered Utah's original security contentions, these regulations had been published in the Federal Register as final rules,[4] but would not take effect until five months after the Board's ruling. We see no real point to Utah's argument. The rules took effect in November, 1998, and will apply to the PFS facility, if licensed. It was sensible for the Board to evaluate Utah's contention under the rules that will cover the PFS facility.

2. Utah Security A (Security Implications of Lack of Nearby Housing)

Utah's Security A argued that the lack of housing near the PFS facility would make it impossible for PFS to call on off-duty security personnel in the case of an emergency. But as PFS's response pointed out, its security plan does not rely on off-duty security personnel to

---

[3] *See id.*

[4] *See* Final Rule, Physical Protection for Spent Nuclear Fuel and High-Level Radioactive Waste, 63 Fed. Reg. 26,955 (1998).

respond to an emergency or repel intruders. Our regulations provide that an ISFSI must have sufficient watchmen to detect intrusion and alert local law enforcement, but the regulations allow ISFSIs to rely on law enforcement (not the watchmen) to thwart an attack.[5] It appears that Utah's contention results from a misinterpretation of PFS's security plan. Utah's petition for review therefore fails to raise a significant issue of law, policy, or fact for the Commission to resolve.

3. Utah Security G (Failure to Describe Procedures for Protecting Fuel)

Utah's Security G contended that PFS "has failed to adequately assess and describe procedures that will protect spent fuel from unauthorized access or activities, such as terrorism and sabotage." The Board found this an impermissible attack on our regulations, specifically 10 C.F.R. 72.184(a), which states: "[p]rocedures do[] not have to be submitted for approval."[6] Utah's petition says only that the "security plan does not adequately protect fuel from unauthorized access or activities," but does not explain how the Board's ruling on Security-G constituted an error of fact or law. We see no basis for taking review of Security-G.

4. Utah Security J (Lack of Agreement with Local Law Enforcement)

In 2002, the Board admitted late-filed Utah Security J, which claimed that recently-enacted Utah legislation barring any local government from providing services (including law enforcement services) to a spent nuclear fuel storage facility rendered PFS unable to comply with various security regulations.[7] After the United States District Court for the District of Utah

---

[5]10 C.F.R. §73.51. *See also* Statement of Considerations, 63 Fed. Reg. at 26,957.

[6]10 C.F.R. § 72.184(a). *See* 10 C.F.R. § 72.184(b) (safeguards contingency procedures must be developed and maintained).

[7]LBP-02-07, 55 NRC 167 (2002).

ruled the Utah statutes to be preempted by federal law,[8] the Board dismissed the contention.[9] Utah appealed the district court's ruling to the United States Court of Appeals for the Tenth Circuit, and a decision on that matter is pending.

Utah argues that the Board erred in dismissing its contention when the matter was still under appeal to a higher court. We see no error. The Board was bound to apply the law as it existed at the time of its ruling, which was as the district court ruled. In addition, the district court's legal conclusion that the Utah statutes were preempted by federal law seems reasonable. Congress, in enacting the Atomic Energy Act, clearly intended the federal government to occupy the field of regulating the safety of atomic energy.[10] Utah's laws seemingly amount to an attempt to make it impossible for any applicant to obtain an NRC ISFSI license, thereby effectively prohibiting this project. If, on appeal, the law on this point changes, we can consider requests to revive this contention.

5. Utah U, Basis 4 (EIS Should Describe Environmental Impact of Terrorism)

Utah U, Basis 4, argued that the EIS is deficient in not describing the environmental impacts of a saboteur successfully breaching one or more casks. Review of this matter is denied, as the Commission has already held in this proceeding that the environmental impacts of terrorism or sabotage are not subject to review under NEPA.[11]

B. Contentions Relating to the Intermodal Transfer Facility

---

[8] *Skull Valley Band of Goshute Indians v. Leavitt*, 215 F.Supp.2d 1232 (D.Utah, 2002).

[9] LBP-02-20, 56 NRC 169 (2002).

[10] *English v. General Electric Co.*, 496 U.S. 72, 81; 11 S.Ct. 2270; 110 L. Ed. 2d 65 (1990).

[11] CLI-02-25, 56 NRC 340 (2002).

PFS envisions that spent fuel will be shipped to its facility on existing rail lines to an area north of the facility. At that point, PFS proposes to either build a new rail line to ship the casks the final 32 miles to the PFS facility, or to transfer the casks onto heavy-haul trucks at an Intermodal Transfer Facility (ITF). Utah claims that the volume of traffic at the proposed ITF would necessitate some temporary storage, thereby making the facility a storage facility that must be licensed under Part 72 and conform to all applicable regulations. Both PFS and the NRC staff believe that the ITF would not be an NRC-licensed facility at all. Rather, they argue, the spent fuel will still be in transit and would be covered by Department of Transportation ("DOT") regulations that will ensure public health and safety.

The Board initially found portions of the ITF related contentions admissible.[12] It later dismissed them as an attack on applicable NRC and Department of Transportation regulations, which hold spent fuel in transit to fall under DOT's jurisdiction.[13] The Board cited the Hazardous Materials Transportation Act,[14] which defines DOT's authority to regulate the "transportation" of nuclear materials, including "the movement of property and loading, unloading, or storage incidental to the movement" of materials.[15]

It appears to us that the Board reached the proper conclusion under the NRC-DOT regulatory regime. PFS-bound spent fuel will be in shipment, even during temporary holding at the transfer point, until it arrives at the PFS facility in Skull Valley. Thus it falls under DOT regulations. We see no basis for accepting review on the ITF contentions.

---

[12]LBP-98-7, 47 NRC at 184-85.

[13]LBP-99-34, 50 NRC 168 (1999).

[14]49 U.S.C. §§ 5101-5127.

[15]*Id.* at § 5102(12). *See* LBP-99-34, 50 NRC at 177 n. 3.

C. Contentions Utah J and Utah U, Basis 2 (Inspection and Maintenance of Safety Components–Lack of a Hot Cell)

1. Utah J (Inspection and Maintenance of Safety Components, including Canisters and Cladding).

Utah J argues that the ISFSI's design is inadequate to protect public safety because there is no "hot cell" or other means through which a canister may be opened to inspect the condition of the fuel. Utah argues that this deficiency violates 10 C.F.R. § 72.122(f), which provides that components important to safety (that is, the fuel cladding) must be designed to permit inspection, and 10 C.F.R. § 72.128(a), which provides that spent fuel storage facilities "must be designed with ... [a] capability to test and monitor components important to safety."

The Board found this contention to be an attack on agency regulations and rulemaking-associated determinations and to be lacking in factual or expert support.[16]

Other than the general requirements that components important to safety must be capable of inspection, Utah cites no regulation requiring a hot cell at an ISFSI. The fuel cladding is not a "structure or system important to safety," as that term is defined in our regulations.[17] Those structures or systems are limited to parts of "the ISFSI,[18] MRS, or spent fuel *storage cask*" important to maintain the safe condition of the spent fuel. The regulation does not refer to the *contents* of the canister. NRC has made rulemaking-associated

---

[16]LBP-98-7, 47 NRC at 189-90.

[17]10 C.F.R. §73.3.

[18]That is, the "complex," or larger facility. *See id.*

determinations that the fuel cladding, once encased in a canister, is no longer important to safety.[19]

We therefore see no basis for questioning the Board's determination that this contention presented an impermissible challenge to our regulations, rulemaking-associated determinations, and lacked factual or expert opinion support.

2. *Utah U, Basis 2 (Impacts of Onsite Storage Not Considered)*

The Board rejected basis 2 of Utah U, which claimed the ER was defective in failing to "consider the safety risks and costs raised by PFS's failure to provide adequate means for inspecting and repairing the contents of spent fuel canisters or for detecting and removing contamination on the canisters." The Board found that this basis impermissibly attacked agency regulations or rulemaking-associated determinations. But whether or not NRC safety regulations impose certain requirements does not resolve the question whether there are potential environmental consequences that should be discussed under NEPA. Because we do not find the Board's rationale for rejecting Utah U, basis 2 entirely clear, the Commission grants review of whether that basis should have been admitted.

Various portions the FEIS discussed inspections and procedures to ensure that no contaminated canisters are stored at the PFS facility. Because Utah U, basis 2 was filed in response to the ER, it never addressed the FEIS. Among other issues the parties should address is whether the FEIS moots any of Utah's concerns. As the Commission recently held in *Catawba Nuclear Station,* complaints about the adequacy of an applicant's ER are superseded

---

[19]*See, e.g.*, Proposed Rule Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High Level Radioactive Waste, 51 Fed. Reg. 19,106 (1986) "[F]or storage of spent fuel the cladding need not be maintained if additional confinement is provided ... the canister could act as a replacement for the cladding." *Id.* at 19,108.

when the issues involved are discussed in the FEIS.[20] Therefore, Utah's complaint may have been mooted by the FEIS.

D. NEPA/Economic Contentions

1. Contentions Utah X (Need for the Facility) and Utah Z (No Action)

In Contentions Utah X and Z, Utah claims that PFS's ER, and, subsequently, the Staff's EIS, overstate the need for the facility and the disadvantages of not building the facility. Utah claims that in looking at the "need" for the facility the EIS focuses on the advantages primarily to PFS and its potential customers, rather than including "an evenhanded discussion of the actual need for the proposed facility." In support of this, Utah claims that simply storing spent fuel at reactors until a permanent repository is ready is a safe and environmentally preferable option. In addition, in looking at the "no action" alternative, Utah claims that the Board erred in looking at only environmental effects. We are not persuaded that the EIS either overstates the need for the facility or fails to adequately discuss the advantages of not building the facility.

The heart of Utah's complaint is that the EIS fails to consider whether the country as a whole "needs" the facility or not. But that question borders on the political. We do not believe that NEPA charges the staff, in drafting the EIS, or the Board, in its hearing process, with answering that question. Rather, the EIS enumerated certain benefits of the project, which would accrue primarily to PFS and its customers. In addition, it listed benefits to certain communities–such as the benefit of allowing early decommissioning of shutdown reactors and the economic benefit to the Skull Valley Band of Goshutes, an impoverished Indian tribe. The

---

[20]*Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-02-28, 56 NRC 373, 382-84 (2002).

EIS acknowledged that at-reactor storage was a viable option presenting no significant environmental impacts.[21]

On the other hand, the EIS examines in great detail various environmental effects of the project. Utah points to no significant environmental effect the staff failed to consider. Similarly, Utah does not specify any advantages of the "no action" alternative that it claims the EIS ignored. It is apparent that the disadvantages of allowing the project are the mirror image of the advantages of not allowing it (the "no action" alternative), and *vice versa*. As did the Board, we see no genuine dispute here.

We recently said that "NRC adjudicatory hearings are not EIS editing sessions."[22] Neither is the Commission appeals process. We find that Utah's complaint fails to raise any clear Board error of fact or law on the "need" and "no action" issues.

2. Contention Utah Y (Connected Actions)

The Board rejected Utah's proposed Contention Y at the outset of the adjudication.[23] Utah Y contended that the environmental analyses of the project should consider its impact on the Department of Energy's plans for a permanent waste repository at Yucca mountain. Utah argues that storing up to 40,000 metric tons of spent fuel would reduce the pressure on DOE to pursue a permanent waste repository. It also claims that "[o]ne implication of licensing the PFS facility is to practically foreclose DOE and congressional decisions on future [spent nuclear fuel] storage."

---

[21] *See* Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah, NUREG-1714, Vol. 1 at liii.

[22] *Duke Energy Corporation* (McGuire Nuclear Station, Units 1 and 2, Catawba Nuclear Station, Units 1 and 2), CLI-03-17, 58 NRC __, __ (2003).

[23] LBP-98-7, 47 NRC at 202.

In a NEPA analysis it is proper for an agency to consider the overall effect of a government program involving smaller connected actions, rather than considering only the components, each of which may have only insignificant environmental effects.[24] But we do not agree that the logical result of approving the PFS facility is that it will affect, adversely, the development of a permanent repository. Utah believes that approval of the PFS facility will both delay the development of a permanent repository, and "commit the federal government to one of many courses of action."

We do not see why the availability of *private* offsite storage would affect *DOE's* duties under the Nuclear Waste Policy Act. The NWPA assigns DOE a duty to develop a permanent repository, which is not discretionary or dependent on DOE's deciding that there is a "need" for it. Further, the NWPA also requires DOE to fully investigate Yucca Mountain, and only Yucca Mountain, to determine whether it is suitable for long-term storage. The decision to go forward with the Yucca Mountain plan is to be based on scientific criteria only. Whether or not PFS is in place as an interim storage facility has no bearing at all on the Yucca Mountain decision.

Because Utah has not shown a connection between the PFS facility and the permanent repository to be developed by DOE, NEPA does not require the PFS EIS to consider impacts on the development of a permanent repository. We see no error in the Board's finding no genuine dispute here.

3. Contentions Utah CC (One-sided Cost-Benefit Analysis) and Utah SS (Final EIS Revised Cost-Benefit Analysis)

Utah argues that the cost-benefit analysis in the EIS is biased and inaccurate. Utah claims that the EIS improperly considers the benefit of a 40-year storage period, when it should

---

[24]In *Thomas v. Peterson*, 753 F.3d 754 (9th Cir. 1985), cited by Utah, the court held that the environmental review of the effects of building a timber road through a National Forest must also consider the effects of the timber sales the road was designed to accommodate.

only consider the benefit of storing fuel at the site for 20 years, because PFS has applied for only a 20-year license. If one assumes that spent fuel will not be stored at the facility beyond 20 years of license issuance, the net benefit, in terms of costs avoided, would be reduced, Utah says. The Board dismissed Utah CC at the contention filing stage, finding no genuine dispute.[25]

After the FEIS was issued, Utah submitted contention SS, which again challenged the cost/benefit analysis as biased in favor of the project for failing to include a sufficient economic analysis. In a ruling from the bench, the Board found the contention timely, but rejected it for failing to state a claim for which relief could be granted. The Board held that NEPA did not require the staff to redo the analysis.[26] The Board noted that Utah had not alleged that there was "gross environmental harm," as in the cases requiring an economic analysis. Further, the Board found that the benefit put forward for the project was not economic, but "a sort of insurance policy" against late creation of a permanent repository for high level waste.

Utah points to our decision in *Claiborne Enrichment Center,* where we said that "[m]isleading information on the economic benefits of a project ... could skew an agency's overall assessment of a project's costs and benefits, and result in approval of a project that otherwise would not have been approved because of its adverse environmental impacts."[27]

Because NEPA cost/benefit questions have proved troublesome in the past, as for example in the *Claiborne* case,[28] because the record would benefit from a written decision on

---

[25]LBP-98-7, 47 NRC at 204.

[26]*See* Oral decision at evidentiary hearing, Tr. 9213-14 (May 17, 2002).

[27]*Louisiana Energy Services* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77 (1998).

[28]*See* CLI-98-3, 47 NRC at 87-100. *See also, e.g., Hydro Resources, Inc.,* CLI-01-4, 53 NRC 31, 48-51 (2001).

these issues, and because the context of the question here is unusual, the Commission believes that review of the admissibility of Utah CC and SS is appropriate.

4. Contention Utah HH and II (Low Rail Corridor Fire Hazards)

Utah contends that the Board improperly found its proposed contentions Utah HH and II to be impermissibly late. The issue for the Commission's review is whether the Board improperly found that Utah did not have good cause for filing these contentions late.

PFS originally proposed a rail spur to run alongside Skull Valley Road to bring the spent fuel from the existing rail line to the PFS facility. A year later, PFS amended its plan by moving the rail line to the west, through open rangeland along the edge of the Cedar Mountain range. Within 30 days of that license amendment, Utah sought to add Contention Utah HH, saying that this rail spur would cause fire hazards by providing a new ignition source and an obstacle to fire trucks attempting to cross the rail line, and Utah II, saying that the ER had failed to consider environmental impacts and costs of operating the rail line. The Board rejected this contention as impermissibly late, finding no reason that Utah could not have raised these issues with the original application.[29]

Utah now claims that the reason it did not file the contention at the time of the original application was that only the new alignment presented the fire hazards.

The Board noted that the differences in the new alignment and the old one might be a basis to find "good cause" for late filing, but found that Utah did not explain why the original alignment would not also provide a potential ignition source, impediment to firefighters, and so on.[30] Utah, however, did not present its argument with its contention to show good cause for late

---

[29]LBP-98-29, 48 NRC 286 (1998).

[30]*See* LBP-98-29, 48 NRC at 292-93 n. 2 (1998).

filing, as it is required to do by our rules of practice.[31] Rather, the reason Utah gave for not filing its fire-related objections to the rail line at the outset was that the rail line was only one of many possibilities mentioned in PFS's initial application.[32]

In presenting a late contention, the proponent's first duty is to demonstrate good cause to the Board.[33] Even if a party on review provides a credible argument that there was good cause, if the intervenor did not present that argument to the Board along with the late contention, we have no basis for concluding that the Board erred.

Basis 1 of Utah II challenged the ER's failure to consider environmental impacts of fires caused by the rail spur. The Board found that basis untimely for the same reason it rejected HH, that is, that this issue could have been raised with respect to the original rail spur proposal.[34] Utah II also listed six additional bases, arguing that the ER failed to consider the rail line's effects on species, visual impacts, noise levels, historical resources, and the impact on grazing rights. The Board found these bases timely, but inadmissible on other grounds, such as lacking factual support and impermissibly challenging NRC regulations.[35]

Utah's petition does not discuss the Board's legal conclusions with respect to each of bases 2-7 of Utah II, making it difficult to ascertain any particular error. Rather, Utah makes a general allegation that the Commission has not complied with NEPA by evaluating the environmental impacts of the rail spur. But the FEIS does discuss the rail line's impacts on

---

[31] 10 C.F.R. § 2.714(a)(1)(i).

[32] LBP-98-29, 47 NRC at 292-93 (1998).

[33] *See* 10 C.F.R. §2.724(a)(1)(i).

[34] *Id.* at 295-96.

[35] *Id.* at 296.

vegetation and species,[36] livestock,[37] historic resources,[38] noise,[39] visual impacts,[40] recreation,[41] and wildfires.[42] Therefore, even if the Board erred (and we see no suggestion of error), Utah's contention II appears to be insubstantial, or even moot, given the FEIS's contents.

D. Utah KK (Interference with Use of UTTR and Resulting Economic Impacts)

In July, 2000, Utah filed Utah KK, which argued that the presence of the PFS facility would cause the military to restrict operations in the Utah Test and Training Range. This would both impair the nation's military readiness and possibly lead to closing Hill Air Force base, which in turn, Utah claims, would have adverse impacts on the local economy.

The Board rejected the contention as untimely as Utah showed no good cause for the late filing.[43] The issue before us is whether the Board properly rejected the contention on that basis.

Utah argues that it first raised this issue in comments on the scope of the EIS, and that the staff represented that the EIS would include all direct and indirect economic impacts. It argues that it relied on the staff's pronouncement that it would consider these impacts, but that the DEIS did not do so.

---

[36] *See* FEIS § 5.4.

[37] *See* FEIS §§ 5.5.1.1, 5.5.2.1, 5.5.4.

[38] *See* FEIS § 5.6.1.1.

[39] *See* FEIS § 5.8.1.

[40] *See* FEIS § 5.8.2.

[41] *See* FEIS § 5.8.3.

[42] *See* FEIS § 5.8.4.

[43] LBP-00-27, 52 NRC 216 (2000).

The Board was correct in finding no good cause for Utah's late contention. Commenting on the scope of EIS does not substitute for raising a timely contention. It is essential to efficient case management that intervenors file contentions on the basis of the applicant's environmental report and not delay their contentions until after the staff issues its environmental analysis.[44] In the interest of expedition, our rules require the filing of contentions as early as possible. Utah did not do this and the Board rightly refused to allow Utah to bring up old grievances late in the hearing process.

Further, we reject the argument that the national significance of Utah's military concerns warrants overriding the usual requirement that intervenors show good cause for untimely filing. Utah has offered no factual support for its theory that the military will curtail training in Skull Valley if the PFS facility is built; in fact, there is evidence in the record to the contrary.[45] Thus, there appears to be little cause for concern either that the proposed facility could impact military preparedness or that it could cause the military to close Hill Air Force Base.

E. Transportation Contentions–Proposed Utah LL-OO

Utah contention V complained that PFS's ER failed to discuss environmental impacts of transportation. The Board admitted a single basis, whether PFS improperly relied on Summary *Table S-4*, Environmental Impact of Transportation of Fuel and Waste to and From one Light

---

[44] *See Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 NRC 200, 251 (1993), *petition for review and motion for directed certification denied*, CLI-94-2, 39 NRC 91 (1994).

[45] *See* FEIS §§ G.3.8.1.8, G.3.13.3.1. We also note that the parties are currently preparing for a hearing on the subject of the consequences of a military aircraft crashing into the PFS site. Last year, the Board found that, while such a crash is extremely unlikely, its probability is just within the range making it a "credible event" under the Commission's stringent safety standards. That ruling was premised on the military taking no steps to curtail flights over the site.

Water Cooled Nuclear Power Reactor,[46] because the shipping casks involved would be heavier than those assumed by Table S-4.

Instead of relying on table S-4, the DEIS calculated the transportation impacts using a PFS-specific computer analysis, called the RADTRAN 4 computer model. When Utah in turn challenged this model in Contentions Utah LL-OO, the Board found the new contentions impermissibly late.[47] The Board later dismissed Contention Utah V as moot.[48] The issue before us is whether the Board erred in finding the new transportation-related contentions impermissibly late.[49]

Recognizing that the DEIS could give rise to new contentions, the Board's procedural order governing the underlying proceeding required the staff to give all parties 15 days' notice before it planned to release the DEIS and make the DEIS available to the intervenors on an expedited basis.[50] The order explicitly provided that intervenors would have 30 days to file new contentions.

On June 12, 2000 the staff informed Utah that the DEIS had been completed and that a copy would be provided at the start of a June 19, 2000 evidentiary hearing. Utah filed its contentions on August 2, 2000. The Board found that, because staff had not given a full 15 day's notice before it gave Utah a copy of the DEIS, the due date for new contentions under its

---

[46]10 C.F.R. §51.52.

[47]LBP-00-28, 52 NRC 226 (2000), *review denied*, CLI-01-01, 53 NRC 1 (2001).

[48]LBP-01-22, 54 NRC 155 (2001).

[49]Although Utah suggests that the dismissal of Utah V as moot denied it "due process," it does not explain how any aspect of that contention, as admitted, was still in issue after the staff's DEIS performed a PFS-specific analysis not relying on Table S-4.

[50]Licensing Board Memorandum and Order (General Schedule for Proceedings and Associated Guidance)(June 29, 1998), at 4-5 (unpublished).

order should be considered 45 days after that notice–or July 27, 2000. It ruled that Utah's amended contentions were therefore at least 5 days too late. It also found that portions of contentions Utah NN (economic effects of the maximum credible accident) and Utah OO (economic risks of a transportation accident) were nearly three years too late, because they could have been raised with respect to the PFS ER.[51]

Utah argues that, considering the timing of the DEIS's release at the start of a week-long hearing and narrow margin by which it missed the deadline, the Board's rejection of its contentions was a denial of due process. We can't agree. Although the size of the document and the timing of its release might well have justified an extension of the filing deadline, had Utah requested it, we cannot find that the Board's action amounted to a denial of due process when the schedule for late contentions was spelled out clearly in the Board's 1998 order.

In addition, we reject Utah's argument that the significance of the issues involved warrants overriding the Board's finding of no good cause for late filing. The Board noted that, had its inquiry reached the substantive stage, it would have admitted only a single subpart of one transportation contention, Utah MM (DEIS underestimates the severity of a category 6 accident by underestimating the release of Chalk River Unidentified Deposits (CRUD)).[52] We emphasize that our staff analyzes the safety of license applications in their entirety, whether or not particular questions are admitted for hearing. Thus rejecting contentions as too late is not the same as ignoring safety concerns.

IV. OHNGO GAUDADEH DEVIA'S PETITION FOR REVIEW

A. OGD Contention B (Emergency Plan and EPCRTKA)

---

[51]LBP-00-28, 52 NRC at 235.

[52]*Id.* at 239, n. 3.

OGD's proposed Contention B contended that the emergency plan failed to address the safety of persons living outside the facility and failed to meet the requirements of the Emergency Planning and Community Right to Know Act of 1986 (EPCRTKA).[53] The Board found the contention inadmissible as a collateral attack on agency regulations, as lacking factual or expert support, and for failing to show any genuine dispute.[54]

As the Board recognized, NRC regulations distinguish between ISFSIs that will only store packaged waste and facilities that process or reprocess waste. NRC does not require a facility like the one PFS proposes to build, which will only store prepackaged waste, to have a formal offsite emergency plan because no onsite accident is expected to have significant offsite consequences.[55] Therefore, we see no suggestion that the Board may have made a mistake of law or fact in rejecting this portion of the contention.

In addition, the Board was correct in rejecting OGD's EPCRTKA claim as lacking a factual basis. EPCRTKA imposes reporting and emergency planning requirements on facilities possessing certain listed hazardous substances in excess of prescribed quantities established by the Environmental Protection Agency. PFS's Emergency Plan stated that it will not possess any listed substance in threshold quantities,[56] and OGD submitted no evidence to contradict that

---

[53]Title III, Pub. L. 99-499.

[54]LBP-98-7, 47 NRC at 227.

[55]*See* 10 C.F.R. § 72.32(a). *See also* Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSIs) and Monitored Retrievable Storage Facilities (MRS), 60 Fed. Reg. 32,430. The statement of considerations provided:

> NUREG-1140 concluded that the worst-case accident involving an ISFSI has insignificant consequences to the public health and safety. Therefore, the final requirements to be imposed on most ISFSI licensees reflect this fact, and do not mandate formal offsite components to their onsite emergency plans.

Id. at 32,431.

[56]PFS Emergency Plan at 2-6.

statement. Although the spent fuel itself is "hazardous," in that is requires safe handling under NRC regulations, it is not an "extremely hazardous substance" on the EPA's EPCRTKA list. The safe handling of spent nuclear fuel is NRC's bailiwick, and our own regulations describe all necessary emergency planning procedures. Because OGD did not show PFS would possess any EPCRTKA substances in reportable quantities, the Board properly rejected OGD's EPCRTKA complaint as lacking a factual basis.

B. OGD Contention E (Failure to Plan for Leaking or Contaminated Casks)

OGD's proposed Contention E argued that the license application failed to provide a plan for dealing with casks that may leak or become contaminated during the 20 to 40 year storage period. OGD claimed that the license application should have a plan for dealing with a leaking cask or canister, should have an alternative location to store a canister that becomes defective, and should address "uncertainties" about whether permanent storage will ever become available at Yucca Mountain. The Board rejected this contention as lacking a factual basis and constituting an attack on our regulations and rulemaking-associated determinations, and failing to show a genuine dispute.[57]

The problem with the contention is that NRC determined that even worst-case scenarios (such as drops) involving a cask would not breach it.[58] OGD's contention lacks a factual foundation because it does not present any plausible scenario requiring special planning for a breached cask. In addition, the applicant's response to this contention pointed out that its SAR did plan for either returning any defective cask to the shipper or enclosing it in a transportation cask at the ISFSI.[59] Other than the bald assertion that PFS does not adequately provide for

---

[57]LBP-97-8, 47 NRC at 228-29.

[58]See 60 Fed. Reg. 32,430, 32,438 (1995).

[59]PFS Answer to Contentions, p. 524-25.

contingencies, OGD did not address PFS's proposals. Therefore, there is no error apparent in the Board's decision that this contention lacked factual support, failed to show a genuine dispute, and amounts to an attack on NRC regulations which rest on the premise that NRC-approved casks will survive accidents without contaminating the environment or causing safety concerns.

C. OGD Contention J (Licenses, Permits and Approvals)

OGD's proposed Contention J claimed that the license application failed to discuss the compliance with all applicable permits, licenses and approvals. It also alleged that the NRC, as a federal agency, owes a "trust responsibility" to Native Americans to ensure that their tribal lands are not contaminated.

The Board found this contention inadmissible for various reasons. We note that the FEIS discusses the permits, licenses and approvals PFS will need for its facility, mooting any deficiency in the ER.[60]

OGD's petition focuses not on any particular environmental permitting issue, but rather on the Board's conclusion that the NRC doesn't owe any heightened "trust responsibility" to Native Americans. OGD does not cite any legal basis for the proposition that the NRC owes a fiduciary duty to Native Americans to protect their land from contamination. Rather, the cases OGD cites deal with the government's fiduciary duties in handling funds owed or held in trust for Native Americans.

The NRC certainly has a statutory duty to protect all members of the public, including Indian tribes, from radiation hazards without regard to ethnic origin. The NRC is attempting to do so here both through the hearing process and through the NRC staff's safety and environmental review process. But we see no reason to foreclose Indian tribes from possible

---

[60]FEIS at 1.6.2.

economic opportunities (such as the PFS facility, if built) under the guise of protecting Indian tribes from environmental harm, no matter how slight.

OGD complains that the Board erred in placing the "burden of producing information" on OGD. But the party proffering a contention always has the burden to offer sufficient fact-based allegations showing that a genuine dispute exists.[61] That is the essence of our contention-pleading process.

D. OGD Contention O (Environmental Justice)

OGD initially offered six bases for its environmental justice claim. The Board accepted the contention as admissible insofar as it claimed that the facility would cause disparate environmental impacts to tribe members, who are both ethnic minorities and poor.[62] It later narrowed the issue to whether there was a subgroup within the tribe that was not receiving or would not receive any benefit from the project, thereby suffering a "disparate environmental harm" from the project.[63] The Commission reversed that ruling, finding that this agency's approach to environmental justice was to look at disparate environmental harms, not disparate economic benefits.[64]

OGD now argues that the Board improperly rejected bases that claimed the license application failed to discuss the "environmental, sociological, and psychological costs" to the Skull Valley Band. The Board rejected this claim both because the cost/benefit analysis was not

---

[61] *See, e.g., Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-28, 56 NRC 373, 383 (2002).

[62] LBP-98-7, 47 NRC at 233.

[63] LBP-02-08, 55 NRC 171 (2002).

[64] CLI-02-20, 56 NRC 147 (2002).

pertinent to the environmental justice inquiry and also because "psychological harm" resulting from fear or stigma associated with a facility is not cognizable under NEPA.[65]

OGD also says the Board should have admitted, under the environmental justice rubric, its argument that the ER should have weighed the costs and benefits of operating the ISFSI against the alternative of leaving the wastes where they are until a permanent facility is available. The Board rejected that claim because it found the cost/benefit analysis had nothing to do with an environmental justice claim. Here, however, the environmental justice concern is that society at large is reaping the economic benefits of a project while imposing its costs unfairly on an economically disadvantaged minority. The EIS did discuss various environmental impacts, including visual and cultural impacts.[66] The EIS concluded, however, that the particular benefits to the Skull Valley Band of Goshutes outweigh the particular environmental harms that will be suffered by the Band.[67] Therefore, it is not apparent how factoring in the costs to society at large of allowing the PFS facility (such as transportation costs and hazards), and the benefits to society at large of operating the PFS facility would give a more accurate picture of environmental justice considerations.

We therefore deny review of OGD's environmental justice issues.

V. CONCLUSION

For the foregoing reasons, Commission grants review in part and denies review in part. The parties are directed to file briefs, not to exceed 20 pages, on Utah U, basis 2, and on Utah CC and SS, as outlined above. Utah should file its opening brief within 21 days of this order; the

---

[65]LBP-98-7, 47 NRC at 233. *See Metropolitan Edison Co. v. People Against Nuclear Energy,* 460 U.S. 766, 772-79 (1983).

[66]*See* FEIS 4.5 (Socioeconomics and Community Resources); 4.6 (Cultural Resources); 4.8.2 (Scenic Qualities).

[67]*See* FEIS 6.2.1.2.

NRC staff and PFS should file their answering briefs within 21 days after receipt of Utah's brief. Utah may file a reply brief, not to exceed 5 pages, within 7 days after receipt of the staff and PFS briefs. All briefs should be served electronically. Any brief exceeding 10 pages shall contain a table of cases and authorities and a table of contents. Any interested *amici curiae* are authorized to file briefs as set out above, at the time of the party they support.

IT IS SO ORDERED.

For the Commission

/RA/

Annette L. Vietti-Cook,
Secretary of the Commission

Dated at Rockville, MD
This 5th day of February, 2004

Copr. (C) West 2000 No Claim to Orig. U.S. Govt. Works

47 N.R.C. 142
(Cite as: 47 N.R.C. 142, 1998 WL 223777 (N.R.C.))

****1** IN THE MATTER OF
PRIVATE FUEL STORAGE, L.L.C.
(Independent Spent Fuel Storage Installation)

Nuclear Regulatory Commission

Atomic Safety and Licensing Board

LBP-98-7
Docket No. 72-22-ISFSI (ASLBP No. 97-732-02-ISFSI)

April 22, 1998

***142** Before Administrative Judges: G. Paul Bollwerk, III, Chairman; Dr. Jerry R. Kline; Dr. Peter S. Lam

In this proceeding concerning the application of Private Fuel Storage, L.L.C., under 10 C.F.R. Part 72 to construct and operate an independent spent fuel storage installation (ISFSI), the Licensing Board rules on (1) the issues of standing and admissibility of contentions relative to pending hearing requests/intervention petitions either supporting or opposing the application; (2) a 10 C.F.R. s 2.758 rule waiver petition; and (3) various administrative and procedural matters, including the use of "lead" parties and informal discovery.

RULES OF PRACTICE: INTERVENTION

Longstanding agency practice requires that an individual, group, business entity, or governmental entity that wants to intervene "as of right" as a full party in an adjudicatory proceeding concerning a proposed licensing action must establish that it (1) has filed a timely intervention petition or meets the standards that permit consideration of an untimely petition; (2) has standing to intervene; and (3) has proffered one or more contentions that are litigable in the proceeding. See 10 C.F.R. ss 2.714(a)(1)-(2), (b)(2). Further, the Commission ***143** has recognized that, notwithstanding a potential party's failure to meet the elements necessary to establish its standing to intervene as of right, it is possible, as a matter of discretion, to afford that participant party status. See Portland General Electric Co. (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 614-17 (1976).

RULES OF PRACTICE: INTERVENTION PETITION(S) (TIMELINESS)

Each intervention petition must be timely filed as prescribed in the notice of opportunity for hearing issued by the agency. For a petition that is not filed on time to be accepted for consideration, the participant seeking to intervene must demonstrate that a balancing of the five

factors set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v) support accepting the petition. Those factors include: (1) good cause, if any, for failure to file on time; (2) the availability of other means whereby the petitioner's interest will be protected; (3) the extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record; (4) the extent to which the petitioner's interest will be represented by existing parties; and (5) the extent to which the petitioner's participation will broaden the issues or delay the proceeding.

RULES OF PRACTICE: INTERVENTION (STANDING)

Relative to the question of standing as of right for those seeking party status, the agency has applied contemporaneous judicial standing concepts that require a participant to establish (1) it has suffered or will suffer a distinct and palpable injury that constitutes injury-in-fact within the zones of interests arguably protected by the governing statutes (e.g., the Atomic Energy Act of 1954 (AEA), the National Environmental Policy Act of 1969 (NEPA)); (2) the injury is fairly traceable to the challenged action; and (3) the injury is likely to be redressed by a favorable decision. See Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-96-1, 43 NRC 1, 6 (1996). Further, when an entity seeks to intervene on behalf of its members, that entity must show it has an individual member who can fulfill all the necessary elements and who has authorized the entity to represent his or her interests.

RULES OF PRACTICE: STANDING TO INTERVENE (UNCONTESTED; CONSTRUCTION OF PETITION)

****2** In assessing a petition to determine whether the requisite standing elements are met, which the presiding officer must do even though there are no objections ***144** to a petitioner's standing, the Commission has indicated that a presiding officer is to "construe the petition in favor of the petitioner." Georgia Institute of Technology (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 115 (1995).

RULES OF PRACTICE: INTERVENTION (DISCRETIONARY)

A petitioner can be granted party status, as a matter of discretion, based upon the presiding officer's consideration of the following factors: (a) weighing in favor of allowing intervention are (1) the extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record, (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding, and (3) the possible effect of any order which may be entered in the proceeding on the petitioner's interest; and (b) weighing against allowing intervention are (4) the availability of other means whereby petitioner's interest will be protected, (5) the extent to which the petitioner's interest will be represented by existing parties, and (6) the extent to which petitioner's participation will inappropriately broaden or delay the proceeding. Pebble Springs, CLI-76-27, 4 NRC at 616.

RULES OF PRACTICE: INTERVENTION BY A STATE; STANDING TO INTERVENE (STATE)

When the facility to be licensed is to be located on a reservation of a Native American tribe that

is wholly within the borders of a state, that state's asserted health, safety, and environmental interests relative to its citizens living, working, and traveling near the proposed facility and in connection with its property adjoining the reservation and the proposed transportation routes to the facility are sufficient to establish its standing.

RULES OF PRACTICE: INTERVENTION BY NATIVE AMERICAN TRIBE; STANDING TO INTERVENE (NATIVE AMERICAN TRIBE)

Assertion of standing based on general interests of one Native American tribe or its members in vast "aboriginal lands" that encompass tribe's existing reservation and reservation of second tribe on which facility to be licensed is to be built is inconsistent with the congressionally recognized status of the two tribes as distinct entities with separate reservations some 75 miles apart. Standing for the first tribe must, therefore, be established based on contacts of individual tribal members with the reservation of second tribe where the facility is to be located.

*145 RULES OF PRACTICE: STANDING TO INTERVENE (INJURY IN FACT)

Assertion that individual engages in activities in "the vicinity" of the location of the facility to be licensed is too general to provide him with standing as of right individually or in a representational capacity. See Atlas Corp. (Moab, Utah Facility), LBP-97-9, 45 NRC 414, 426-27 (description of activities as "near," in "close proximity," or "in the vicinity" of facility in question insufficient to establish standing), aff'd, CLI-97-8, 46 NRC 21 (1997).

RULES OF PRACTICE: STANDING TO INTERVENE

**3 Standing under 10 C.F.R. s 2.714 is not predicated on whether a petitioner wishes to take a position for or against a pending licensing application. Rather, it turns on the petitioner's ability to show that it has one or more cognizable interests that will be adversely impacted if the proceeding has one outcome rather than another. See Nuclear Engineering Co. (Sheffield, Illinois, Low-Level Radioactive Waste Disposal Site), ALAB-473, 7 NRC 737, 743 (1978).

RULES OF PRACTICE: DISCRETIONARY INTERVENTION (LATE-FILED PETITION; TIMELINESS)

Nothing in the general terms of 10 C.F.R. s 2.714 governing intervention petitions exempts a discretionary intervention request from its late-filing provisions.

RULES OF PRACTICE: UNTIMELY INTERVENTION PETITIONS (GOOD CAUSE FOR LATE FILING)

Under factor one of the five-factor late intervention balancing test in 10 C.F.R. s 2.714(a)(1), an attempt to justify late filing as a reasonable failure to anticipate that a state's university community would not be willing to discuss the scientific merits of a proposed instate facility does not account for the precept that the failure of some other group to "carry the ball" does not constitute good cause for late filing. See Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Units 1 and 2), CLI-88-12, 28 NRC 605, 609 (1988), reconsideration denied on

other grounds, CLI-89-6, 29 NRC 348 (1989), aff'd, Citizens for Fair Utility Regulation v. NRC, 898 F.2d 51 (5th Cir.), cert. denied, 498 U.S. 896 (1990).

*146 RULES OF PRACTICE: UNTIMELY INTERVENTION PETITIONS (LACK OF GOOD CAUSE FOR LATE FILING)

When lacking good cause for late filing under factor one of the five-factor late intervention balancing test set forth in 10 C.F.R. s 2.714(a)(1), a petitioner must make a particularly strong showing on the other four factors. See, e.g., Duke Power Co. (Perkins Nuclear Station, Units 1, 2, and 3), ALAB- 431, 6 NRC 460, 462 (1977) (citing cases).

RULES OF PRACTICE: UNTIMELY INTERVENTION PETITIONS (OTHER MEANS TO PROTECT PETITIONER'S INTERESTS)

Ability to file 10 C.F.R. s 2.715(a) limited appearance statements or otherwise provide a group's expertise to other participants generally is not pertinent under factor two of five-factor late intervention balancing test set forth in 10 C.F.R. s 2.174(a)(1) because it gives insufficient regard to the value of adjudicatory participation rights. See Duke Power Co. (Amendment to Materials License SNM-1773--Transportation of Spent Fuel from Oconee Nuclear Station for Storage at McGuire Nuclear Station), ALAB-528, 9 NRC 146, 150 & n. 7 (1979).

RULES OF PRACTICE: UNTIMELY INTERVENTION PETITIONS (ADEQUACY OF EXISTING REPRESENTATION)

Under factor four of the five-factor late intervention balancing test set forth in 10 C.F.R. s 2.714(a)(1), NRC Staff interests generally are assumed not to be coextensive with those of a private petitioner. See Washington Public Power Supply System (WPPSS Nuclear Project No. 3), ALAB-747, 18 NRC 1167, 1174- 75 & n. 22 (1983).

RULES OF PRACTICE: UNTIMELY INTERVENTION PETITIONS

**4 In the five-factor balancing test for late intervention petitions under 10 C.F.R. s 2714(a)(1), factor two--other means to protect petitioner's interests--and factor four--adequacy of existing representation--are accorded less significance in the balance. See Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Unit 2), CLI-93-4, 37 NRC 156, 165 (1993).

RULES OF PRACTICE: STANDING TO INTERVENE (INJURY IN FACT; ZONE OF INTERESTS)

Interest in presenting "sound science" to presiding officer is laudable, but provides no basis for standing either as an interest cognizable for standing *147 purposes or as one that will be the subject of actual or imminent injury upon the grant or denial of a license. See Sheffield, ALAB-473, 7 NRC at 743 (legal and nuclear organizations seeking to support low-level waste site renewal application lack standing because no showing that granting or denying application would injure any cognizable interest of either organization or its members); Allied-General Nuclear Services (Barnwell Fuel Receiving and Storage Station), ALAB-328, 3 NRC 420, 422

(1976) (when no showing of injury to cognizable interests of its individual members by licensing action, asserted ability of civil liberties organization and its members to provide information and data on civil rights issues inadequate to provide basis for standing).

RULES OF PRACTICE: INTERVENTION (DISCRETIONARY)

Of the six Pebble Springs factors for assessing a discretionary intervention request, factors one, four, five, and six are basically coextensive with the last four factors of the late-filing standard of 10 C.F.R. s 2.714(a)(1), with Pebble Springs factor one--assistance in developing a sound record--having significant sway. See Pebble Springs, CLI-76-27, 4 NRC at 616-17.

RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY; SPECIFICITY AND BASIS)

For a proffered legal or factual contention to be admissible, it must be pled with specificity. In addition, the contention's sponsor must provide (1) a brief explanation of the bases for the contention; (2) a concise statement of the alleged facts or expert opinion that will be relied on to prove the contention, together with the source references that will be relied on to establish those facts or opinion; and (3) sufficient information to show there is a genuine dispute with the applicant on a material issue of law or fact, which must include (a) references to the specific portions of the application (including the accompanying environmental and safety reports) that are disputed and the supporting reasons for the dispute, or (b) the identification of any purported failure of the application to contain information on a relevant matter as required by law and reasons supporting the deficiency allegation. See 10 C.F.R. s 2.714(b)(2)(i)-(iii). A contention that fails to meet any one of these standards must be dismissed, as must a contention that, even if proven, would be of no consequence because it would not entitle a petitioner to any relief. See id. s 2.714(d)(2).

*148 RULES OF PRACTICE: CONTENTIONS (ACCEPTANCE WHERE SUBJECT TO PENDING RULEMAKING; CHALLENGE OF COMMISSION RULE)

**5 An adjudication is not the proper forum for challenging applicable statutory requirements or the basic structure of the agency's regulatory process. Philadelphia Electric Co. (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20, aff'd in part on other grounds, CLI-74-32, 8 AEC 217 (1974). Similarly, a contention that attacks a Commission rule, or which seeks to litigate a matter that is, or clearly is about to become, the subject of a rulemaking, is inadmissible. See 10 C.F.R. s 2.758; Potomac Electric Power Co. (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 AEC 79, 85, 89 (1974). This includes contentions that advocate stricter requirements than agency rules impose or that otherwise seek to litigate a generic determination established by a Commission rulemaking. See Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), LBP-93-1, 37 NRC 5, 29-30 (1993); Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-82-106, 16 NRC 1649, 1656 (1982); see also Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-96-7, 43 NRC 235, 251 (1996); Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), LBP-91-19, 33 NRC 397, 410, aff'd in part and rev'd in part on other grounds, CLI-91-12, 34 NRC 149 (1991). By the same token, a contention that simply states the petitioner's views about what regulatory policy should be does not present a

litigable issue. See Peach Bottom, ALAB-216, 8 AEC at 20-21 & n. 33.

RULES OF PRACTICE: CONTENTIONS (SCOPE OF PROCEEDING)

The scope of an adjudicatory proceeding is specified by the notice of hearing/opportunity for hearing and contentions that deal with matters outside that defined scope must be rejected. See, e.g., Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-316, 3 NRC 167, 170-71 (1976); Portland General Electric Co. (Trojan Nuclear Plant), ALAB-534, 9 NRC 287, 289 n. 6 (1979).

RULES OF PRACTICE: CONTENTIONS (MATERIALITY)

Any issues of law or fact raised in a contention must be material to the grant or denial of the license application in question, i.e., they must make a difference in the outcome of the licensing proceeding so as to entitle the petitioner to cognizable relief. See 10 C.F.R. s 2.714(d)(2)(ii); 54 Fed.Reg. 33,168, 33,172 ***149** (1989). This requirement of materiality embodies the notion that an alleged error or deficiency regarding a proposed licensing action must have some significance relative to the agency's general responsibility and authority to protect the public health and safety and the environment. See Seabrook, LBP-82-106, 16 NRC at 1656 (safety contention "must either allege with particularity that an applicant is not complying with a specified [safety] regulation, or allege with particularity the existence and detail of a substantial safety issue on which the regulations are silent" (footnote omitted)); see also Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), LBP-82-116, 16 NRC 1937, 1946 (1982).

RULES OF PRACTICE: CONTENTIONS (SUPPORTING INFORMATION OR EXPERT OPINION)

****6** The bald assertion that a matter ought to be considered or that a factual dispute exists so as to merit further consideration of a matter is not sufficient. See Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 NRC 200, 246 (1993), review declined, CLI- 94-2, 39 NRC 91 (1994); see also Connecticut Bankers Ass'n v. Board of Governors, 627 F.2d 245, 251 (D.C.Cir.1980). Nor does mere speculation provide an adequate basis for a contention. See Yankee Nuclear, CLI-96-7, 43 NRC at 267. Instead, a petitioner must provide documents or other factual information or expert opinion that set forth the necessary technical analysis to show why the proffered bases support its contention. See Georgia Institute of Technology (Georgia Tech Research Reactor, Atlanta, Georgia), LBP-95-6, 41 NRC 281, 305, vacated in part and remanded on other grounds, CLI-95-10, 42 NRC 1, aff'd in part, CLI-95-12, 42 NRC 111 (1995).

RULES OF PRACTICE: CONTENTIONS (SUPPORTING INFORMATION OR EXPERT OPINION)

With respect to documentary or other factual information or expert opinion alleged to provide the basis for a contention, the Board is not to accept uncritically the assertion that a document or other factual information or an expert opinion supplies the basis for a contention. In the case of a document, the Board should review the information provided to ensure that it does indeed supply

a basis for the contention. See Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-919, 30 NRC 29, 48 (1989), vacated in part on other grounds and remanded, CLI-90-4, 31 NRC 333 (1990); see also Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-89- 3, 29 NRC 234, 241 (1989) ("where a contention is based on a factual underpinning in a document that has been essentially repudiated by the ***150** source of that document, the contention may be dismissed unless the intervenor offers another independent source"); Yankee Nuclear, LBP-96-2, 43 NRC at 90 ("[a] document put forth by an intervenor as the basis for a contention is subject to scrutiny both for what it does and does not show"). By the same token, an expert opinion that merely states a conclusion (e.g., the application is "deficient," "inadequate," or "wrong") without providing a reasoned basis or explanation for that conclusion is inadequate because it deprives the Board of the ability to make the necessary, reflective assessment of the opinion as it is alleged to provide a basis for the contention.

RULES OF PRACTICE: CONTENTIONS (CHALLENGE TO LICENSE APPLICATION)

In framing contentions regarding a proposed licensing action, the focus of a petitioner's concern should be the license application. See 10 C.F.R. s 2.714(b)(2)(iii). In this regard, a contention that fails directly to controvert the license application at issue or that mistakenly asserts the application does not address a relevant issue is subject to dismissal. See Rancho Seco, LBP-93-23, 38 NRC at 247-48; Georgia Power Co. (Vogtle Electric Generating Plant, Units 1 and 2), LBP-91-21, 33 NRC 419, 424 (1991), appeal dismissed, CLI-92-3, 35 NRC 63 (1992).

RULES OF PRACTICE: CONTENTIONS (SCOPE)

****7** Although licensing boards generally are to litigate "contentions" rather than "bases," it has been recognized that "[t]he reach of a contention necessarily hinges upon its terms coupled with its stated bases." See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-899, 28 NRC 93, 97 (1988).

RULES OF PRACTICE: CONTENTIONS (INCORPORATION BY REFERENCE)

Incorporation by reference of one or more of the contentions of other petitioners is permitted in agency proceedings, albeit subject to the five late-filing factors set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v) if adoption by reference is sought after the time for filing contentions has expired.

***151** RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS

As set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v), the factors that must be balanced in determining whether to admit a late-filed contention are (1) good cause, if any, for failure to file on time; (2) the availability of other means whereby the petitioner's interest will be protected; (3) the extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record; (4) the extent to which the petitioner's interest will be represented by existing parties; (5) the extent to which the petitioner's participation will broaden the issues or delay the proceeding. See, e.g., Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17

NRC 1041, 1046-47 (1983).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (GOOD CAUSE FOR DELAY)

Relative to the first factor set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v) that must be balanced in determining whether to admit a late-filed contention, unavailability of proprietary documents does not provide good cause for delay in filing a contention when review of nonproprietary materials timely available indicates proprietary information was not necessary to the development of the late-filed contention. See Catawba, CLI-83-19, 17 NRC at 1043, 1045 (if contention's factual predicate otherwise available, unavailability of document does not constitute good cause for late filing); see also Yankee Atomic Electric Co. (Yankee Nuclear Power Station), LBP-96-15, 44 NRC 8, 26 (1996); Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), LBP-83- 39, 18 NRC 67, 69 (1983).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (GOOD CAUSE FOR DELAY; OTHER MEANS AND OTHER PARTIES TO PROTECT INTERVENORS' INTERESTS)

Relative to the first factor set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v) that must be balanced in determining whether to admit a late-filed contention, lacking good cause for delay in filing a contention, a petitioner must make a compelling showing on the other four factors. See Commonwealth Edison Co. (Braidwood Nuclear Power Station, Units 1 and 2), CLI-86-8, 23 NRC 241, 244 (1986). Factors two--no other means to protect the petitioner's interests in the contentions--and four--extent to which other parties can represent those interests--are, however, to be accorded less weight than factors three and five. See id. at 245.

***152** RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTION (SOUND RECORD DEVELOPMENT)

****8** Relative to the five factors set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v) that must be balanced in determining whether to admit a late-filed contention, in connection with factor three--sound record development--the Commission has directed that the proponent of a late-filed contention should, with as much particularity as possible, " 'identify its prospective witnesses, and summarize their proposed testimony.' " Id. at 246 (quoting Mississippi Power and Light Co. (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-704, 16 NRC 1725, 1730 (1982)).

RULES OF PRACTICE: WAIVER OF RULES OR REGULATIONS

The standard for seeking a waiver of a rule or regulation in an adjudication is set forth in 10 C.F.R. s 2.758(b), which provides:

The sole ground for petition for waiver or exception shall be that special circumstances with respect to the subject matter of the particular proceeding are such that the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted.

Procedurally, section 2.758(b) requires that the petition must be accompanied by an affidavit (1) identifying the specific aspect or aspects of the subject matter of the proceeding as to which the application of the rule would not serve the purposes for which it was adopted, and (2) setting forth with particularity the "special circumstances" alleged to justify the waiver or exception requested.

RULES OF PRACTICE: WAIVER OF RULES OR REGULATIONS

Paragraphs (c) and (d) of section 2.758 state that a party's failure to make a prima facie showing on the section 2.758(b) rule waiver standard precludes further consideration of the matter, while a presiding officer that finds a prima facie showing has been made must certify the petition to the Commission for its consideration.

RULES OF PRACTICE: WAIVER OF RULES OR REGULATIONS (SPECIAL CIRCUMSTANCES)

In connection with a 10 C.F.R. s 2.758 rule waiver petition, a petitioner seeking to establish a prima facie case that "special circumstances" exist such that the rule would not serve the purposes for which it was adopted must make three showings. First, relative to establishing the requisite "special ***153** circumstances" exist to support the waiver, the petitioner must allege facts not in common with a large class of facilities that were not considered, either explicitly or by necessary implication, in the rulemaking proceeding for the rule sought to be waived. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-89-20, 30 NRC 231, 235 (1989). Put another way, the circumstances alleged must be unique to the particular facility at issue. See Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-653, 16 NRC 55, 72-74 (1981). Speculation about future events is, however, an inadequate basis to establish the necessary "special circumstances." See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-895, 28 NRC 7, 24-26, rev'd in part on other grounds, CLI- 88-10, 28 NRC 573 (1988).

RULES OF PRACTICE: WAIVER OF RULES OR REGULATIONS (SPECIAL CIRCUMSTANCES)

****9** Also with respect to the need to demonstrate "special circumstances" in requesting a rule waiver pursuant to 10 C.F.R. s 2.758, the petitioner must show application of the rule will not serve the purposes for which it was adopted. See Seabrook, CLI-89-20, 30 NRC at 235. Explicit statements in the statement of considerations are a primary source for determining the purposes for which the rule or regulation was adopted. See, e.g., Seabrook, CLI-88-10, 28 NRC at 598-600; Seabrook, ALAB-895, 28 NRC at 12. Further, in ascertaining a rule's purposes and whether those purposes would be impaired, it is permissible to consider future events the agency logically would have anticipated in promulgating its rules. See Houston Lighting and Power Co. (South Texas Project, Units 1 and 2), LBP-83-37, 18 NRC 52, 59 (1983). On the other hand, in seeking to establish that the rationale for the rule has been undercut, conjectural statements that merely highlight the uncertainty surrounding future events are not, in and of themselves, sufficient. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-89-10, 29 NRC 297, 301, rev'd, ALAB-920, 30 NRC 121, rev'd, CLI-89-20, 30 NRC 231

(1989). Moreover, it has been established that a valid purpose for which the rule or regulation was adopted, within the meaning of 10 C.F.R. s 2.758, includes eliminating Staff case-by-case review of a generic issue in individual applications and removing such an issue from adjudication in any operating license proceeding. See Seabrook, ALAB-895, 28 NRC at 14, 16-17; see also Carolina Power and Light Co. (Shearon Harris Nuclear Power Plant), ALAB-837, 23 NRC 525, 547 (1986).

***154** RULES OF PRACTICE: WAIVER OF RULES OR REGULATIONS (SIGNIFICANT SAFETY PROBLEM)

The third showing that must be made by a 10 C.F.R. s 2.758 rule waiver petition is that the circumstances involved are "unusual and compelling" such that it is evident from the petition and other allowed papers that a waiver is necessary to address the merits of a "significant safety problem" relative to the rule at issue. Seabrook, CLI-89-20, 30 NRC at 235. Justifying a waiver, therefore, requires that a petitioner establish the issue raised is a significant safety problem, even if there clearly are special circumstances that undercut the rationale for the rule. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-920, 30 NRC 121, 129 (1989). Safety issues that are "conceivable" or "theoretical" do not fulfill this requirement, however. See Seabrook, CLI-89-20, 30 NRC at 243-44. Further, any claim of significance must be viewed in the context of any other protective measures that are in place to prevent safety problems. See id. at 244.

LICENSING BOARD(S): DISCRETION IN MANAGING PROCEEDING (LEAD INTERVENORS OR PARTIES)

RULES OF PRACTICE: INTERVENTION (LEAD INTERVENORS OR PARTIES)

In accordance with 10 C.F.R. s 2.714(f)-(g), a presiding officer is authorized to control the general compass of the hearing by consolidating issues and limiting party participation to avoid the presentation of irrelevant, duplicative, or repetitive evidence. When some of a petitioner's admitted contentions challenging an application have been adopted by other intervenors, other contentions proposed by different parties challenging the application have been consolidated because of their related subject matter, and one of the parties has filed a single contention expressing general support for the application, it is appropriate to designate "lead" parties for the litigation of the various admitted contentions.

RULES OF PRACTICE: INTERVENTION (LEAD INTERVENORS OR PARTIES)

****10** The party assigned the role of lead party has primary responsibility for litigating a contention. Absent some other presiding officer directive, the party with the lead role in support of a contention is to conduct all discovery on the contention; file or respond to any dispositive or other motions regarding the contention; submit any required prehearing briefs on the issue; prepare prefiled direct testimony, conduct any redirect examination, and provide any surrebuttal ***155** testimony regarding the contention; and prepare posthearing proposed findings of fact and conclusions of law on the contention. The party that has the lead role in opposing a contention has similar duties, with its hearing responsibilities including conducting witness cross-

examination and recross-examination and preparing rebuttal testimony as appropriate. For any given contention, the lead party is responsible for consulting with the other "involved" parties (i.e., any party that adopted its contention, filed a contention that has been consolidated, or has opposed the same contention) regarding litigation activities, but the ultimate litigating responsibility for the contention rests with the lead party.

RULES OF PRACTICE: DISCOVERY (INFORMAL DISCOVERY)

During an informal discovery process that includes the exchange of relevant documents and interviews with individuals with relevant information, parties are expected to be specific in their information requests and provide access to requested information and knowledgeable individuals to the maximum degree possible. Failure to participate in the informal discovery process consistent with the presiding officer's directives may result in appropriate Board sanctions.

***156** MEMORANDUM AND ORDER

(Rulings on Standing, Contentions, Rule Waiver Petition, and Procedural/Administrative Matters)

Responding to a July 21, 1997 notice of opportunity for a hearing, 62 Fed.Reg. 41,099 (1997), the State of Utah (State or Utah); three Native American entities, Ohngo Gaudadeh Devia (OGD), Confederated Tribes of the Goshute Reservation (Confederated Tribes), and Skull Valley Band of Goshute Indians (Skull Valley Band); three ranching, farming, and land investment companies, Castle Rock Land and Livestock, L.C. (Castle Rock Land), Skull Valley Co., Ltd. (Skull Valley), and Ensign Ranches of Utah, L.C. (Ensign Ranches); and one Native American individual, Confederated Tribes Chairman David Pete ***157** have filed five separate timely hearing requests/petitions to intervene that are before the Licensing Board. In addition, pending with the Board is a late-filed intervention petition submitted by the group Scientists for Secure Waste Storage (SSWS). Each Petitioner seeks to be heard on a variety of issues in connection with the June 1997 application of Private Fuel Storage, L.L.C. (PFS), for a license under 10 C.F.R. Part 72 to possess and store spent nuclear reactor fuel in an independent spent fuel storage installation (ISFSI) located on the Skull Valley Goshute Indian Reservation in Skull Valley, Utah. In addition, Petitioners Castle Rock Land/Skull Valley/Ensign Ranches have invoked the provisions of 10 C.F.R. s 2.758 seeking a waiver of the application of the Commission's rules under (1) 10 C.F.R. Part 72, as it might be applicable to the proposed PFS ISFSI facility; and (2) 10 C.F.R. s 51.23, as that rule (i) makes a generic finding of Commission confidence that a repository will be built and available to accept high-level nuclear waste (HLW) in the first quarter of the next century, and (ii) excuses the need for any discussion of ISFSI spent fuel environmental impacts following the term of the ISFSI license.
****11** For the reasons set forth below, we find Petitioners State, Castle Rock Land/Skull Valley, OGD, Confederated Tribes, and Skull Valley Band have established their standing to intervene. In addition, each of these Petitioners has presented at least one admissible contention concerning the PFS application. We thus admit these Petitioners as parties to this proceeding. On the other hand, as is explained below, Petitioners Pete and SSWS have failed to establish their standing to intervene while Ensign Ranches, although having standing, lacks an admissible contention. We therefore deny these participants' hearing requests/intervention petitions. We also conclude that,

having failed to establish a basis for waiver of 10 C.F.R. Part 72 or 10 C.F.R. s 51.23, the section 2.758 petition of Intervenors Castle Rock Land/Skull Valley/Ensign Ranches must be denied. Finally, we outline certain procedural and administrative rulings, including the designation of "lead" parties and the use of informal discovery, that will apply to the litigation of the parties' admitted contentions.

I. BACKGROUND

A. The PFS Application and Proposed ISFSI

To obtain a 20-year Part 72 license for its proposed ISFSI, in June 1997 PFS filed with the agency an application consisting of, among other things, a safety analysis report (SAR), an environmental report (ER), an emergency plan (EP), a physical security plan (PSP), and a preliminary decommissioning plan (PDP). According to its application, PFS is a limited liability corporation owned by eight American utilities. Each of these utilities has one or more operating nuclear facilities. PFS intends to obtain the funds necessary to construct, operate, ***158** and decommission the Skull Valley ISFSI through equity contributions from its owners, preshipment customer payments pursuant to service agreements that commit PFS to store customer spent fuel, and annual storage fee payments under those service agreements. See [PFS], License Application [for] Private Fuel Storage Facility at 1-1 to -4, 3-1 (rev. 0 June 1997) [hereinafter License Application].

The application also indicates that the ISFSI, which is to be on a one-quarter mile square site leased by PFS from the Skull Valley Band, will be used for aboveground dry cask storage of up to 40,000 metric tons uranium (MTU) of spent nuclear fuel from commercial nuclear plants in the United States. The spent fuel is to be loaded into canisters at the originating reactors, which are then welded shut and placed into shipping casks for transport to Utah by rail. Because the PFS facility is located some 25 miles from the existing main rail line, the shipping casks containing the canisters would be moved to the PFS facility either by truck or a newly constructed rail spur. Once at the PFS site, the canisters would be removed from the shipping casks and placed in storage casks that would be placed vertically on concrete pads in a protected area at the site. See id. at 1-1 to -4, 3-1 to -2.

B. Timely Hearing Requests/Intervention Petitions

****12** In response to the NRC Staff's July 1997 notice of opportunity for a hearing regarding this application, a number of petitioners filed requests for hearings and petitions to intervene asking that they be made a party to any adjudicatory proceeding conducted in connection with the application. First filed was the joint request of the Confederated Tribes, which seeks to intervene either as a party under 10 C.F.R. s 2.714(a) or as an interested governmental entity under section 2.715(c), and Tribal Chairman Pete, who appears both as a tribal leader and in his individual capacity. See Request for Hearing and Petition to Intervene of the Confederated Tribes of the Goshute Reservation and David Pete (Aug. 29, 1997) [hereinafter Confederated Tribes/Pete Petition]. The Confederated Tribes/Pete oppose granting the application.

Thereafter, the State, which seeks either party or interested governmental entity status, and three ranching, farming, and land investment companies, Castle Rock Land, Skull Valley, and Ensign Ranches (collectively Castle Rock), submitted hearing requests. See [State] Request for Hearing

and Petition for Leave to Intervene (Sept. 11, 1997) [hereinafter State Petition]; [Castle Rock] Request for Hearing and Petition to Intervene (Sept. 11, 1997) [hereinafter Castle Rock Petition]. The State and Castle Rock oppose the application as well.

Also seeking party status under section 2.714(a) are the Skull Valley Band and OGD. See Verified Petition for Leave to Intervene (Sept. 12, 1997) [hereinafter Skull Valley Band Petition]; [OGD] Request for Hearing and Petition to ***159** Intervene (Sept. 12, 1997) [hereinafter OGD Petition]. The Skull Valley Band is a federally recognized Indian tribe that leased tribal land to PFS for construction and operation of the proposed ISFSI. It supports the PFS application. OGD, on the other hand, is an organization that consists primarily of members of the Skull Valley Band who oppose the PFS application and its plan to construct and operate an ISFSI on reservation land.

In response to the Confederated Tribes/Pete petition, both Applicant PFS and the NRC Staff filed pleadings contesting both the standing of the Confederated Tribes and Mr. Pete to intervene as parties and the Confederated Tribes' purported status as an interested governmental entity. See Applicant's Answer to Request for Hearing and Petition to Intervene of [Confederated Tribes/Pete] (Sept. 15, 1997) [hereinafter PFS Confederated Tribes/Pete Petition Response]; NRC Staff's Response to Request for Hearing and Petition to Intervene Filed by [Confederated Tribes/Pete] (Sept. 18, 1997) [hereinafter Staff Confederated Tribes/Pete Petition Response]. In contrast, both PFS and the Staff did not contest the standing of the State, Castle Rock, OGD, and the Skull Valley Band to intervene as parties, and the Applicant asserted the Skull Valley Band also would qualify as an interested governmental entity. See Applicant's Answer to Request for Hearing and Petition to Intervene of [Utah] (Sept. 26, 1997) [hereinafter PFS State Petition Response]; Applicant's Answer to Request for Hearing and Petition to Intervene of [Castle Rock] (Sept. 26, 1997) [hereinafter PFS Castle Rock Petition Response]; Applicant's Answer to Request for Hearing and Petition to Intervene of [OGD] (Sept. 26, 1997) [hereinafter PFS OGD Petition Response]; Applicant's Answer to Petition to Intervene of [Skull Valley Band] (Sept. 29, 1997) [hereinafter PFS Skull Valley Band Petition Response]; NRC Staff's Status Report and Response to Requests for Hearing and Petitions to Intervene Filed by (1) [Utah], (2) [Skull Valley Band], (3) [OGD], (4) [Castle Rock] (Oct. 1, 1997) [hereinafter Staff Hearing Petitions Response]. Both PFS and the Staff made the point, however, that these Petitioners must present litigable contentions in order to be admitted as parties.

C. Supplements to Timely Hearing Requests/Intervention Petitions

1. Schedule for Filing Supplements

****13** In this connection, in an initial prehearing order issued September 23, 1997, the Licensing Board established an October 1997 date for these Petitioners to file supplements to their hearing/intervention requests that would include their contentions, with supporting bases. That directive also established a tentative schedule for a Board visit to the Applicant's proposed ISFSI site and a prehearing conference to entertain participant presentations on whether the Petitioners have proffered information sufficient to establish they have standing and admissible ***160** contentions. See Licensing Board Memorandum and Order (Initial Prehearing Order) (Sept. 23, 1997) (unpublished). Within a week, however, the State filed two motions seeking to delay or suspend this schedule. In one, Utah asked that we suspend this proceeding pending the establishment of a local public document room (LPDR) and the Applicant's submission of a

"complete" application. See [Utah] Motion to Suspend Licensing Proceedings Pending Establishment of a[n LPDR] and Applicant's Submission of a Substantially Complete Application, and Request for Re-notice of Construction Permit/Operating License Application (Oct. 1, 1997). Petitioners Confederated Tribes/Pete, OGD, and Castle Rock supported both State motions. In the other motion, the State asked that the time for filing hearing request/intervention supplements be extended by 45 days. See [State] Motion for Extension of Time to File Contentions (Oct. 1, 1997).

Applicant PFS and Petitioner Skull Valley Band opposed the State's motions. The Staff opposed the State's suspension motion, but declared it had no objection to a 30-day extension of time for the filing of contentions. In an October 17, 1997 ruling, the Board denied the State's suspension request, but provided an additional 30 days to file intervention petition supplements, including contentions and supporting bases. See Licensing Board Memorandum and Order (Ruling on Motions to Suspend Proceeding and for Extension of Time to File Contentions) (Oct. 17, 1997) (unpublished). Thereafter, the Board rescheduled the site visit and prehearing conference for the week of January 26, 1998.

Then, 10 days before its petition supplement was due, the State filed a motion for a protective order to gain access to the Applicant's physical security plan and to extend the time for filing contentions relating to that plan. See [State] Motion for a Protective Order to Review and File Contentions on the Applicant's [PSP] (Nov. 14, 1997). Both PFS and the Staff filed responses declaring they had no objection to the State's protective order request. In a November 21 issuance, the Board granted the State's requests for a protective order and an extension of the filing deadline for security plan-related contentions. See Licensing Board Memorandum and Order (Ruling on [State] Motion for Protective Order) (Nov. 21, 1997) (unpublished). After obtaining a proposed order from the participants, the Board issued the protective order on December 17, 1997. See Licensing Board Memorandum and Order (Protective Order and Schedule for Filing Security Plan Contentions) (Dec. 17, 1997) (unpublished); see also Licensing Board Memorandum and Order (Protective Order Amendment) (Dec. 22, 1997) (unpublished); Licensing Board Memorandum and Order (Additional Amendments to Protective Order) (Dec. 23, 1997) (unpublished).

2. Supplemental Filings

****14** Petitioners OGD and Castle Rock filed their supplemental petition with contentions on November 24, 1997. See [OGD] Contentions Regarding the Materials ***161** License Application of [PFS] in an [ISFSI] (Nov. 24, 1997) [hereinafter OGD Contentions]; Contentions of Petitioners [Castle Rock] on the License Application for the [PFS] Facility (Nov. 24, 1997) [hereinafter Castle Rock Contentions]. In the Castle Rock filing, Petitioner Ensign Ranches indicated it was only joining in the first five contentions. See Castle Rock Contentions at 1. That same date, the State filed its non-security plan-related contentions. See [State] Contentions on the Construction and Operating License Application by [PFS] for an [ISFSI] (Nov. 24, 1997) [hereinafter State Contentions]. Petitioners Confederated Tribes/Pete filed an initial supplement on October 15 in which they addressed the standing aspects of their petition, with a second filing on November 24 that presented their contentions. See Supplemental Memorandum in Support of the Petition of [Confederated Tribes/Pete] to Intervene and for a Hearing (Oct. 15, 1997) [hereinafter Confederated Tribes/Pete First Supplemental Memorandum]; Statement of Contentions on Behalf of [Confederated Tribes/Pete] (Nov. 24, 1997) [hereinafter Confederated

Tribes/Pete Contentions]. Likewise, the Skull Valley Band submitted a supplemental petition setting forth its sole contention in support of the facility application. See Supplemental Petition to Intervene (Nov. 24, 1997) [hereinafter Skull Valley Band Contention].

This was not the end of the Petitioners' standing and contention-related pleadings, however. On December 23, 1997, the State filed a request to accept two late-filed contentions asserted to deal with proprietary material on cask seismic stability and radiation shielding. See [State] Request for Consideration of Late-Filed Contentions EE and FF (Dec. 23, 1997) [hereinafter State Contentions EE and FF). Six days later, Confederated Tribes/Pete filed a second supplemental memorandum on the matter of standing. See Further Supplemental Memorandum in Support of the Petition of [Confederated Tribes/Pete] to Intervene and for a Hearing (Dec. 29, 1997) [hereinafter Confederated Tribes/Pete Second Supplemental Memorandum]. The State then timely filed its security plan contentions on January 3, 1998. See [State] Contentions Security-A through Security-I Based on Applicant's Confidential Safeguards Security Plan (Jan. 3, 1998). The State thereafter sought admission of an additional late-filed contention in the issue of cask seismic stability, which again was asserted to be based on proprietary information. See [State] Request for Consideration of Late-Filed Contention GG (Jan. 8, 1998) [hereinafter State Contention GG].

3. Responses to Supplemental Filings

Not unexpectedly, these pleadings were the subject of various participant responses and replies. Applicant filed responses to the various Petitioners' contentions, opposing all but two of the timely filed nonsecurity contentions submitted by the Petitioners opposing the application. See Applicant's Answer to Petitioners' Contentions (Dec. 24, 1997) [hereinafter PFS Contentions Response]; ***162** Applicant's Supplemental Answer to [State] Contentions Z to DD (Jan. 6, 1997) [hereinafter PFS Supplemental Contentions Response]. [FN1] PFS also filed responses opposing the State's security plan contentions and its three late-filed contentions. See Applicant's Answer to [State] Request for Consideration of Late Filed Contentions EE and FF (Jan. 9, 1997) [hereinafter PFS State Contentions EE and FF Response]; Applicant's Answer to [State] Contentions Security-A Through Security-I Based on Applicant's Confidential Safeguards Security Plan (Jan. 20, 1998); Applicant's Answer to [State] Request for Consideration of Late-Filed Contention GG (Jan. 20, 1998) [PFS State Contention GG Response]. Along with the Skull Valley Band, PFS also continued to oppose the admission of Petitioners Confederated Tribes/Pete based on lack of standing. See Applicant's Answer to [Confederated Tribes/Pete] Supplemental Memorandum in Support of Petition to Intervene and for a Hearing (Dec. 12, 1997) [hereinafter PFS Confederated Tribes/Pete First Supplemental Memorandum Response]; Response of [Skull Valley Band] to Further Supplemental Memorandum in Support of the Petition of [Confederated Tribes/Pete] to Intervene and for a Hearing (Jan. 13, 1998) [hereinafter Skull Valley Band Confederated Tribe/Pete Second Supplemental Memorandum Response].

****15** The Staff responded to the Petitioners' contentions as well, asserting that, with the exception of Ensign Ranches that joined only in the first five Castle Rock contentions, each had submitted at least one litigable contention. See NRC Staff's Response to Contentions Filed by (1) [State], (2) [Skull Valley Band], (3) [OGD], (4) [Castle Rock], and (5) [Confederated Tribes/Pete] (Dec. 24, 1997) [hereinafter Staff Contentions Response]. The Staff nonetheless opposed the admission of the State's three late-filed contentions and declared that only three of the State's nine security plan contentions were admissible in full or in part. See NRC Staff's

Response to [State] Request for Consideration of Late-Filed Contentions EE and FF (Jan. 9, 1998) [hereinafter Staff State Contentions EE and FF Response]; NRC Staff's Response to [State] Security Plan Contentions (Jan. 20, 1998) [hereinafter Staff State Security Plan Contentions Response]; NRC Staff's Response to [State] Request for Consideration of Late-Filed Contention GG (Jan. 20, 1998) [hereinafter Staff State Contention GG Response]. In addition, in response to the supplemental filings of Confederated Tribes/Pete regarding their standing, the Staff ultimately declared there was an adequate basis for admitting the tribe, but not Chairman Pete. See NRC Staff's Response to the Supplemental Memorandum Filed by [Confederated Tribes/Pete] in Support of Their Petition to Intervene (Dec. 23, 1997) [hereinafter Staff Confederated ***163** Tribes/Pete First Supplemental Memorandum Response]; NRC Staff's Response to "Further Supplemental Memorandum in Support of the Petition of [Confederated Tribes/Pete] to Intervene and for a Hearing" (Jan. 14, 1998) [hereinafter Staff Confederated Tribes/Pete Second Supplemental Memorandum Response].

Acting in response to requests from the State and Castle Rock Land/Skull Valley, the Licensing Board also permitted those participants to file replies to the PFS and Staff responses to their contentions. See Licensing Board Memorandum and Order (Granting Leave to File Reply Pleadings and Requesting Information) (Jan. 6, 1998) (unpublished). The State and Castle Rock made those filings on January 16, 1998. See [State] Reply to the NRC Staff's and Applicant's Response to [State] Contentions A Through DD (Jan. 16, 1997) [hereinafter State Contentions Reply]; Reply of Petitioners [Castle Rock] to the Responses of the NRC Staff and the Applicant (Jan. 16, 1998) [hereinafter Castle Rock Contentions Reply].

Finally, the State submitted a response to the contentions of OGD, Confederated Tribes/Pete, and Castle Rock in which it supported all these contentions and sought to adopt each as part of its contentions. See [State] Response to Contentions of [OGD, Confederated Tribes/Pete, and Castle Rock] (Dec. 19, 1997) [hereinafter State Adopted Contentions Response]. In response, PFS labeled this filing an unsupported attempt to submit late-filed contentions. See Applicant's Answer to [State] Late-Filed Contentions (Dec. 31, 1997) [hereinafter PFS State Adopted Contentions Response].

D. Late-Filed Intervention Request and Castle Rock Rule Waiver Petition

****16** To add to these filings, one week before the scheduled prehearing conference, and some four months after the period for filing timely intervention requests had expired, a group of individuals represented by Dr. Richard Wilson filed a petition to intervene. In that petition, which they acknowledged was untimely, they sought an opportunity to participate in support of the PFS application as of right under 10 C.F.R. s 2.714 or by means of limited appearance statements pursuant to section 2.715(a). See Letter from Richard Wilson to Secretary, U.S. Nuclear Regulatory Commission (Jan. 20, 1998) [hereinafter SSWS Late-Filed Intervention Petition]; see also Letter from Richard Wilson to Secretary, U.S. Nuclear Regulatory Commission (Jan. 22, 1998) [hereinafter SSWS Revised Intervention Petition]. Also, in the last week before the prehearing conference, Castle Rock submitted a petition pursuant to 10 C.F.R. s 2.758(b) asking for a waiver of two Commission rules: (1) 10 C.F.R. Part 72 to the extent it would permit the licensing of a privately operated ISFSI such as that proposed by PFS; and (2) 10 C.F.R. s 51.23, the so-called Waste Confidence Decision, under which the Commission has declared that, for purposes of preparing an ER and ***164** an environmental impact statement (EIS) relative to agency licensing actions, including a Part 72 ISFSI, it has made a generic

determination that a permanent repository will be built and available for HLW within the first quarter of the next century. See Petition of [Castle Rock] for Non-Application or Waiver of Commission Regulations, Rules, and General Determinations (Jan. 21, 1998) [hereinafter Castle Rock Waiver Petition].

E. Site Visit and Initial Prehearing Conference

On January 26, 1998, accompanied by representatives of the various participants, the Board took a bus tour of the eastern Tooele County, Utah area. This tour included views of or stops at various sites in and around Skull Valley the Petitioners had identified as potentially relevant to the issues in this proceeding. Among these were (1) Rowley Junction, the highway interchange at the intersection of Interstate 80 and Skull Valley Road where PFS would locate an intermodal transfer point (ITP) for transfer of waste transportation casks from the Union Pacific rail line to trucks or a railroad spur for transport south to the proposed Skull Valley ISFSI site; (2) the Skull Valley Band's reservation from along Skull Valley Road, the paved access road that runs approximately 35 miles south from Interstate 80 through the reservation and passes about 2 miles to the east of the proposed ISFSI; (3) the English Village at the United States Army's Dugway Proving Grounds, which is located 10 miles south of the Skull Valley Band's reservation near the end of Skull Valley Road; and (4) State Roads 199 and 36, which connect Skull Valley Road with Tooele, Utah, the Tooele County seat, and afford views of the United States Department of Defense Tooele Chemical Agent Disposal Facility and the Tooele Army Depot.
****17** Beginning the next day, the Board conducted a 3-day prehearing conference during which it heard oral presentations regarding the standing of Petitioners Confederated Tribes/Pete and the admissibility of most of the Petitioners' ninety or so contentions. To avoid any discussion of nonpublic safeguards or proprietary information, the Board limited presentations regarding the State's nine security plan contentions and three late-filed contentions to the issues of the expertise of the witness sponsoring the State's security plan contentions and whether the State satisfied the five late-filing standards of 10 C.F.R. s 2.714(a)(1), while permitting the State, PFS, and the Staff to make additional post-prehearing conference filings on the substance of those contentions' admissibility.

F. Post-Prehearing Conference Filings

Following the prehearing conference, pursuant to a Board directive, Dr. Wilson filed an intervention petition supplement that denominated the group of ***165** individuals he was representing as the Scientists for Secure Waste Storage and indicated at least one member resided in Salt Lake City, Utah. See Letter from Richard Wilson to Secretary, U.S. Nuclear Regulatory Commission (Feb. 2, 1998) [hereinafter SSWS First Intervention Petition Supplement]. The State, OGD, and the Staff filed responses opposing intervention by SSWS, while PFS and the Skull Valley Band submitted answers supporting its participation as of right or as a discretionary intervenor. See [State] Opposition to Amended Petition to Intervene (Feb. 13, 1998) [hereinafter State SSWS First Intervention Petition Supplement Response]; OGD's Response to Wilson/ALF Amended Petition and Order Dated 2/2/98 Allowing Participant Responses to Said Petition (Feb. 13, 1998) [hereinafter OGD SSWS First Intervention Petition Supplement Response]; NRC Staff's Response to Petition for Leave to Intervene Filed by Richard Wilson and [SSWS] (Feb. 13, 1998) [hereinafter Staff SSWS First Intervention Petition

Supplement Response]; Response of [Skull Valley Band] to Petition of [SSWS] (Feb. 13, 1998) [hereinafter Skull Valley Band SSWS First Intervention Petition Supplement Response]; Applicant's Answer to Amended Petition of [SSWS] (Feb. 13, 1998) [hereinafter PFS SSWS First Intervention Petition Supplement Response]. Thereafter, in accordance with a further Board directive, SSWS filed a final intervention petition supplement setting forth its "contentions" for litigation, which consisted of one "general" contention and a series of responses to other Petitioners' contentions. In addition, it provided further information concerning its Salt Lake City member and asserted that, if SSWS was not entitled to intervention as of right, it should be granted discretionary intervention status. See Amended and Supplemental Petition of [SSWS] to Intervene (Feb. 27, 1998) [hereinafter SSWS Second Intervention Petition Supplement]. The State and the Staff again opposed SSWS's participation, while PFS and the Skull Valley Band continued to support its admission. See [State] Response to [SSWS] Amended and Supplemental Petition to Intervene (Mar. 9, 1998) [hereinafter State SSWS Second Intervention Petition Supplement Response]; NRC Staff's Response to "Amended and Supplemental Petition of [SSWS]" (Mar. 9, 1998) [hereinafter Staff SSWS Second Intervention Petition Supplement Response]; Applicant's Answer to Amended and Supplemental Petition of [SSWS] (Mar. 9, 1998) [hereinafter PFS SSWS Second Intervention Petition Supplement Response]; [Skull Valley Band] Memorandum in Support of Petition of [SSWS] and the Atlantic Legal Foundation to Intervene (Mar. 9, 1998) [hereinafter Skull Valley Band SSWS Second Intervention Petition Supplement Response].

****18** Also following the prehearing conference, the State, PFS, and the Staff submitted a series of Board-approved pleadings concerning the admissibility of the State's nine security contentions and its three late-filed contentions. See [State] Reply to NRC Staff and Applicant's Responses to Utah's Security Plan Contentions Security-A Through Security-I (Feb. 11, 1998) [hereinafter ***166** State Security Plan Contentions Reply]; [State] Reply to the NRC Staff's and Applicant's Responses to [State] Contentions EE and GG, and Notice of Withdrawal of Contention FF (Feb. 11, 1998) [hereinafter State Contentions EE and GG Reply]; NRC Staff's Response to "[State] Reply to the NRC Staff's and Applicant's Responses to [State] Contentions EE and GG, and Notice of Withdrawal of Contention FF" (Feb. 23, 1998) [hereinafter Staff State Contentions EE and GG Surreply]; Applicant's Answer to [State] Reply Concerning Late-Filed Contentions EE and GG (Feb. 23, 1998) [hereinafter PFS State Contentions EE and GG Surreply]. These three participants also submitted responses to the Castle Rock rule waiver petition, with the State supporting the petition and PFS and the Staff opposing it. See [State] Response to [Castle Rock] Non-Application or Waiver of Commission Regulations, Rules and General Determinations (Feb. 18, 1998) [hereinafter State Castle Rock Waiver Petition Response]; Applicant's Answer to Castle Rock's Petition for Non-Application or Waiver of Commission Regulations, Rules, and General Determinations (Feb. 18, 1998) [PFS Castle Rock Waiver Petition Response]; NRC Staff's Response to Petition of [Castle Rock] for Non-Application of Commission Regulations, Rules, and General Determinations (Feb. 18, 1998) [hereinafter Staff Castle Rock Waiver Petition Response].

G. Designation of Separate Board to Consider Physical Security Contentions

On March 26, 1998, the Chief Administrative Judge issued a notice establishing a separate three-member Atomic Safety and Licensing Board to consider and rule on all matters concerning the PFS physical security plan. See 63 Fed.Reg. 15,900, 15,900 (1998). Under the terms of that

notice, this Board retains jurisdiction over all other issues relating to the PFS application. See id. State contentions Security-A through Security-I fall within the jurisdiction of the recently established PSP Board. As a consequence, that Board will rule on the admissibility of those nine contentions. [FN2]

With the materials described above before us, we turn to the questions of the intervening participants' standing, the admissibility of their proffered, non- PSP contentions, and the efficacy of the Castle Rock rule waiver petition.

*167 II. ANALYSIS

Longstanding agency practice requires that an individual, group, business entity, or governmental entity that wants to intervene "as of right" as a full party in an adjudicatory proceeding concerning a proposed licensing action must establish that it (1) has filed a timely intervention petition or meets the standards that permit consideration of an untimely petition; (2) has standing to intervene; and (3) has proffered one or more contentions that are litigable in the proceeding. See 10 C.F.R. ss 2.714(a)(1)-(2), (b)(2). Further, the Commission has recognized that, notwithstanding a potential party's failure to meet the elements necessary to establish its standing to intervene as of right, it is possible, as a matter of discretion, to afford that participant party status. See Portland General Electric Co. (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 614-17 (1976). In this instance, the different intervening participants have sought to establish they meet these requirements for party status. [FN3]

A. Late Intervention/Standing

1. Standards Governing Late Intervention and Standing

**19 At the threshold, each intervention petition must be timely filed as prescribed in the notice of opportunity for hearing issued by the agency. For a petition that is not filed on time to be accepted for consideration, the participant seeking to intervene must demonstrate that a balancing of the five factors set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v) support accepting the petition. Those factors include: (1) good cause, if any, for failure to file on time; (2) the availability of other means whereby the petitioner's interest will be protected; (3) the extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record; (4) the extent to which the petitioner's interest will be represented by existing parties; and (5) the extent to which the petitioner's participation will broaden the issues or delay the proceeding.

Relative to the question of standing as of right for those seeking party status, the agency has applied contemporaneous judicial standing concepts that *168 require a participant to establish (1) it has suffered or will suffer a distinct and palpable injury that constitutes injury-in-fact within the zones of interests arguably protected by the governing statutes (e.g., the Atomic Energy Act of 1954 (AEA), the National Environmental Policy Act of 1969 (NEPA)); (2) the injury is fairly traceable to the challenged action; and (3) the injury is likely to be redressed by a favorable decision. See Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-96-1, 43 NRC 1, 6 (1996). Further, when, as here, an entity such as the Confederated Tribes or OGD seeks to intervene on behalf of its members, that entity must show it has an individual member who can fulfill all the necessary elements and who has authorized the organization to represent his or her interests. Moreover, in assessing a petition to determine whether these elements are

met, which the Board must do even though there are no objections to a petitioner's standing, the Commission has indicated that we are to "construe the petition in favor of the petitioner." Georgia Institute of Technology (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 115 (1995).

Even if a petitioner fails to comply with these requirements to demonstrate its standing as of right, it is not necessarily deprived of the opportunity to obtain party status in an agency adjudicatory proceeding. The Commission has recognized that a petitioner can be granted party status, as a matter of discretion, based upon the presiding officer's consideration of the following factors:

(a) Weighing in favor of allowing intervention--

(1) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.

(2) The nature and extent of the petitioner's property, financial, or other interest in the proceeding.

(3) The possible effect of any order which may be entered in the proceeding on the petitioner's interest.

****20** (b) Weighing against allowing intervention--

(4) The availability of other means whereby petitioner's interest will be protected.

(5) The extent to which the petitioner's interest will be represented by existing parties.

(6) The extent to which petitioner's participation will inappropriately broaden or delay the proceeding.

Pebble Springs, CLI-76-27, 4 NRC at 616.

We apply these general guidelines in looking to each of the Petitioners' standing presentations and the argument of SSWS as to why its January 1998 petition for intervention should be accepted even though late-filed.

***169** 2. State of Utah

DISCUSSION: State Petition at 9-18; PFS State Petition Response at 1; Staff Hearing Petitions Response at 4-5.

RULING: The reservation of the Skull Valley Band upon which the PFS facility is to be constructed is located wholly within the borders of the State of Utah. The State's asserted health, safety, and environmental interests relative to its citizens living, working, and traveling near the proposed facility and in connection with its property adjoining the reservation and the proposed transportation routes to the facility are sufficient to establish its standing in this proceeding.

3. Castle Rock

DISCUSSION: Castle Rock Petition at 6-14; PFS Castle Rock Petition Response at 1; Staff Hearing Petitions Response at 4-5.

RULING: Castle Rock Land, Skull Valley, and Ensign Ranches are all business entities involved in farming and ranching in the Skull Valley area. Castle Rock owns, and Ensign Ranches leases and operates, a farm/ranch that is adjacent to the Skull Valley Band reservation less than 2000 feet from the boundary of the proposed PFS facility. Skull Valley owns, and Ensign Ranches leases and operates, a farm/ranch that is located within 4 miles of the north boundary of the Skull Valley Band reservation. These properties also are located along the

proposed road transportation route to the facility. These entities' asserted health, safety, and environmental interests relative to this property are sufficient to establish their standing in this proceeding.

4. OGD

DISCUSSION: OGD Petition at 7-17; PFS OGD Petition Response at 1; Staff Hearing Petitions Response at 4-5.
RULING: OGD is a group consisting of members of the Skull Valley Band or other Native Americans who oppose the PFS proposal. Attached to the group's petition are the affidavits of 4 members of the Skull Valley Band, each of whom states that OGD is authorized to represent his or her interests. All four reside on the Skull Valley Band reservation between 4000 feet and 2 1/2 miles from the proposed PFS facility. These individuals' asserted health, safety, and environmental interests and their agreement to permit OGD to represent their interests are sufficient to establish OGD's standing to intervene in this proceeding.

***170** 5. Confederated Tribes/Pete

****21** DISCUSSION: Confederated Tribes/Pete Petition at 5-10; PFS Confederated Tribes/Pete Petition Response at 14-20; Staff Confederated Tribes/Pete Petition Response at 8-14; Confederated Tribes/Pete First Supplemental Memorandum at 2- 5; PFS Confederated Tribes/Pete First Supplemental Memorandum Response at 4-15; Staff Confederated Tribes/Pete First Supplemental Memorandum Response at 2-9; Confederated Tribes/Pete Second Supplemental Memorandum at 1-2; Skull Valley Band Confederated Tribes/Pete Second Supplemental Memorandum Response at 1-3; Staff Confederated Tribes/Pete Second Supplemental Memorandum Response at 2-4; Tr. at 10-26.
RULING: In their initial petition, the Confederated Tribes and Mr. Pete describe the Confederated Tribes as a federally recognized sovereign entity that consists of approximately 450 members. About half its membership resides on the Tribe's reservation, which straddles the Utah/Nevada border approximately 75 miles west of their Skull Valley Band "cousins" reservation that is to be the PFS ISFSI site. Most of the remainder of Confederated Tribes members live in communities surrounding the Confederated Tribes' reservation.
In his affidavit accompanying the petition, Mr. Pete states he is Chairman of the Confederated Tribes Business Council, its governing body, and seeks admission both in his official capacity and as an individual. Mr. Pete describes a vast 7.2 million acre area that includes both the Confederated Tribes and the Skull Valley Band reservations as the Goshute's aboriginal area in which Goshutes have hunted, fished, gathered, and lived for some time. He also states that activities such as hunting, fishing, and gathering are undertaken by Confederated Tribes members, including himself, in "the vicinity" of the Skull Valley Band reservation. Confederated Tribes/Pete Petition, Affidavit in Support of Request for Hearing and Petition to Intervene of [Confederated Tribes/Pete] (Aug. 28, 1997) at 16. He asserts that his health, safety, and environmental interests as well as those of the Confederated Tribes would be adversely impacted by the planned PFS facility in Skull Valley.
In their subsequent supplemental memoranda on standing, these Petitioners provide affidavits from two additional Confederated Tribes members, Genevieve Fields and Chrissandra Reed, who describe various contacts Confederated Tribes members have with the Skull Valley Band

reservation; express concern about the health, safety, and environmental impacts of the proposed PFS facility; and authorize the Confederated Tribes and Chairman Pete to represent their interests in this proceeding. More specifically, Ms. Reed states that her 3- year-old granddaughter, who resides with her and is a member of the Confederated Tribes, visits Ms. Reed's cousins who live on the Skull Valley Band reservation approximately every other week. These visits last from one night to up to two weeks. Ms. Reed asserts that, as her granddaughter's legal guardian, ***171** she is concerned about the health and safety impacts of the facility upon her granddaughter during the child's visits. Ms. Reed further declares that she visits the Skull Valley Band reservation eight to ten times a year herself.

****22** In resolving the question of standing for Confederated Tribes and Mr. Pete, any assertion of standing based on the general interests of Confederated Tribes or its members in Goshute "aboriginal lands" is inconsistent with the congressionally recognized status of the Confederated Tribes and the Skull Valley Band as distinct entities with separate reservations. Standing must, therefore, be established based on contacts of individual Confederated Tribes members with the Skull Valley Band reservation and the PFS facility located there. Chairman Pete's assertion he engages in activities in "the vicinity" of the Skull Valley reservation is too general to provide him with standing as of right individually or in a representational capacity. [FN4] See Atlas Corp. (Moab, Utah Facility), LBP-97-9, 45 NRC 414, 426-27 (description of activities as "near," in "close proximity," or "in the vicinity" of facility in question insufficient to establish standing), aff'd, CLI-97-8, 46 NRC 21 (1997). The affidavit of Confederated Tribes member Genevieve Fields suffers from a similar deficiency because it fails to describe any recent activities she personally engages in on the Skull Valley Band reservation.

In contrast, Ms. Reed's two affidavits describe a pattern of visits onto the Skull Valley Band reservation by her and her granddaughter, for whom she acts as legal guardian, that bring one or both of them within distances of the facility we have found sufficient to provide standing for other participants. See supra p. 169. The record does contain information suggesting the visits by Ms. Reed and her granddaughter are not as frequent as she described. See PFS Confederated Tribes/Pete First Supplemental Memorandum Response, Exh. 1, at 1- 2. There also are conflicting claims about whether Ms. Reed's granddaughter will continue to visit her relatives on the Skull Valley Band reservation, albeit with the representation that such visits have not been terminated by the Skull Valley Band or any Band member. See Tr. at 23-26.

After reviewing all this information "in the light most favorable to the petitioner," we are unable to conclude that the pattern of familial association that brings Ms. Reed and her minor granddaughter onto the Skull Valley Band reservation to visit Ms. Reed's cousins has become so attenuated as to provide an insufficient basis for standing for Ms. Reed or her minor granddaughter, whose legal interests Ms. Reed represents as guardian. Having been authorized to represent Ms. Reed's interests, Confederated Tribes thus has standing to participate in this proceeding.

***172** 6. Skull Valley Band

DISCUSSION: Skull Valley Band Petition at 1-3; PFS Skull Valley Band Petition Response at 4-7; Staff Hearing Petitions Response at 4-5.

RULING: The Skull Valley Band, a federally recognized American Indian tribe, owns and will lease the land upon which the PFS facility is to be built. The Skull Valley Band's verified petition, which is signed by the three-member tribal Executive Committee that is elected by all

adult voting members of the Skull Valley Band and is authorized to conduct the tribe's daily business, declares the Band seeks to participate as a party in any proceeding that may be convened to protect its legal, health, safety, cultural, and financial interests.

**23 Standing under 10 C.F.R. s 2.714 is not predicated on the position a petitioner wishes to take vis a vis a pending licensing application. Rather, it turns on the petitioner's ability to show that it has one or more cognizable interests that will be adversely impacted if the proceeding has one outcome rather than another. See Nuclear Engineering Co. (Sheffield, Illinois, Low- Level Radioactive Waste Disposal Site), ALAB-473, 7 NRC 737, 743 (1978). In this instance, the Skull Valley Band has shown it and its members residing on the reservation have cognizable interests that will be affected adversely by one of the possible outcomes of this proceeding. The Skull Valley Band therefore has established its standing.

7. SSWS

a. Late-Filing Standards

DISCUSSION: SSWS Intervention Petition at unnumbered 1; SSWS Revised Intervention Petition at unnumbered 1; SSWS First Intervention Petition Supplement at unnumbered 1; State SSWS First Intervention Petition Supplement Response at 4-8; OGD SSWS First Intervention Petition Supplement Response at unnumbered 2; Staff SSWS First Intervention Petition Supplement Response at 4- 12; SSWS Second Intervention Petition Supplement at unnumbered 21-26; State SSWS Second Intervention Petition Supplement Response at 3-8; Skull Valley Band SSWS Second Intervention Petition Supplement Response at 5; Staff SSWS Second Intervention Petition Supplement Response at 5-9.

RULING: Of the participants now before us, only SSWS filed its intervention petition out of time. Its intervention petition was submitted more than 4 months beyond the deadline specified in the agency's July 21, 1997 notice of opportunity for hearing. See 62 Fed.Reg. at 41,099. SSWS therefore must demonstrate that a balancing of the five factors in 10 C.F.R. s 2.714(a)(1)(i)- (v) weighs in favor of permitting late filing as it seeks to intervene either as of right or a matter of *173 discretion. [FN5] For the reasons outlined below, we find SSWS has failed to meet its burden in this regard.

On the first and most important factor--good cause for filing late--SSWS fails to make a convincing showing. SSWS makes no assertions regarding the adequacy of the agency's notice. This is not surprising. Putting aside the fact that Federal Register notice generally is considered constructive notice to all residents of the United States, see 44 U.S.C. s 1508, any SSWS claim regarding a lack of actual notice would be problematic in the face of the State's showing in its

(1990).

**24 Thus lacking good cause for its late filing, SSWS must make a particularly strong showing on the other four factors. See, e.g., Duke Power Co. (Perkins Nuclear Station, Units 1, 2, and 3), ALAB-431, 6 NRC 460, 462 (1977) (citing cases). Regarding factor two--other means to protect the petitioner's interests--despite the general rule that the ability to file 10 C.F.R. s 2.715(a) limited appearance statements or otherwise provide a group's expertise to other participants is not pertinent because it gives insufficient regard to the value of adjudicatory participation rights, see Duke Power Co. (Amendment to Materials License SNM-1773--Transportation of Spent Fuel from Oconee Nuclear Station for Storage at McGuire Nuclear Station), ALAB-528, 9 NRC 146, 150 & n. 7 (1979), in this instance, as the Staff points out, the existence of those outlets has more resonance given the interests SSWS purports to champion.

As is outlined below relative to SSWS's standing, the interests of SSWS and its members are not rooted in any particular concern about the health, safety, or environmental impacts of the PFS ISFSI upon those members. Instead, theirs is an academic and professional interest in bringing to bear SSWS members' ***174** scientific expertise to assure that record development is "correct" and proceeds in a manner that does not "misrepresent and demean science and the scientific community." SSWS First Intervention Petition Supplement at unnumbered 2. So too, under factor four--the extent to which the petitioner's interest will be represented by other participants--while Staff interests generally are assumed not to be coextensive with those of a private petitioner, see Washington Public Power Supply System (WPPSS Nuclear Project No. 3), ALAB- 747, 18 NRC 1167, 1174-75 & n. 22 (1983), in this instance SSWS's interest in ensuring the Board has "an objective presentation of the scientific evidence" by those without a "financial or political interest in the outcome," SSWS Second Supplemental Petition at unnumbered 25, 28, suggests SSWS sees itself fulfilling a role that, at least in part, mirrors the Staff's general pursuits. Accordingly, these two factors, which in any event are accorded less significance in the balance, see Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Unit 2), CLI-93-4, 37 NRC 156, 165 (1993), are, at best, minor in terms of the weight they afford to the "acceptance" side of the balance.

Factor three--assistance in developing a sound record--appears initially to be the strongest item supporting late acceptance of this petition. In its "contentions" provided in its last supplemental filing, SSWS states its position with respect to a number of the pending contentions filed by other participants, identifies prospective witnesses for those issues from among its members, and provides professional qualification statements for most of those witnesses that demonstrate considerable expertise in a variety of scientific and engineering disciplines that are relevant to the issues raised in this proceeding. As the State points out, however, this SSWS showing is flawed because it all too often reflects a lack of knowledge, understanding, or concern about the particulars of the PFS application, the focal point of this proceeding. This, in turn, suggests that the group's input will not be useful in helping to resolve the issues in this proceeding, which fundamentally deal with adequacy of the PFS proposal. Thus, this factor is, at best, also minor in terms of the weight it provides in favor of accepting the petition.

**25 Finally, we look to factor five--extent to which a late petitioner's participation will broaden the issues or delay the proceeding--which, like factor three, generally is accorded more significance among the four "non-good cause" factors. At first blush, this factor too would appear to weigh in favor of accepting the late-filed application. Albeit 4 months late and filed only a week before the long-scheduled initial prehearing conference, the SSWS petition nonetheless was submitted before contentions were admitted. Consequently, the timing of the

actual litigation of this proceeding up to this point has not been substantially affected, other than the additional time it has taken this Board to rule on the SSWS petition in conjunction with those that were timely filed. Moreover, given the scope of SSWS's proffered "contentions," in which it provides its views on a ***175** number of the other Petitioners' contentions, and the group's repeated assertion it intends only to provide clarity and perspective to existing issues, its petition would not appear to "broaden" the issues, at least in the conventional sense.

At the same time, we perceive a not insubstantial risk that by the very nature of its more "academic" interest in this proceeding and its own organizational structure, SSWS will "broaden" the issues in or otherwise delay this proceeding as it goes forward. For instance, SSWS has asked to be allowed "to participate in the preparation (and peer review) of the Commission's Safety and Environmental reports to the extent consistent with this intervention." SSWS First Intervention Petition Supplement at unnumbered 3. This suggests a desire to cut a somewhat wider swath across this proceeding than simply responding to admitted contentions. SSWS also declares that in addressing any issues in the proceeding, it will prepare and circulate the proposed written comments among the twenty or so members of the group with the intent of arriving at a "group report" and circulate any oral comments by its spokesman for "subsequent checking." Id. at 1. Such "litigation by committee" could broaden or delay the proceeding by creating the potential for differing views from the same participant and by forcing the Board, if it wants the input of the "group," to set schedules that will accommodate group consultation.

Utilizing its authority to structure intervenor participation, the Board could attempt to mitigate these potential broadening and delay elements by, for instance, requiring SSWS to present only a single, organizational position under strict deadlines. But to do so may well impair SSWS's chosen "peer review" style of record development in ways that would be administratively and substantively deleterious to its stated goals. Given the uncertainty created by SSWS's own organizational structure, we conclude that factor five likewise provides little if any weight in favor of accepting the SSWS late-filed petition.

****26** Considering in sum all five factors, we find the attenuated showings under factors two, three, four, and five do not provide the type of "compelling" demonstration that is necessary to overcome the total lack of good cause for the late filing of the SSWS intervention petition. SSWS thus has failed to establish that, on balance, its late-filed intervention petition should be accepted.

b. Standing as of Right

DISCUSSION: SSWS Intervention Petition at unnumbered 2-3; SSWS Revised Intervention Petition at unnumbered 2-3; SSWS First Intervention Petition Supplement at unnumbered 2-3; State SSWS First Intervention Petition Supplement Response at 9-14; OGD SSWS First Intervention Petition Supplement Response at unnumbered 2-4; Staff SSWS First Intervention Petition Supplement Response at 16-20; State SSWS Second Intervention Petition Supplement at 8-9; Staff SSWS Second Intervention Petition Supplement Response at 9-10.

***176** RULING: Even if SSWS had established that its late-filed intervention petition should be accepted, it still would not be entitled to party status in this proceeding as of right because, as we describe below, it has failed to establish its standing to intervene.

Because it seeks representational standing, SSWS must show that one or more of its members who has authorized it to represent him or her in this proceeding has or will suffer cognizable injury in fact as a result of the proposed PFS licensing action. [FN6] Unlike the other Petitioners, however, SSWS has not alleged there is any injury in fact to any of its members by reason of

their proximity to the proposed facility. Indeed, the only PFS member listed as residing in the State of Utah lives and works in Salt Lake City, more than 50 miles from the PFS site. This is well beyond the range within which we have found impacted health, safety, or environmental interests. See supra p. 169. Nor has there been any showing that he, or any other member of SSWS, engages in recreational or other activities anywhere near the PFS site.

In fact, while expressing support for the application, SSWS has made no showing that the grant or denial of the PFS request would have any impact on any interests of its members, even financial, that are normally put forth as a basis for standing in agency proceedings. Rather, the primary interest SSWS and its members seek to espouse is the desire as "nuclear scientists and administrators" with considerable expertise and experience but without a "financial or political interest in the outcome" of this proceeding to "inform the citizens of the state [of Utah] and this licensing board" about scientific and engineering principles that may be pertinent to the matters at issue. SSWS Second Intervention Petition Supplement at unnumbered 2, 28. This interest in presenting "sound science" is laudable, but it provides no basis for SSWS's standing either as an interest cognizable for standing purposes or as one that will be the subject of actual or imminent injury upon the grant or denial of the license. See Sheffield, ALAB-473, 7 NRC at 743 (legal and nuclear organizations seeking to support low-level waste site renewal application lack standing because no showing that granting or denying application would injure any cognizable interest of either organization or its members); Allied-General Nuclear Services (Barnwell Fuel Receiving and Storage Station), ALAB-328, 3 NRC 420, 422 (1976) (when no showing of injury to cognizable interests of its individual members by licensing action, asserted ability of civil liberties organization and its members to provide information and data on civil rights issues inadequate to ***177** provide basis for standing). SSWS thus lacks standing to intervene as of right in this proceeding.

c. Discretionary Standing

****27** DISCUSSION: SSWS Intervention Petition at unnumbered 1; SSWS Revised Intervention Petition at unnumbered 1-2; SSWS First Intervention Petition Supplement at unnumbered 1-2; State SSWS First Intervention Petition Supplement Response at 15-17; OGD SSWS First Intervention Petition Supplement Response at unnumbered 4-5; Skull Valley Band SSWS First Intervention Petition Supplement Response at 3-4; PFS SSWS First Intervention Petition Supplement Response at 1- 5; SSWS Second Intervention Petition Supplement at unnumbered 26-28; State SSWS Second Intervention Petition Supplement Response at 9-12; PFS Second Intervention Petition Supplement Response at 1-9; Skull Valley Band SSWS Second Intervention Petition Supplement Response at 5; Staff SSWS Second Intervention Petition Supplement Response at 10-12.

RULING: Even without standing as of right, however, SSWS asserts it could become a party if it can fulfill the requirements for discretionary standing set out in the Commission's Pebble Springs decision. After analyzing the guidelines in that decision, we again conclude SSWS is not eligible for party status.

Of the six Pebble Springs factors for assessing a discretionary intervention request, factors one, four, five, and six are basically coextensive with last four factors of the late-filing standard of 10 C.F.R. s 2.714(a)(1), with Pebble Springs factor one--assistance in developing a sound record--having significant sway. See Pebble Springs, CLI-76-27, 4 NRC at 616-17. We assess these four individually as we did in section II.A.7.a above, likewise concluding they provide

little, if any, support for admitting SSWS as a party.

This leaves factor two--nature and extent of Petitioner's interest in the proceeding--and factor three--possible effect of any order entered on the Petitioner's interest--to be considered. In both instances, these are not positive factors relative to SSWS. As we have noted above, although expressing support for the application, the interests SSWS champions are primarily academic, tied to its concern about ensuring the dissemination of "correct" scientific and engineering information. The generalized interests of SSWS in overseeing the record simply are not of the type that support permitting discretionary intervention.

In summary, given SSWS's failure to show that its contribution to the record will be of particular value (factor one) or that its interests are of the type that this proceeding is intended to encompass or will significantly impact (factors two and three) combined with our conclusions that other means and parties may well represent and protect those interests (factors four and five) and there is the real possibility SSWS participation will inappropriately broaden or delay the ***178** proceeding (factor six), we find discretionary intervention is not appropriate in this instance. [FN7]

B. Contentions

1. Contention Admissibility Standards

a. Pleading Requirements

i. GENERAL REQUIREMENTS

****28** For a proffered legal or factual contention to be admissible, it must be pled with specificity. In addition, the contention's sponsor must provide (1) a brief explanation of the bases for the contention; (2) a concise statement of the alleged facts or expert opinion that will be relied on to prove the contention, together with the source references that will be relied on to establish those facts or opinion; and (3) sufficient information to show there is a genuine dispute with the applicant on a material issue of law or fact, which must include (a) references to the specific portions of the application (including the accompanying environmental and safety reports) that are disputed and the supporting reasons for the dispute, or (b) the identification of any purported failure of the application to contain information on a relevant matter as required by law and reasons supporting the deficiency allegation. See 10 C.F.R. s 2.714(b)(2)(i)-(iii). A contention that fails to meet any one of these standards must be dismissed, as must a contention that, even if proven, would be of no consequence because it would not entitle a petitioner to any relief. Id. s 2.714(d)(2).

From these general principles, agency case law and regulations suggest there are a number of more specific corollaries regarding contention admissibility, which can be summarized as follows:

***179** ii. CHALLENGES TO STATUTORY REQUIREMENTS/REGULATORY PROCESS/REGULATIONS

An adjudication is not the proper forum for challenging applicable statutory requirements or the basic structure of the agency's regulatory process. Philadelphia Electric Co. (Peach Bottom

Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20, aff'd in part on other grounds, CLI-74-32, 8 AEC 217 (1974). Similarly, a contention that attacks a Commission rule, or which seeks to litigate a matter that is, or clearly is about to become, the subject of a rulemaking, is inadmissible. See 10 C.F.R. s 2.758; Potomac Electric Power Co. (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 AEC 79, 85, 89 (1974). This includes contentions that advocate stricter requirements than agency rules impose or that otherwise seek to litigate a generic determination established by a Commission rulemaking. See Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), LBP-93-1, 37 NRC 5, 29-30 (1993); Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-82-106, 16 NRC 1649, 1656 (1982); see also Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-96-7, 43 NRC 235, 251 (1996); Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), LBP-91-19, 33 NRC 397, 410, aff'd in part and rev'd in part on other grounds, CLI-91-12, 34 NRC 149 (1991). By the same token, a contention that simply states the petitioner's views about what regulatory policy should be does not present a litigable issue. See Peach Bottom, ALAB-216, 8 AEC at 20- 21 & n. 33.

iii. CHALLENGES OUTSIDE SCOPE OF PROCEEDING

****29** The scope of an adjudicatory proceeding is specified by the notice of hearing or of opportunity for hearing and contentions that deal with matters outside that defined scope must be rejected. See, e.g., Portland General Electric Co. (Trojan Nuclear Plant), ALAB-534, 9 NRC 287, 289 n. 6 (1979); Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-316, 3 NRC 167, 170-71 (1976).

iv. MATERIALITY

Any issues of law or fact raised in a contention must be material to the grant or denial of the license application in question, i.e., they must make a difference in the outcome of the licensing proceeding so as to entitle the petitioner to cognizable relief. See 10 C.F.R. s 2.714(d)(2)(ii); 54 Fed.Reg. 33,168, 33,172 (1989). This requirement of materiality embodies the notion that an alleged error or deficiency regarding a proposed licensing action must have some significance ***180** relative to the agency's general responsibility and authority to protect the public health and safety and the environment. See Seabrook, LBP-82-106, 16 NRC at 1656 (safety contention "must either allege with particularity that an applicant is not complying with a specified [safety] regulation, or allege with particularity the existence and detail of a substantial safety issue on which the regulations are silent" (footnote omitted)); see also Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), LBP-82-116, 16 NRC 1937, 1946 (1982).

Agency case law further suggests this requirement of materiality mandates certain showings in specific contexts. For instance, contentions concerning alleged deficiencies in a decommissioning plan must not only allege and provide sufficient bases to show the deficiencies but also show that the purported deficiencies have "some independent health and safety significance" such that reasonable assurance of the public health and safety with respect to decommissioning is no longer assured. Yankee Atomic Electric Co. (Yankee Nuclear Power Station), LBP-96-2, 43 NRC 61, 75, aff'd, CLI-96-7, 43 NRC 235 (1996); see also Yankee Nuclear, CLI-96-7, 43 NRC at 258 ("Petitioners must show some specific, tangible link between the alleged errors in the plan and the health and safety impacts they invoke"). In this same vein,

when challenging the adequacy of a decommissioning funding plan cost estimate, a contention lacks materiality absent an additional showing there is not reasonable assurance the amount in dispute can be paid, thereby avoiding a mere formalistic redraft of the funding plan. See Yankee Nuclear, CLI-96-1, 43 NRC at 9. Similarly, a contention challenging whether an emergency response plan's provisions provide the requisite reasonable assurance based on the adequacy of implementing procedures for those provisions fails to present a material issue. See Louisiana Power and Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1107 (1983).

v. NEED FOR ADEQUATE FACTUAL INFORMATION OR EXPERT OPINION AS CONTENTION BASIS

****30** The bald assertion that a matter ought to be considered or that a factual dispute exists so as to merit further consideration of a matter is not sufficient. See Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 NRC 200, 246 (1993), review declined, CLI- 94-2, 39 NRC 91 (1994); see also Connecticut Bankers Association v. Board of Governors, 627 F.2d 245, 251 (D.C.Cir.1980). Nor does mere speculation provide an adequate basis for a contention. See Yankee Nuclear, CLI-96-7, 43 NRC at 267. Instead, a petitioner must provide documents or other factual information or expert opinion that set forth the necessary technical analysis to show why the proffered bases support its contention. See Georgia Institute of Technology (Georgia Tech Research Reactor, Atlanta, Georgia), LBP-95-6, 41 ***181** NRC 281, 305, vacated in part and remanded on other grounds, CLI-95-10, 42 NRC 1, aff'd in part, CLI-95-12, 42 NRC 111 (1995).

With respect to documentary or other factual information or expert opinion alleged to provide the basis for a contention, the Board is not to accept uncritically the assertion that a document or other factual information or an expert opinion supplies the basis for a contention. In the case of a document, the Board should review the information provided to ensure that it does indeed supply a basis for the contention. See Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-919, 30 NRC 29, 48 (1989), vacated in part on other grounds and remanded, CLI-90-4, 31 NRC 333 (1990); see also Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-89- 3, 29 NRC 234, 241 (1989) ("where a contention is based on a factual underpinning in a document that has been essentially repudiated by the source of that document, the contention may be dismissed unless the intervenor offers another independent source"); Yankee Nuclear, LBP-96-2, 43 NRC at 90 ("[a] document put forth by an intervenor as the basis for a contention is subject to scrutiny both for what it does and does not show"). By the same token, an expert opinion that merely states a conclusion (e.g., the application is "deficient," "inadequate," or "wrong") without providing a reasoned basis or explanation for that conclusion is inadequate because it deprives the Board of the ability to make the necessary, reflective assessment of the opinion as it is alleged to provide a basis for the contention.

vi. FAILURE PROPERLY TO CHALLENGE APPLICATION

In framing contentions regarding a proposed licensing action, the focus of a petitioner's concern should be the license application. See 10 C.F.R. s 2.714(b)(2)(iii). In this regard, a contention that fails directly to controvert the license application at issue or that mistakenly asserts the

application does not address a relevant issue is subject to dismissal. See Rancho Seco, LBP-93-23, 38 NRC at 247-48; Georgia Power Co. (Vogtle Electric Generating Plant, Units 1 and 2), LBP-91-21, 33 NRC 419, 424 (1991), appeal dismissed, CLI-92-3, 35 NRC 63 (1992).

b. Scope of Contentions

****31** Although licensing boards generally are to litigate "contentions" rather than "bases," it has been recognized that "[t]he reach of a contention necessarily hinges upon its terms coupled with its stated bases." See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-899, 29 NRC 93, 97 (1988). In this instance, Applicant PFS in an effort to provide greater specificity ***182** to the various Petitioners' contentions restated them by incorporating many of the contention bases as subparts of the contentions. In a number of instances a Petitioner objected to these redrafts, but in a several other instances, often after further negotiations and revision, the changes were adopted by the Petitioner. As set forth below, the language of the Petitioners' contentions reflects those agreed-upon changes. Moreover, as is outlined below, exercising our authority under 10 C.F.R. s 2.714(f), we have acted to further define and/or consolidate contentions when the issues sought to be raised by one or more Petitioners appear related or when redrafting would clarify the scope of the contentions.

c. Adoption/Incorporation by Reference

Three of the Petitioners, Castle Rock Land/Skull Valley, the Confederated Tribes, and the State, have sought to incorporate by reference one or more of the contentions of other participants. As the Staff points out, such adoption has been permitted in other proceedings. See Staff Contentions Response at 133 n. 82 (citing cases).

We likewise will permit adoption here by Castle Rock Land/Skull Valley and the Confederated Tribes, with two caveats. First, if the language of the adopted contention was revised as a result of the process described in section II.B.1.b above, that is the language that will be considered to be adopted. [FN8] Second, as is set forth more fully in section III.A below, for any contention subject to adoption, a "lead" party is appointed with primary responsibility for marshaling the parties' case relative to that contention.

As to the State, it sought to incorporate by reference all the other participants' contentions in a filing submitted well after the November 24, 1997 deadline for filing contentions. See State Adopted Contentions Response at 2. As PFS points out, the State has not addressed the late-filing factors in seeking to add these to the list of contentions it is sponsoring. See PFS State Adopted Contentions Response at 1-2. Because we agree with the Applicant, we deny the State's late-filed contentions request.

d. Criteria for Admitting Late-Filed Contentions

Of the contentions discussed below, two (Utah EE and GG) were submitted after the time for filing intervention petition supplements had expired. As such, they must be assessed under a five-factor test to determine whether, on balance, ***183** they should be considered even though late filed. As set forth in 10 C.F.R. s 2.714(a)(1)(i)-(v), the factors that must be balanced in determining whether to admit a late-filed contention are (1) good cause, if any, for failure to file on time; (2) the availability of other means whereby the petitioner's interest will be protected; (3) the extent to which the petitioner's participation may reasonably be expected to assist in

developing a sound record; (4) the extent to which the petitioner's interest will be represented by existing parties; (5) the extent to which the petitioner's participation will broaden the issues or delay the proceeding. See, e.g., Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1046-47 (1983).

****32** With these general precepts before us, we turn to each of the Petitioners' claims regarding their contentions.

2. State Contentions

UTAH A--Statutory Authority

CONTENTION: Congress has not authorized NRC to issue a license to a private entity for a 4,000 cask, away-from reactor, centralized, spent nuclear fuel storage facility.

DISCUSSION: State Contentions at 3-9; PFS Contentions Response at 22-25; Staff Contentions Response at 6-14; State Contentions Reply at 9-15; Tr. at 45-64.

RULING: Inadmissible in that the contention and its supporting basis impermissibly challenge the agency's existing regulatory provisions or rulemaking-associated generic determinations. See section II.B.1.a.ii above. Nothing in the language of the 10 C.F.R. Part 72 provisions describing an ISFSI and the "persons" authorized to apply for and be issued a license to construct and operate an ISFSI indicates PFS is ineligible to seek such permission. See 10 C.F.R. s 72.2(b); id. s 72.3 (definitions of "Independent spent fuel storage installation" and "Person"); id. s 72.6(a). Indeed, when adopting Part 72 in 1980 the Commission specifically contemplated the possibility of stand-alone, "away from reactor" sites as well as the possibility that there could be "large" installations. See 45 Fed.Reg. 74,693, 74,696, 74,698-99 (1980). Thereafter, when the Commission revised Part 72 following the passage of the Nuclear Waste Policy Act of 1982 (NWPA), 42 U.S.C. ss 5841, 10101-10270--the lodestone for the State's assertion the Board lacks jurisdiction--it made revisions to accommodate the statutory provisions for a monitored retrievable storage (MRS) installation to be constructed and operated by the Department of Energy (DOE). It did not, however, make changes to the original scope of Part 72 that would preclude the creation of an installation such as that now contemplated by PFS. ***184** In these circumstances, in which the Commission clearly has established the scope of Part 72, inquiry into that determination is beyond our authority. [FN9]

UTAH B--License Needed for Intermodal Transfer Facility

CONTENTION: PFS's application should be rejected because it does not seek approval for receipt, transfer, and possession of spent nuclear fuel at the Rowley Junction Intermodal Transfer Point ("ITP"), in violation of 10 C.F.R. s 72.6(c)(1), in that:

1. The Rowley Junction operation is not merely part of the transportation operation but a de facto interim spent fuel storage facility at which PFS will receive, handle, and possess spent nuclear fuel for extended periods of time.

2. The anticipated volume and quantity of fuel shipments that will pass through Rowley junction is a large magnitude that is unlike the intermodal transfer operations that previously occurred with respect to shipments of spent nuclear fuel from commercial nuclear power plant sites.

3. The volume of fuel shipments will not be capable of passing directly through Rowley

Junction and some type of temporary storage of casks will be necessary at the site of the ITP, thus making Rowley Junction a spent nuclear fuel storage facility. Further PFS fails to discuss the number of heavy haul trucks that will be available to haul casks, the mechanical reliability of these units, and their performance under all weather conditions which is necessary to analyze the amount of queuing and storage that will occur at Rowley Junction.

**33 4. Because the ITP is stationary, it is important to provide the public with the regulatory protections that are afforded by compliance with 10 C.F.R. Part 72, including a security plan, an emergency plan, and radiation dose analyses.

DISCUSSION: State Contentions at 10-15; PFS Contentions Response at 25-42; Staff Contentions Response at 14-19; State Contentions Reply at 15-19; Tr. at 133-63.

RULING: Paragraphs two and three of this contention are inadmissible in that they and their supporting bases impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including the provisions of 10 C.F.R. Part 71 governing transportation of spent fuel from reactor sites to the PFS facility. See section II.B.1.a.ii above. Regarding paragraphs one and four, as is relevant here, the Part 71 regulations authorize transportation of spent fuel under a general license for a Commission licensee or "carrier," which is defined as a "common, contract, or private carrier," that complies with the general controls and procedures requirements, quality assurance measures, and other provisions of Subparts A, G, and H of Part 71. 10 C.F.R. ss 71.0(d), 71.4, *185 71.12. In this instance, there is a genuine legal/factual issue that merits further inquiry as to whether the PFS scheme for operation of the Rowley Junction ITP will cause the materials delivered there to remain within the possession and control of an entity or entities that comply with the terms of the general license issued under section 71.12 or will be handled in such a way as to require specific licensing under Part 72. See State Contentions at 11 (PFS will be receiving and handling spent fuel at ITP using PFS owned and operated equipment); Tr. at 144-62.

This contention is admitted, albeit limited to paragraphs one and four. [FN10] Revised language reflecting this ruling is set forth at p. 251 of Appendix A to this Memorandum and Order.

UTAH C--Failure to Demonstrate Compliance with NRC Dose Limits

CONTENTION: The Applicant has failed to demonstrate a reasonable assurance that the dose limits specified in 10 C.F.R. s 72.106(b) can and will be complied with in that:

1. License Application uses data for HI-STORM and TranStor casks that have not been fully reviewed or approved by the NRC.

2. License Application erroneously states that the loss of confinement accident is not credible.

3. License Application makes selective and inappropriate use of data from NUREG-1536 for the fission product release fraction.

4. License Application makes selective and inappropriate use of data from SAND80-2124 for the respirable particulate fraction.

5. The dose analysis in the License Application only considers dose due solely to inhalation of the passing cloud. Direct radiation and ingestion of food and water are not considered in the analysis.

6. In the dose calculation, PFS appears to assume local residents will be evacuated until contamination is removed, although this is not expressly discussed in the License Application.

**34 7. PFS fails to calculate doses to children.

8. PFS uses the ICRP-30 dose model which is outdated and inadequate. PFS should be

required to use the new ICRP-60 dose model.

DISCUSSION: State Contentions at 16-21; PFS Contentions Response at 42-58; Staff Contentions Response at 19-23; State Contentions Reply at 20-28; Tr. at 165-203.

***186** RULING: Paragraph one of this contention is inadmissible in that it and its supporting basis impermissibly challenge the Commission's regulatory scheme, provisions, or rulemaking-associated generic determinations, which establish a separate cask design approval process under rulemaking procedures and cask design approval prior to licensing of the PFS facility. [FN11] See section II.B.1.a.ii above. Paragraph two also is inadmissible in that it and its supporting basis lack materiality; lack adequate factual and expert opinion support; and/or impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including 10 C.F.R. Part 71, by seeking to litigate transportation-related sabotage matters. See section II.B.1.a.i, ii, iv, v above. Paragraph six is inadmissible in that it and its supporting basis fail to provide any support, from the application or otherwise, for its assertion there is an evacuation assumption in the PFS application. See section II.B.1.a.i, v, vi above. Finally, paragraphs seven and eight are inadmissible in that they and their supporting bases impermissibly challenge the agency's regulatory standards or rulemaking-associated generic determinations, including 10 C.F.R. Part 20, and make no showing that, even taking into account dose rates to children and/or the ICRP-60 dose model, the Part 20 standards will not be met. See section II.B.1.a.i, ii, iv, v.

Paragraphs three, four, and five are admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry. A revised contention reflecting these rulings is set forth at p. 251 of Appendix A to this Memorandum and Order.

UTAH D--Facilitation of Decommissioning

CONTENTION: The proposed ISFSI is not adequately designed to facilitate decommissioning, because PFS has not provided sufficient information about the design of its storage casks to assure compatibility with DOE repository specifications. Moreover, in the reasonably likely event that PFS's casks do not conform to DOE specification, PFS fails to provide any measures for the repackaging of spent fuel for ultimate disposal in a high level radioactive waste repository. Moreover, PFS provides no measures for verification of whether the condition of spent fuel meets disposal criteria that DOE may impose.

DISCUSSION: State Contentions at 22-26; PFS Contentions Response at 58-68; Staff Contentions Response at 23-26; State Contentions Reply at 28-33; Tr. at 189-219.

RULING: As this contention and its supporting basis allege incompatibility with DOE repository specifications, it is inadmissible because it seeks to ***187** challenge the Commission's regulatory program, regulations, or rulemaking-associated generic determinations under which DOE cask criteria, admittedly incomplete at present, need only be addressed as they become available, and has not demonstrated any specific inadequacy in the application's discussion of any existing DOE specifications that creates a genuine dispute. See section II.B.1.a.i, ii, vi above. As this contention and its supporting basis assert the need for a facility "hot cell" for spent fuel canister inspection to ensure compatibility with future DOE spent fuel acceptance limits, avoid storage removal operational safety problems, or provide a fuel repackaging capability for fuel transfer to casks compatible with later DOE requirements or for transfer of degraded fuel prior to shipment to a HLW repository, the contention also is inadmissible as impermissibly challenging the agency's regulations or rulemaking-associated generic

determinations and lacking the necessary factual information or expert opinion support. See section II.B.1.a.i, ii, v.

UTAH E--Financial Assurance

**35 CONTENTION: Contrary to the requirements of 10 C.F.R. ss 72.22(e) and 72.40(a)(6), the Applicant has failed to demonstrate that it is financially qualified to engage in the Part 72 activities for which it seeks a license.
DISCUSSION: State Contentions at 27-38; PFS Contentions Response at 69-83; Staff Contentions Response at 26-27; State Contentions Reply at 34-38; Tr. at 222-32.
RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry. We note, however, that while differences between the financial qualifications requirements of 10 C.F.R. Part 50, including Appendix C, and those in 10 C.F.R. Part 72 suggest the Part 50 provisions are not applicable in toto to Part 72 applicants, we agree with the Staff that Part 50 should be used as guidance in reviewing PFS's financial qualifications. See Staff Contentions Response at 108 (citing Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-97-15, 46 NRC 294, 302 (1997)).
Because of the similarity of this contention with Castle Rock 7 and Confederated Tribes F, see infra pp. 215, 236, we consolidate those issue statements as set forth in the revised contention specified at pp. 251-52 of Appendix A to this Memorandum and Order.

UTAH F--Inadequate Training and Certification of Personnel

CONTENTION: Training and certification of PFS personnel fails to satisfy Subpart I of 10 C.F.R. Part 72 and will not assure that the facility is operated in a safe manner.
*188 DISCUSSION: State Contentions at 39-41; PFS Contentions Response at 84-91; Staff Contentions Response at 28; State Contentions Reply at 38-40; Tr. at 261-64.
RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry, with the caveat that the second portion of the contention's basis concerning physical and mental condition of operators has been resolved/withdrawn. See State Contentions Reply at 39; Tr. at 261-62.
In addition, as is noted below, see infra p. 194, the portion of Utah P (subparagraph b of paragraph seven) that deals with training for the PFS radiation protection program, is consolidated with this contention. A revised contention reflecting this ruling is set forth on p. 252 of Appendix A to this Memorandum and Order.

UTAH G--Quality Assurance

CONTENTION: The Applicant's Quality Assurance ("QA") program is utterly inadequate to satisfy the requirements of 10 C.F.R. Part 72, Subpart G.
DISCUSSION: State Contentions at 42-51; PFS Contentions Response at 92-101; Staff Contentions Response at 28-30; State Contentions Reply at 40-43; Tr. at 269-80.
RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry, but limited to its bases one and four that assert a lack of detail in the PFS QA program description and a failure to demonstrate the independence of the PFS QA program. The contention's basis two regarding inadequate QA descriptions for PFS quality control over

spent fuel canister packaging operations and materials and handling at originating reactor sites, shipping cask materials and construction, and welding on shipping casks and spent fuel canisters is inadmissible as impermissibly challenging the agency's regulatory program, standards, and/or rulemaking-associated generic determinations. See section II.B.1.a.ii above. So too, the contention's basis three concerning inconsistency between the QA program description and the SAR is inadmissible as lacking materiality. See section II.B.1.a.i, iv above.

UTAH H--Inadequate Thermal Design

**36 CONTENTION: The design of the proposed ISFSI is inadequate to protect against overheating of storage casks and of the concrete cylinders in which they are to be stored in that:

1. Storage casks used in the License Application are not analyzed for the PFS maximum site design ambient temperature of 110 <<degrees>> F.

*189 2. The maximum average daily ambient temperatures for unnamed cities in Utah nearest the site do not necessarily correspond to the conditions in Skull Valley; PFS should provide information on actual temperatures at the Skull Valley site.

3. PFS's projection that average daily temperatures will not exceed 100 << degrees>> F fails to take into account the heat stored and radiated by the concrete pad and storage cylinders.

4. In projecting ambient temperatures, PFS fails to take into consideration the heat generated by the casks themselves.

5. PFS fails to account for the impact of heating the concrete pad on the effectiveness of convection cooling.

6. PFS has not demonstrated that the concrete structure of the TranStor cask is designed to withstand the temperatures at the proposed ISFSI.

7. PFS has not demonstrated that the concrete structure of the HI-STORM cask is designed to withstand the temperatures at the proposed ISFSI.

DISCUSSION: State Contentions at 52-59; PFS Contentions Response at 101-20; Staff Contentions Response at 30; State Contentions Reply at 43-47; Tr. at 280- 90.

RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry.

UTAH I--Lack of a Procedure for Verifying the Presence of Helium in Canisters

CONTENTION: The design of the proposed ISFSI fails to satisfy 10 C.F.R. ss 72.122(f) and 10 C.F.R. s 72.128(a), and poses undue risk to the public health and safety, because it lacks a procedure, or any evidence of a procedure, for verifying the presence of helium inside spent fuel canisters.

DISCUSSION: State Contentions at 60-62; PFS Contentions Response at 121-31; Staff Contentions Response at 30-31; State Contentions Reply at 47-49; Tr. at 291-300.

RULING: Inadmissible in that the contention and its supporting bases impermissibly challenge agency regulations or rulemaking-associated generic determinations, including those concerning the need for canister inspection and testing; and/or lack adequate factual information or expert opinion support. See section II.B.1.a.i, ii, v above.

UTAH J--Inspection and Maintenance of Safety Components, Including Canisters and Cladding

CONTENTION: The design of the proposed ISFSI fails to satisfy 10 C.F.R. ss 72.122(f) and 72.128(a), and poses undue risk to the public health and safety, because it lacks a hot cell or other facility for opening casks and inspecting the condition of spent fuel.
***190** DISCUSSION: State Contentions at 63-71; PFS Contentions Response at 131-46; Staff Contentions Response at 32-33; State Contentions Reply at 49-53; Tr. at 204-19.
****37** RULING: Inadmissible in that the contention and its supporting bases impermissibly challenge agency regulations or rulemaking-associated generic determinations, including those concerning canister inspection and repair; and/or lack adequate factual information or expert opinion support. See section II.B.1.a.i, ii, v above.

UTAH K--Inadequate Consideration of Credible Accidents

CONTENTION: The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the ISFSI, intermodal transfer site, and transportation corridor along Skull Valley Road, including the cumulative effects of the nearby hazardous waste and military testing facilities in the vicinity.
DISCUSSION: State Contentions at 72-79; PFS Contentions Response at 146-65; Staff Contentions Response at 32-33; State Contentions Reply at 54-58; Tr. at 300-17.
RULING: Relative to the State's assertions regarding the impact on the PFS facility of accidents involving materials or activities at or emanating from the Tekoi Rocket Engine Test facility, Dugway Proving Ground, Salt Lake City International Airport, Hill Air Force Base, and the Utah Test and Training Range, this contention is admitted as supported by bases establishing a genuine material dispute sufficient to warrant further inquiry. Further, this contention is admitted as supported by bases establishing a genuine material dispute sufficient to warrant further inquiry regarding the State's assertions concerning the impact on the Rowley Junction ITP of accidents involving (1) materials or activities at or emanating from the facilities specified above, or (2) hazardous materials that pass through Rowley Junction from the Laidlaw APTUS hazardous waste incinerator, the Envirocare low-level radioactive and mixed waste landfill, or Laidlaw's Clive Hazardous Waste Facility and Grassy Mountain hazardous waste landfill. [FN12] Finally, in connection with the State's assertions regarding lack of consideration of accidents involving trucks or railcars transporting spent fuel casks as they travel to the ITP facility from reactor sites and thereafter along Skull Valley Road, these are inadmissible as impermissibly challenging the basic structure of the agency's regulatory processes, requirements, or rulemaking-associated generic determinations, including 10 C.F.R. Part 71, which places ***191** such matters within the ambit of DOT regulation and control. [FN13] See section II.B.1.a.ii above.
A revised contention reflecting this ruling, as well as the consolidation of this contention with Castle Rock 6 and a related portion of Confederated Tribes B, see infra pp. 214, 235, is set forth at p. 253 of Appendix A to this Memorandum and Order.

UTAH L--Geotechnical

CONTENTION: The Applicant has not demonstrated the suitability of the proposed ISFSI site because the License Application and SAR do not adequately address site and subsurface investigations necessary to determine geologic conditions, potential seismicity, ground motion, soil stability and foundation loading.

**38 DISCUSSION: State Contentions at 80-95; PFS Contentions Response at 165-68; Staff Contentions Response at 33-34; State Contentions Reply at 58-59; Tr. at 331-33.
RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry. [FN14]

UTAH M--Probable Maximum Flood

CONTENTION: The application fails to accurately estimate the Probable Maximum Flood (PMF) as required by 10 C.F.R. s 72.98, and subsequently, design structures important to safety are inadequate to address the PMF; thus, the application fails to satisfy 10 C.F.R. s 72.24(d)(2).

1. The Applicant's determination of the PMF drainage area to be 26 sq. miles is inaccurate because the Applicant has failed to account for all drainage sources that may impact the ISFSI site during extraordinary storm events.

2. In addition to design structures important to safety being inadequate to address the PMF, the consequence of an inaccurate PMF drainage area may negate the Applicant's assertion that the facility area is "flood dry."

DISCUSSION: State Contentions at 96-97; PFS Contentions Response at 168-69; Staff Contentions Response at 34; State Contentions Reply at 59; Tr. at 333-34.
*192 RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry.

UTAH N--Flooding

CONTENTION: Contrary to the requirements of 10 C.F.R. s 72.92, the Applicant has completely failed to collect and evaluate records relating to flooding in the area of the intermodal transfer site, which is located less than three miles from the Great Salt Lake shoreline.
DISCUSSION: State Contentions at 98-99; PFS Contentions Response at 169-72; Staff Contentions Response at 34-35; State Contentions Reply at 59-60; Tr. at 334-39, 350.
RULING: Admitted as supported by bases establishing a genuine material dispute sufficient to warrant further inquiry. [FN15]

UTAH O--Hydrology

CONTENTION: The Applicant has failed to adequately assess the health, safety and environmental effects from the construction, operation and decommissioning of the ISFSI and the potential impacts of transportation of spent fuel on groundwater, as required by 10 C.F.R. ss 72.24(d), 72.100(b) and 72.108, with respect to the following contaminant sources, pathways, and impacts:

1. Contaminant pathways from the applicant's sewer/wastewater system, the retention pond, facility operations and construction activities.

2. Potential for groundwater and surface water contamination.

3. The effects of applicant's water usage on other well users and on the aquifer.

4. Impact of potential groundwater contamination on downgradient hydrological resources.

DISCUSSION: State Contentions at 100-08; PFS Contentions Response at 172-86; Staff Contentions Response at 35-36; State Contentions Reply at 59-60; Tr. at 339-60.
RULING: Except as it seeks to litigate the groundwater impacts of spent fuel shipments on

transportation routes, which is inadmissible as an impermissible challenge to the Commission's regulations or rulemaking-associated generic determinations, including 10 C.F.R. Part 71, see section II.B.1.a.ii above, this ***193** contention is admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry. [FN16]

****39** In addition, as is noted below, see infra pp. 216, 217, the similarity of this contention and Castle Rock 8 and 10 warrants consolidating this contention and its supporting bases with those issue statements. The consolidated contention is set forth at p. 254 of Appendix A to this Memorandum and Order.

UTAH P--Inadequate Control of Occupational and Public Exposure to Radiation

CONTENTION: The Applicant has not provided enough information to meet NRC requirements of controlling and limiting the occupational radiation exposures to as low as reasonably achievable (ALARA) and analyzing the potential dose equivalent to an individual outside of the controlled area from accidents or natural phenomena events in that:

1. The Applicant has failed to provide detailed technical information demonstrating the adequacy of its policy of minimizing exposure to workers as a result of handling casks, nor does it describe the design features that provide ALARA conditions during transportation, storage and transfer of waste. Specifically, if the design has incorporated ALARA concepts, the storage casks used at the ISFSI should have the lowest dose rate.

2. The Applicant has failed to provide an analysis of alternative cask handling procedures to demonstrate that the procedures will result in the lowest individual and collective doses.

3. The Applicant has failed to adequately describe why the Owner Controlled Area boundaries were chosen and whether the boundary dose rates will be the ultimate minimum values compared to other potential boundaries.

4. The Applicant has failed to indicate whether rainwater or melted snow from the ISFSI storage pads will be collected, analyzed, and handled as radioactive waste.

5. The Applicant has failed to provide design information on the unloading facility ventilation system to show that contamination will be controlled and workers will be protected in a manner compatible with the ALARA principle. In addition, procedures to maintain and ensure filter efficiency and replace components are not provided.

6. The Applicant has failed to provide adequate or complete methods for radiation protection and failed to provide information on how estimated radiation exposures values to operating personnel were derived to determine if dose rates are adequate.

7. The Applicant has failed to describe a fully developed radiation protection program that ensures ALARA occupational exposures to radiation by not adequately describing:

a. the management policy and organizational structure to ensure ALARA;

***194** b. a training program that insures all personnel who direct activities or work directly with radioactive materials or areas are capable of evaluating the significance of radiation doses;

c. specifics on personnel and area, portable and stationary radiation monitoring instruments, and personnel protective equipment, including reliability, serviceability, equipment limitation specifications;

****40** d. a program for routine equipment calibration and testing for operation and accuracy;

e. a program to effectively control access to radiation areas and movement of radiation sources;

f. a program to maintain ALARA exposures of personnel servicing leaking casks;

g. a program for monitoring and retaining clean areas and monitoring dose rates in radiation zones to ensure ALARA; and

h. specific information on conducting formal audits and review of the radiation protection program.

8. The Applicant has completely failed to include an analysis of accident conditions, including accidents due to natural phenomena, in accordance with 10 C.F.R. ss 72.104 and 72.126(d).

9. The Applicant has failed to control airborne effluent which may cause unacceptable exposure to workers and the public, Contention T, Basis 3(a) (Air Quality) is adopted and incorporated by reference.

DISCUSSION: State Contentions at 109-13; PFS Contentions Response at 187-206; Staff Contentions Response at 37-39; State Contentions Reply at 61-66; Tr. at 367-80.

RULING: Inadmissible as to all paragraphs except subparagraph b of paragraph seven in that these portions of the contention and their supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including the applicable ALARA provisions; lack materiality; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iv, v, vi above. With regard to subparagraph b of paragraph seven, this portion of the contention is admitted as supported by a basis establishing a genuine material dispute adequate to warrant further inquiry and is incorporated into Utah F, which deals generally with PFS training program adequacy. See supra p. 188. The revised contention is set forth at p. 252 of Appendix A to this Memorandum and Order.

***195** UTAH Q--Adequacy of ISFSI Design to Prevent Accidents

CONTENTION: The Applicant has failed to adequately identify and assess potential accidents, and, therefore, the Applicant is unable to determine the adequacy of the ISFSI design to prevent accidents and mitigate the consequences of accidents as required by 10 C.F.R. 72.24(d)(2).

DISCUSSION: State Contentions at 114-15; PFS Contentions Response at 207-15; Staff Contentions Response at 39-40; State Contentions Reply at 66; Tr. at 390- 94.

RULING: Inadmissible in that this contention and its supporting bases fail to establish with specificity any genuine material dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations; lack materiality; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iii, v, vi above. [FN17]

UTAH R--Emergency Plan

CONTENTION: The Applicant has not provided reasonable assurance that the public health and safety will be adequately protected in the event of an emergency at the storage site, at the transfer facility, or offsite during transportation in that:

****41** 1. PFS has not adequately described the facility, the activities conducted there, or the area in sufficient detail to evaluate the adequacy and appropriateness of the emergency plan, nor has PFS considered specific impediments to emergency response such as flooding, ice, snow, etc.

2. PFS has not identified adequate emergency and medical facilities and equipment to respond to an onsite emergency.

a. Tooele County capabilities and equipment are not addressed adequately.

b. No provision for extra onsite preparedness giving time for Tooele County to respond, particularly in adverse weather conditions.

3. The plan was not adequately coordinated with the State or other government (local, county, state, federal) agencies.

a. PFS has not supported its claim regarding absence of extremely hazardous substances and that no assistance will be required external to Tooele County.

b. PFS does not address transportation accidents or accidents at the intermodal transfer point.

***196** 4. PFS has not adequately described means and equipment for mitigation of accidents, because it:

a. Does not address how it would procure a crane within 48 hours for a tip over cask accident.

b. Does not adequately support capability to fight fires.

5. The Emergency Plan does not provide adequate detail to meet provisions of Reg. Guide 3.67, s 5.4.1 regarding equipment inventories and locations.

DISCUSSION: State Contentions at 116-22; PFS Contentions Response at 215-36; Staff Contentions Response at 40-49; State Contentions Reply at 66-69; Tr. at 792-803.

RULING: Admitted with regard to paragraph one and subparagraph b of paragraph three as they relate to the Rowley Junction ITP and subparagraph b of paragraph four relating to onsite firefighting capabilities as supported by bases establishing a genuine material dispute adequate to warrant further inquiry. [FN18] Inadmissible as to all other portions of paragraph one, paragraph two, subparagraph a of paragraphs three and four, and paragraph five in that these portions of the contention and their supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations, including Commission determinations relating to the need for offsite emergency response plans for ISFSIs; lack materiality; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iv, v, vi above.

A revised contention reflecting this ruling is set forth at p. 254 of Appendix A to this Memorandum and Order.

UTAH S--Decommissioning

CONTENTION: The decommissioning plan does not contain sufficient information to provide reasonable assurance that the decontamination or decommissioning of the ISFSI at the end of its useful life will provide adequate protection to the health and safety of the public as required by 10 C.F.R. s 72.30(a), nor does the decommissioning funding plan contain sufficient information to provide reasonable assurance that the necessary funds will be available to decommission the facility, as required by 10 C.F.R. s 70.3(b).

****42** DISCUSSION: State Contentions at 123-30; PFS Contentions Response at 236-56; Staff Contentions Response at 49-52; State Contentions Reply at 69-74; Tr. at 394-409.

RULING: Admitted as it is supported by bases one, two, four, five, ten, and eleven, which are sufficient to establish a genuine material dispute adequate ***197** to warrant further inquiry, [FN19] with the caveat that for the decommissioning cost estimates at issue under basis four, the costs of nonradiological solid and hazardous waste disposal are a consideration only to the extent necessary for license termination, see 53 Fed.Reg. 24,018, 24,019 (1988). Inadmissible as to the

matters specified in bases three, six, seven, eight, and nine provided in support of this contention, which fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including 10 C.F.R. s 51.23; lack materiality; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, ii, iv, v above.

Because of the similarity of the issues raised in this contention and Castle Rock 7, see infra p. 215, the portions of that contention and their supporting bases that specifically relate to decommissioning (i.e., paragraphs c and f) are hereby consolidated with this contention, which is revised as set forth at p. 255 of Appendix A to this Memorandum and Order.

UTAH T--Inadequate Assessment of Required Permits and Other Entitlements

CONTENTION: In derogation of 10 C.F.R. s 51.45(d), the Environmental Report does not list all Federal permits, licenses, approvals and other entitlements which must be obtained in connection with the PFS ISFSI License Application, nor does the Environmental Report describe the status of compliance with these requirements in that:

1. The Applicant has failed to show that it is entitled to use the land for the ISFSI site and if it does have such right whether there are any legal constraints imposed on the use and control of the land: the NRC must require the Applicant to fully disclose all provisions of the Applicant's lease with the Skull Valley Band in order to fully evaluate under what conditions that Applicant is entitled to use and control the site.

2. The Applicant has shown no proof of entitlement to build a transfer facility at Rowley Junction or right to use the terminal there; nor has it identified the number of casks expected on each shipment, or explained the effects of rail congestion or whether Rowley Junction has the capacity of handling the expected number of casks; nor has it shown that Union Pacific is willing and capable to handle shipments to Rowley Junction.

3. The Applicant has shown no ability or authority to build a rail spur from the rail head at Rowley Junction to the proposed ISFSI site.

4. The Applicant has shown no basis that it is entitled to widen Skull Valley Road or that the proposed 15-foot roadway would satisfy health, safety and environmental concerns nor does the application describe and identify State and local permits or approvals that are required.

**43 *198 5. The Applicant's air quality analysis does not satisfy the requirements of 10 C.F.R. s 51.45 in that the Applicant has failed to adequately analyze whether it will be in compliance with the health-based National Ambient Air Quality Standards, whether it is subject to section 111 of the Clean Air Act, and whether it is a major stationary source of air pollution requiring a Prevention of Significant Deterioration permit; the Applicant's analysis of air quality impacts in ER 4.3.3 is inadequate; and a state air quality approval order under Utah Code Ann. s 19-2-108 will be required.

6. The Applicant has not addressed the requirement to obtain a Utah groundwater discharge permit.

7. The Applicant's analysis of other required water permits lacks specificity and does not satisfy the requirements in that the Applicant merely states that it "might" need a Clean Water Act Section 404 dredge and fill permit for wetlands along the Skull Valley transportation corridor and that it will be required to consult with the State on the effects of the intermodal transfer site on the neighboring Timpie Springs Wildlife Management Area.

8. The Applicant must show legal authority to drill wells on the proposed ISFSI site and that

its water appropriations will not interfere with or impair existing water rights and identify and describe state approvals that are required.
DISCUSSION: State Contentions at 131-43; PFS Contentions Response at 256-82; Staff Contentions Response at 52-53; State Contentions Reply at 74-83; Tr. at 467-94.
RULING: Admissible as to paragraphs two through eight and their supporting bases, which are sufficient to establish a genuine material dispute adequate to warrant further inquiry, with the caveat that the approvals and entitlements properly at issue under these allegations are limited to those involving appropriate governmental (as opposed to nongovernmental/private) entities. [FN20] Inadmissible as to paragraph one and its supporting basis, which fail to establish with specificity any genuine dispute and impermissibly challenge the Commission's regulatory processes, regulations or rulemaking-associated generic determinations, including those relating to site ownership. [FN21] See section II.B.1.a.i, ii above.
A revised contention reflecting this ruling, as well as the consolidation of all or parts of Castle Rock 10, 12, and 22, see infra pp. 217, 218, 224, is set forth at pp. 255-56 of Appendix A of this Memorandum and Order.

*199 UTAH U--Impacts of Onsite Storage Not Considered

CONTENTION: Contrary to the requirements of NEPA and 10 C.F.R. 51.45(c), the Applicant fails to give adequate consideration to reasonably foreseeable potential adverse environmental impacts during storage of spent fuel on the ISFSI site.
DISCUSSION: State Contentions at 142-43; PFS Contentions Response at 282-92; Staff Contentions Response at 53-54; State Contentions Reply at 83-84; Tr. at 525-50.
**44 RULING: Admissible as to basis one, which is sufficient to establish a genuine material dispute adequate to warrant further inquiry. [FN22] Inadmissible as to bases two, three, and four proffered in support of this contention, which fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including those involving canister inspection and repair and transportation sabotage; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

UTAH V--Inadequate Consideration of Transportation-Related Radiological Environmental Impacts

CONTENTION: The Environmental Report ("ER") fails to give adequate consideration to the transportation-related environmental impacts of the proposed ISFSI in that:
1. In order to comply with NEPA, PFS and the NRC Staff must evaluate all of the environmental impacts, not just regional impacts, associated with transportation of spent fuel to and from the proposed ISFSI, including preparation of spent fuel for transportation to the ISFSI, spent fuel transfers during transportation to the ISFSI, transferring and returning defective casks to the originating nuclear power plant, and transfers and transportation required for the ultimate disposal of the spent fuel.
2. PFS's reliance on Table S-4 is inappropriate and inadequate. 10 C.F.R. s 51.52 applies only to light-water-cooled nuclear power plant construction permit applicants, not to offsite ISFSI applicants. Even if 10 C.F.R. s 51.52 applied, PFS does not satisfy the threshold conditions for using Table S-4, and its reliance on NUREG-1437 is misplaced. Since the conditions specified in

10 C.F.R. s 51.52(a) for use of Table S-4 are not satisfied, the PFS must provide "a full description and detailed analysis of the environmental effects of transportation of fuel and wastes to and from the reactor" in accordance with 10 C.F.R. s 51.52(b).

3. The SAR is inadequate to supplement Table S-4 in that:

a. The Applicant fails to adequately address the intermodal transfer point in that the analysis utilizes unreasonable assumptions regarding rail shipment volume and its associated effects.

***200** b. The Applicant fails to calculate impacts of the return of substandard or degraded casks to the originating nuclear power plant licensees, including additional radiation doses to workers and the public.

c. The Applicant fails to address the environmental impacts of any necessary intermodal transfer required at some of the originating nuclear power plants due to lack of rail access or inadequate crane capability.

4. New information shows that Table S-4 grossly underestimates transportation impacts in that:

a. WASH-1238, which is the basis for Table S-4, uses poor and outdated data, and hence the Applicant's reliance on WASH-1238 and Table S-4 is inadequate to demonstrate compliance with NEPA;

****45** b. WASH-1238 does not quantify the risks of spent fuel transportation. 10 C.F.R. s 51.45(c) requires that, to the extent practicable, the cost and benefits of a proposal should be quantified;

c. WASH-1238 does not address accidents caused by human error or sabotage;

d. WASH-1238 does not include up-to-date analyses of maximum credible accidents;

e. WASH-1238 does not address the potential for degradation of fuel cladding caused by dry fuel storage;

f. WASH-1238 does not address the greater release fraction from severe accident consequences demonstrated in recent analyses;

g. WASH-1238 does not address specific regional characteristics of impacts on the environment from transportation and therefore is inadequate to satisfy 10 C.F.R. s 72.108;

h. WASH-1238 does not address circumstances and consequences of a criticality event of a representative rail transportation cask with a large capacity (capacity greater than a critical mass of fuel);

i. WASH-1238 does not contain information from the more recent and more accurate dose modeling RADTRAN computer program;

j. WASH-1238 does not address a representative transportation distance for the shipment of spent fuel from the originating nuclear power plants. WASH- 1238 assumes an approximate distance of 1000 miles. The PFS acknowledges that the distance may be more than twice that amount. ER at 4.7-3.

DISCUSSION: State Contentions at 144-61; PFS Contentions Response at 292-310; Staff Contentions Response at 54-63; State Contentions Reply at 84-88; Tr. at 551-93, 600-03.

RULING: Admissible as to paragraph two and its supporting basis as it alleges the weight for a loaded PFS shipping cask is outside the parameters of 10 C.F.R. s 51.52 (Summary Table S-4), which is sufficient to establish a genuine material dispute adequate to warrant further inquiry. Inadmissible as to paragraph ***201** one, the balance of the assertions in paragraph two, and paragraphs three and four and their supporting bases, [FN23] which fail to establish with specificity any genuine dispute; impermissibly challenge the applicable Commission regulations or rulemaking-associated generic determinations, including 10 C.F.R. ss 51.52, 72.108, and

"Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants," WASH-1238 (Dec. 1972), as supplemented, NUREG-75/038 (Supp. 1 Apr. 1975); lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

A revised version of this contention that incorporates this ruling is set forth at p. 256 of Appendix A to this Memorandum and Order.

UTAH W--Other Impacts Not Considered

CONTENTION: The Environmental Report does not adequately consider the adverse impacts of the proposed ISFSI and thus does not comply with NEPA or 10 C.F.R. s 51.45(b) in that:

1. The Applicant has not discussed the cumulative impacts of this facility in relationship to hazardous and industrial facilities/activities located in the region of the ISFSI site and the intermodal transfer point.

**46 2. The Applicant has not evaluated the potential for accidents from the heavy haul trucks that could make up to 400 trips per year along the Skull Valley Road, a secondary two-way paved road.

3. The Applicant has not considered the impact of flooding on its facility or the intermodal transfer point.

4. The Applicant has not adequately discussed the degradation of air quality and water resources due to construction, operation, and maintenance of the ISFSI.

5. The Applicant has not fully assessed the environmental impact of placing 4,000 casks over a site with such complex seismicity, capable of faults and potentially unstable soils.

6. The Applicant has not adequately considered the cost of the visual impact of the proposed ISFSI and of the transportation of spent fuel by heavy haul trucks along Skull Valley Road on the public's use and enjoyment of the area.

DISCUSSION: State Contentions at 162-64; PFS Contentions Response at 310-23; Staff Contentions Response at 63-64; State Contentions Reply at 88-89; Tr. at 604-21.

*202 RULING: Admissible as to paragraph three as it asserts a failure to consider the impact of flooding at the Rowley Junction ITP, which is sufficient to establish a genuine material dispute adequate to warrant further inquiry. [FN24] Inadmissible as to paragraphs one and two, paragraph three as it relates to the PFS facility, and paragraphs four, five, and six in that they and their supporting bases fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

A revised contention reflecting this ruling is set forth at p. 256 of Appendix A to this Memorandum and Order.

UTAH X--Need for the Facility

CONTENTION: The Applicant fails to demonstrate there is a need for the facility as is required under NEPA.

DISCUSSION: State Contentions at 165-66; PFS Contentions Response at 323-30; Staff Contentions Response at 64-65; State Contentions Reply at 89-90; Tr. at 652-57.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations; and/or lack adequate factual and expert opinion

support. See section II.B.1.a.i, ii, v above.

UTAH Y--Connected Actions

CONTENTION: The Applicant fails to adequately discuss the link between this proposal and the national high level waste program, a connected action, as is required under NEPA.
DISCUSSION: State Contentions at 167-68; PFS Contentions Response at 330-35; Staff Contentions Response at 65-68; State Contentions Reply at 90-95; Tr. at 122-33.
RULING: Inadmissible in that this contention and its supporting basis fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including 10 C.F.R. ss 51.23, 51.61; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i., ii., v above.

*203 UTAH Z--No Action Alternative

**47 CONTENTION: The Environmental Report does not comply with NEPA because it does not adequately discuss the "no action" alternative.
DISCUSSION: State Contentions at 169-70; PFS Supplemental Contentions Response at 2-13; Staff Contentions Response at 68; State Contentions Reply at 95-96; Tr. at 658-64.
RULING: Admissible as supported by a basis sufficient to establish a genuine material dispute adequate to warrant further inquiry.

UTAH AA--Range of Alternatives

CONTENTION: The Environmental Report fails to comply with the National Environmental Policy Act because it does not adequately evaluate the range of reasonable alternatives to the proposed action.
DISCUSSION: State Contentions at 172-74; PFS Supplemental Contentions Response at 13-20; Staff Contentions Response at 69; State Contentions Reply at 96-98, Tr. at 675-84.
RULING: Admissible as supported by a basis sufficient to establish a genuine material dispute adequate to warrant further inquiry, with the caveat that the scope of the contention is limited to the issue of the adequacy of the PFS alternative site analysis.
As is explained below, this contention is consolidated with a portion of Castle Rock 13. See infra p. 219. The revised contention is set forth at p. 256 of Appendix A to this Memorandum and Order.

UTAH BB--Site Selection and Discriminatory Effects

CONTENTION: The Applicant's site selection process does not satisfy the demands of the President's Executive Order No. 12,898 or NEPA and the NRC staff must be directed to conduct a thorough and in-depth investigation of the Applicant's site selection process.
DISCUSSION: State Contentions at 175-77; PFS Supplemental Contentions Response at 20-32; Staff Contentions Response at 69; State Contentions Reply at 98-99; Tr. at 693-707, 716-29.
RULING: Inadmissible, in that the contention and its supporting bases seek to litigate the issue of "discrimination in the site selection process," State Contentions at 177, which is not a cognizable subject for agency licensing proceedings relative to compliance with NEPA. See

Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 101-06 (1998).

*204 UTAH CC--One-Sided Cost-Benefit Analysis

CONTENTION: Contrary to the requirements of 10 C.F.R. s 51.45(c), the Applicant fails to provide an adequate balancing of the costs and benefits of the proposed project, or to quantify factors that are amenable to quantification in that:

1. Applicant's Environmental Report makes no attempt to objectively discuss the costs of the project.

2. Applicant fails to weigh the numerous adverse environmental impacts discussed, for example, in Contentions H through P, against the alleged benefits of the facility.

3. Applicant fails to compare the environmental costs of the proposal with the significantly lower environmental costs of the no-action alternative.

4. Applicant fails to weigh the benefits to be achieved by alternatives that could reduce or mitigate accidents, environmental contamination, and decommissioning costs, such as inclusion of a hot cell in the facility design.

**48 5. Applicant makes no attempt to quantify the costs associated with the impacts of the facility, many of which are amenable to quantification in that:

a. costs related to accidents and contamination may be quantified in terms of health effects and dollar costs;

b. decommissioning impacts can be quantified;

c. visual impacts can be quantified in terms of lost tourist dollars; and

d. emergency response costs can be quantified based on the cost of those services.

DISCUSSION: State Contentions at 178-79; PFS Supplemental Contentions Response at 32-43; Staff Contentions Response at 70-71; State Contentions Reply at 99- 101; Tr. at 739-45.

RULING: Inadmissible as the contention and its supporting bases fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

UTAH DD--Ecology and Species

CONTENTION: The Applicant has failed to adequately assess the potential impacts and effects from the construction, operation and decommissioning of the ISFSI and the transportation of spent fuel on the ecology and species in the region as required by 10 C.F.R. ss 72.100(b) and 72.108 and NEPA in that:

1. The License Application does not discuss the long term impacts of construction activities on the overall ecological system in Skull Valley.

2. The License Application fails to address adverse impacts of contaminated ground or surface waters on various species, and fails to provide for sampling of the retention pond for contaminants.

*205 3. The License Application fails to include both protective and mitigation plans in conjunction with appropriate authorities for Horseshoe Springs, Salt Mountain Springs, Timpie Springs Waterfowl Management Area, and raptor nests.

4. The License Application has not estimated potential impacts to ecosystems and "important species" in that:

a. The License Application does not discuss the importance of the variety of species found in the Skull Valley ecological system, including aquatic organisms, and does not discuss the interdependence of various species on one another or impact on the ecological system as a whole.

b. The License Application fails to assess the individual and collective impacts on various species, including wetland species, aquatic organisms, plants, fish, and birds from additional traffic, fugitive dust, radiation and other pollutants.

c. The License Application fails to address all possible impacts on federally endangered or threatened species, specifically the peregrine falcon nest in the Timpie Springs Waterfowl Management Area.

d. The License Application fails to include information on pocket gopher mounds which may be impacted by the proposal.

e. The License Application fails to determine whether "culturally or medically (scientific) significant" plant species may be impacted by the PFSF.

****49** f. The License Application fails to identify aquatic plant species which may be adversely impacted by the proposed action.

g. The License Application has not adequately identified plant species that are adversely impacted or adequately assessed the impact on those identified, specifically the impact on two "high interest" plants, Pohl's milkvetch and small spring parsley.

h. License Application does not identify, nor assess the adverse impacts on, the private domestic animal (livestock) or the domestic plant (farm produce) species in the area.

5. License Application fails to assess the potential impacts on Horseshoe Springs, Timpie Springs Waterfowl Management Area, the Great Salt Lake, and Salt Mountain Springs.

6. License Application fails to include the results of detailed site- specific surveys and analyses to determine species in the vicinity of the PFSF. 10 C.F.R. ss 72.100(b) and 72.108 require that detailed surveys of species plus mitigation or prevention plans be prepared now.

DISCUSSION: State Contentions at 180-87; PFS Supplemental Contentions Response at 43-70; Staff Contentions Response at 71-75; State Contentions Reply at 101- 04; Tr. at 766-83.

RULING: Admissible as to subparagraphs c, d, g, and h of paragraph four, which are sufficient to establish a genuine material dispute adequate to warrant further inquiry. Inadmissible as to paragraphs one through three, subparagraphs ***206** a, b, e, and f of paragraph four, and paragraphs five and six in that these paragraphs and their supporting bases fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

A revised contention reflecting this ruling, as well as the consolidation of this contention with a portion of Castle Rock 16 that raises similar issues, see infra p. 221, is set forth at pp. 256-57 of Appendix A to this Memorandum and Order.

UTAH EE--Failure to Demonstrate Cask-Pad Stability During Seismic Event

CONTENTION: The Applicant has failed to demonstrate that storage casks and pads will remain stable during a seismic event. Accordingly, the Applicant fails to satisfy 10 C.F.R. ss 72.122(b)(2) and 72.128(a) in that:

1. The Holtec analysis is inadequate to support the safety of Applicant's proposed design during a seismic event at the PFS facility.

a. The Applicant has not provided enough information about inputs to the model to support

the credibility of the analysis.

b. The Holtec analysis is not based on an adequate inquiry into site conditions and how they affect the stability of the casks.

2. It is impossible to verify from the Holtec Seismic Report if the three independent components of seismic time histories have been properly and conservatively evaluated such that three statistically independent time histories were used in the Holtec report.

**50 3. The Applicant's cask-pad model oversimplifies the behavior of the dynamic loads at the PFS facility, by failing to sufficiently consider the potential for bending, structural deterioration of the concrete surface, translation, and rotation of the pad.

a. In the Holtec report, the Applicant has not considered the effects of simultaneous rotation and translation of the pad, in conjunction with the movement of the casks in the Holtec report.

b. In the Holtec report, the Applicant, by assuming that the casks move uniformly in the same direction oversimplifies or ignores the phenomena that the casks may move in different directions and at different speed from each other as a result of the differences in movement of the pad and casks.

c. In the Holtec report, the Applicant did not consider that the coefficient of friction (i.e., the resistance of the surface of the pad to movement of the casks) may vary over the surface of the pad. There is no indication that the shift from the static friction case to the kinetic case was considered.

d. The assumption that the 30' x 64' pad will remain rigid is unreasonable and oversimplified. Thus, in the Holtec report, the Applicant failed to provide sufficient information about the soil structure and characteristics at the PFS facility site to rule out the potential for differential upheaval and subsidence *207 of the soil beneath the concrete which may cause the pad to bend, crack, and possibly spall.

e. In the Holtec report, the Applicant failed to consider the effects of the embedment of the pad in the compacted granular soil on the site or its destabilizing effect on the casks.

4. In the Holtec report, the Applicant fails to adequately consider site- specific soil characteristics.

a. A reliable seismic analysis should be based on more comprehensive knowledge of soil types; soil features; such as stratigraphy; and measurements of each soil type's ability to respond to dynamic loading, such as dynamic passive resistance, damping, Young's modulus, and Poisson's ratio.

b. In the Holtec report, the Applicant fails to account for the differences in strata beneath the pad, or the impacts on the cask/pad system of different acceleration rates and directional movements for each of the different strata.

c. In the Holtec report, the Applicant fails to account for the potential for cemented and/or collapsible soil on the site, which may also have an effect on the rate and direction of movement of the cask/pad system.

d. State Contention L (Geotechnical) whose basis 4, Soil Stability and Foundation Loading, regarding the failure to consider collapsible soils, is adopted and incorporated herein by reference.

5. In the Holtec analysis, the Applicant does not consider the impact of dynamic loads on the structural integrity of the pad which may cause damage to the concrete surface, including cracking, spalling, and crushing of the concrete which may become a contributing factor to instability of the casks.

**51 6. In the Holtec report, it does not appear that the Applicant performed uncertainty or

sensitivity analyses on the various soil-pad interaction aspects of its seismic analysis.

7. In the Holtec report, the Applicant's earthquake analysis for the Canister Transfer Building is inadequate. The report does not contain any analysis of the seismic response of the cask, transfer cask, and overhead bridge crane. The Applicant must provide an analysis of earthquake impacts on this facility, under postulated accident conditions.

8. It is impossible to evaluate the adequacy of the computer codes used in the Holtec analysis unless the codes are adequately identified.

DISCUSSION regarding Late-Filing Standards: State Contentions EE and FF at 1- 3; PFS State Contention EE and FF Response at 1-8; Staff State Contentions EE and FF Response at 3-6; State Contentions EE and GG Reply at 2-9, 11-13; PFS State Contentions EE and GG Surreply at 2-20; Staff State Contentions EE and GG Surreply at 3-6; Tr. at 419-44.

RULING: We dismiss this contention, which concerns the site-specific seismic stability of one of the two PFS-designated cask systems that is to be used ***208** at the PFS facility, for failure to meet the late-filing requirements of 10 C.F.R. s 2.714(a)(1). Concerning the first factor--good cause for failing to file on time--the State's assertion that good cause exists for late filing because it needed to await receipt of the proprietary information is misplaced. The State acknowledges it received a nonproprietary version of Holtec International's cask-pad seismic stability report for its HI-STORM 100 system on September 22, 1997. It nonetheless maintains two proprietary portions of the report not available to it until mid-November were integral to its contention preparation so as to justify filing Utah EE in late December, nearly a month late. See State Contentions EE and GG Reply at 8-9 (citing Holtec Int'l, Multi- Cask Seismic Response at the PFS ISFSI for PFS, Holtec Report No. HI-971631 (Proprietary Version) (May, 19, 1997) Fig. 4-1 (Hi-Storm 100 Dynamic Model); id. Attach. A (Theoretical Equations of Motion for a Single Cask)). After reviewing both documents and the pertinent nonproprietary materials timely available to the State, we conclude neither proprietary document was necessary to the development of Utah EE, in whole or in part, such that the delay was justified. See Catawba, CLI-83-19, 17 NRC at 1043, 1045 (if contention's factual predicate otherwise available, unavailability of document does not constitute good cause for late filing); see also Yankee Atomic Electric Co. (Yankee Nuclear Power Station), LBP-96-15, 44 NRC 8, 26 (1996); Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), LBP-83-39, 18 NRC 67, 69 (1983).

Lacking good cause for the one-month delay in filing Utah EE, the State must make a compelling showing on the other four factors. See Commonwealth Edison Co. (Braidwood Nuclear Power Station, Units 1 and 2), CLI-86-8, 23 NRC 241, 244 (1986). It fails to do so, however. Factors two and four support the late- filing in that there appear to be no other means to protect the State's interests in this contention or other parties to represent those interests. This duo are, however, to be accorded less weight than factors three and five. See id. at 245.

****52** And as to these two elements, factor three--sound record development-- and factor five--broadening and delaying the proceeding--provide, at best, only lukewarm support for late-admission. In connection with factor three, notwithstanding the Commission's directive that the proponent of a late-filed contention should, with as much particularity as possible, " 'identify its prospective witnesses, and summarize their proposed testimony,' " id. at 246 (quoting Mississippi Power and Light Co. (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-704, 16 NRC 1725, 1730 (1982)), the State has done little more than point to the two affiants supporting the contention, without providing any real clue about what they would say to support the contention beyond ***209** the minimal information they provide for admitting the contention.

[FN25] Further, regarding factor five, while submitted before contentions have been admitted and having some alleged relationship to admitted issue Utah L so as not to portend a protracted delay in the proceeding, as the Staff points out, this contention involves the use of proprietary information so that litigation on its merits carries the likelihood of some delay simply because of the additional procedures that must be utilized to ensure nondisclosure. [FN26] Accordingly, while the other four factors all support late-filed admission, whether taken individually or in concert, we do not find them sufficiently compelling to warrant the admission of Utah EE given the lack of good cause for its late filing.

UTAH FF--Inadequate Analysis of Radiation Shielding

CONTENTION: PFS has not demonstrated satisfaction of NRC dose limits at 10 C.F.R. s 72.104, because its analysis of radiation shielding for the proposed PFS facility is inadequately documented or explained.
DISCUSSION: State Contentions EE and FF at 13-17; PFS State Contentions EE and FF Response at 45-66; Staff State Contentions EE and FF Response at 7-11; State Contentions EE and GG Reply at 1.
RULING: This contention was withdrawn by the State. See State Contentions EE and GG Reply at 1.

***210** UTAH GG--Failure to Demonstrate Cask-Pad Stability During Seismic Event for TranStor Casks

CONTENTION: 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. ss 72.122(b)(2) and 72.128(a) in that:
1. The Sierra Nuclear site-specific analysis gives inadequate consideration to site-specific soil characteristics.
2. Insufficient information is provided about the input to the model of the PFS site soil characteristics to support the credibility of the analysis.
3. Sierra Nuclear's analysis demonstrates there is a potential stability problem with the casks during a design basis seismic event. Applicant's conclusion that the cask will not topple is inconsistent with Sierra Nuclear's recommendation that the possibility of tipover should be analyzed using the ANSYS finite element code.
****53** 4. The conclusion reached in the Sierra Nuclear Report demonstrates that the Holtec analysis is not based on an adequate inquiry into the vertical acceleration of the casks, tipover analysis, and soil site conditions and how these factors affect the stability of the casks.
5. Sierra Nuclear's consultant, Advent Engineering Services, Inc. did not consider that the coefficient of friction may vary over the surface of the pad and did not consider the shift from

Tr. at 419-44.

RULING: Relative to Utah GG, the State has identified two proprietary reports, see State Contention GG at 1 (citing Sierra Nuclear Corp., Soil-Structure Interaction Analysis for Evaluation of TranStor (R) Storage Cask Se[i]smic Stability, SNC No. PFS01-10.02.04 (Proprietary) (rev. 0 July 1997); Sierra Nuclear Corp., TranStor (R) Storage Cask Seismic Stability Analysis for PFS Site, SNC No. PFS01-10.02.05 (Proprietary) (rev. 0 July 1997)), it timely sought and did not receive until some 3 weeks after the November 24, 1997 contention-filing deadline. We conclude those documents are relevant to the development of paragraphs three, four, and five so as to provide good cause for the delay in filing these portions of the contention less than a month later. In contrast, after reviewing the two proprietary documents and the germane nonproprietary documents timely available to the State, we conclude neither proprietary report was necessary to the development of paragraphs one and two, in whole or in part, ***211** such that the 7-week delay in submitting these concerns was justified. See supra p. 208 (citing cases).

As to the other four factors, our analysis parallels that we outlined in connection with Utah EE in which we concluded these elements support late- filing, albeit only moderately so. See supra pp. 208-09. In the case of paragraphs three, four, and five, in light of the good cause for late filing, the overall balance clearly favors further consideration, late-filing notwithstanding. For paragraphs one and two, however, these factors are not sufficient to provide the compelling showing needed to offset the lack of good cause for the filing delay. See Braidwood, CLI-86-8, 23 NRC at 244. We thus conclude that balancing the five late-filing standards only sanctions further consideration of the admissibility of paragraphs three, four, and five, which we do below. [FN27]

b. Admissibility

DISCUSSION: State Contention GG at 4-8; PFS State Contention GG Response at 5- 13; Staff State Contention GG Response at 6-9; State Contentions EE and GG Reply at 27-32.

****54** RULING: Regarding paragraphs three, four, and five of this late-filed contention, the admissibility of which we have concluded appropriately can be considered, we find paragraphs three and four inadmissible because these portions of the contention and their supporting bases fail to establish with specificity any genuine dispute; lack adequate factual and expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above. Paragraph five is admitted as supported by a basis establishing a genuine material dispute adequate to warrant further inquiry. The contention as revised to reflect this ruling is set forth at p. 257 of Appendix A to this Memorandum and Order.

3. Castle Rock Contentions

CASTLE ROCK 1--Absence of NRC Authority

CONTENTION: The Application is defective because NRC does not have authority to license a large-scale, off-site facility for the long-term storage of spent nuclear fuel such as the proposed PFSF.

***212** DISCUSSION: Castle Rock Contentions at 2-10; PFS Contentions Response at 336-40; Staff Contentions Response at 99; Castle Rock Contentions Reply at 7-17; Tr. at 65-86.

RULING: For the reasons given in our discussion regarding Utah A, see supra p. 183, we find this contention inadmissible in that the contention and its supporting basis impermissibly challenge the agency's regulatory provisions or rulemaking-associated generic determinations. See also section II.B.1.a.ii above.

CASTLE ROCK 2--Noncompliance with Regulations

CONTENTION: PFS's Application is defective because it seeks a license for an ISFSI pursuant to 10 C.F.R. Part 72. However, the proposed storage installation is not an ISFSI and is otherwise not licensable under 10 C.F.R. Part 72 in that:

a. In order to harmonize the NRC regulations with the NWPA and Atomic Energy Act, the regulation defining ISFSI must be interpreted to exclude the proposed PFSF.

b. NRC regulations must be construed to require PFS to demonstrate maximization of the use of existing storage capability at reactor sites.

c. NRC regulations must be construed to require PFS to demonstrate that DOE has exhausted all means for providing off-site storage capacity.

d. NRC regulations must be construed to require a showing that DOE has attempted to establish a cooperative program for on-site storage under 42 U.S.C. s 10198.

DISCUSSION: Castle Rock Contentions at 10-15; PFS Contentions Response at 340- 43; Staff Contentions Response at 99-101; Castle Rock Contentions Reply at 17- 19; Tr. at 65-86.

RULING: Inadmissible in that the contention and its supporting bases impermissibly challenge the agency's regulatory structure, provisions, or rulemaking-associated generic determinations. See section II.B.1.a.ii above.

CASTLE ROCK 3--Conflict with DOE Duties and Prerogatives

CONTENTION: The Application must be denied because the proposed PFSF interferes with DOE duties and prerogatives under the NWPA.

**55 DISCUSSION: Castle Rock Contentions at 15-18; PFS Contentions Response at 343-46; Staff Contentions Response at 102-04; Castle Rock Contentions Reply at 19-20; Tr. at 65-85.

RULING: Inadmissible in that the contention and its supporting basis fails to establish with specificity any genuine dispute; impermissibly challenge the agency's regulatory structure, provisions, or rulemaking-associated generic determinations; ***213** and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, ii, v above.

CASTLE ROCK 4--Attempts to Evade the Requirements of the NWPA

CONTENTION: The status of the Application suggests that DOE has either tacitly or directly agreed with PFS and its member utilities to allow the Application to proceed in an attempt to evade the statutory mandates of the NWPA.

DISCUSSION: Castle Rock Contentions at 18-22; PFS Contentions Response at 346- 49; Staff Contentions Response at 104-05; Castle Rock Contentions Reply at 20- 22; Tr. at 77-86.

RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, ii, v above.

CASTLE ROCK 5--Application for Permanent Repository

CONTENTION: The proposed PFSF is properly characterized as a de facto permanent repository, and the Application fails to comply with the licensing requirements for a permanent repository in that:

a. no repository or other storage facilities capable of absorbing the 40,000 MTU of spent fuel to be stored at the PFSF exist, or likely will exist at the time PFS proposed to decommission the PFSF; the PFSF will function as a de facto permanent repository and must be licensed as such; the Application is defective because it does not meet the requirements of a permanent repository.

b. even if a permanent repository is operational at the time the PFSF is proposed to be decommissioned, such repository will not be able to absorb 40,000 MTU at once or at a rate that will permit decommissioning of the PFSF; the PFSF will function as a de facto permanent repository and must be licensed as such; the Application is defective because it does not meet the requirements of a permanent repository.

DISCUSSION: Castle Rock Contentions at 22-26; PFS Contentions Response at 349- 53; Staff Contentions Response at 105-07; Castle Rock Contentions Reply at 22- 29; Tr. at 100-19.

RULING: Inadmissible in that the contention and its supporting basis impermissibly challenge the agency's regulatory provisions or rulemaking- associated generic determinations. See section II.B.1.a.ii above.

*214 CASTLE ROCK 6--Emergency Planning and Safety Analysis Deficiencies

CONTENTION: The Application does not provide for reasonable assurance that the public health and safety will be adequately protected in the event of an emergency affecting the PFSF.

**56 DISCUSSION: Castle Rock Contentions at 26-30; PFS Contentions Response at 353-66; Staff Contentions Response at 107-08; Castle Rock Contentions Reply at 29-33; Tr. at 317-25, 686-87.

RULING: Relative to the Castle Rock's assertions regarding the impact on the PFS facility of fires in Skull Valley or accidents involving materials or activities at or emanating from the Dugway Proving Ground, the Department of Defense Chemical Weapons Incinerator, the Tooele Army Depot, Wendover Air Force Bombing Range, Hill Air Force Bombing Range, APTUS Hazardous Waste Incinerator, Laidlaw Hazardous Waste Incinerator and Landfill, and Envirocare of Utah Low Level Waste Disposal Facility, this contention is admitted as supported by bases establishing a genuine material dispute sufficient to warrant further inquiry. The contention's basis regarding the effect of the 2002 Olympic Winter Games was withdrawn. See Tr. at 686-87.

Because of the similarity of this contention and its supporting bases to Utah K, which Castle Rock Land/Skull Valley have adopted by reference, and a portion of Confederated Tribes B dealing with wildfires, see supra p. 191, infra p. 235, this contention and its bases are consolidated with Utah K and Confederated Tribes B, as is specified at p. 253 of Appendix A to this Memorandum and Order.

CASTLE ROCK 7--Inadequate Financial Qualifications

CONTENTION: The Application does not provide assurance that PFS will have the necessary funds to cover estimated construction costs, operating costs, and decommissioning costs, as

required by 10 C.F.R. s 72.22(e) in that:

a. PFS is a limited liability company with no known assets; because PFS is a limited liability company, absent express agreements to the contrary, PFS's members are not individually liable for the costs of the proposed PFSF, and PFS's members are not required to advance equity contributions. PFS has not produced any documents evidencing its members' obligations, and thus, has failed to show that it has a sufficient financial base to assume all obligations, known and unknown, incident to ownership and operation of the PFSF; also, PFS may be subject to termination prior to expiration of the license;

b. the Application does not adequately account for possible shortfalls in revenue if customers become insolvent, default on their obligations, or otherwise do not continue making payments to the proposed PFSF;

c. the Application does not provide assurance that PFS will have sufficient resources to cover nonroutine expenses, including without limitation the costs of a worst case accident in transportation, storage, or disposal of the spent fuel;

*215 d. the Application fails to provide enough detail concerning the limited liability company agreement between PFS's members, the Service Agreements to be entered with customers, the business plans of PFS, and the other documents relevant to assessing the financial strength of PFS;

**57 e. the Application fails to describe the legal obligations of the Skull Valley Band of Goshute Indians and provide assurance that third parties will have adequate legal remedies if injured as a result of its acts or omissions; and

f. the Application fails to itemize cost estimates and otherwise provide enough detail to permit evaluation of the tenability of such estimates.

DISCUSSION: Castle Rock Contentions at 30-40; PFS Contentions Response at 366- 77; Staff Contentions Response at 108; Castle Rock Contentions Reply at 33-40; Tr. at 232-38.

RULING: Admissible with regard to paragraphs a through d and f in that these portions of the contention and their supporting bases are sufficient to establish a genuine material dispute adequate to warrant further inquiry. Inadmissible as to paragraph e in that this portion of the contention and its supporting basis fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including 10 C.F.R. s 72.22; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, ii, v above.

As we noted above, see supra pp. 187, 197, because of the similarity of the admitted portions of this contention to Utah E and Utah S, both of which Castle Rock Land/Skull Valley have incorporated by reference, the Board will consolidate some aspects of this contention with those issue statements. In the case of Utah E, which concerns financial assurance generally, at pp. 251-52 of Appendix A to this Memorandum and Order the Board has set forth a revised contention that incorporates the issues raised by Castle Rock in paragraphs a through d and f. With regard to Utah S, which concerns decommissioning, the Board finds that the specific concerns expressed in paragraphs c and f of Castle Rock 7 relating to decommissioning costs are covered in bases four and five of Utah S, and thus should be litigated in conjunction with that contention as it is set forth at p. 255 of Appendix A to this Memorandum and Order.

CASTLE ROCK 8--Groundwater Quality Degradation

CONTENTION: The Application, including the ER, is defective and therefore raises the issue

of risk to public health and safety because the proposed site of the PFSF will not, or cannot, be adequately protected against ground water contamination due to facility design, its location, contaminants it will generate, and the nature of the soils and bedrock of the area.
*216 DISCUSSION: Castle Rock Contentions at 40-41; PFS Contentions Response at 377-81; Staff Contentions Response at 109; Castle Rock Contentions Reply at 40-41; Tr. at 360-66.
RULING: Admissible in that this contention and its supporting basis are sufficient to establish a genuine material dispute adequate to warrant further inquiry.
As we noted above, see supra p. 193, because of the similarity of this contention to Utah O, which Castle Rock Land/Skull Valley have incorporated by reference, the Board will consolidate this contention and its supporting basis into that issue statement. The Board sets forth the consolidated contention at p. 254 of Appendix A to this Memorandum and Order.

CASTLE ROCK 9--Regional and Cumulative Environmental Impacts

**58 CONTENTION: The Application fails to adequately discuss the regional and cumulative environmental impacts of the proposed PFSF, as required by 10 C.F.R. ss 72.98(b) & (c) and 72.100, and NEPA, in that:
a. the SAR and ER fail to address the cumulative regional health and safety impact of the ISFSI and other dangerous facilities in Tooele County, including without limitation issues regarding the cumulative impact to the regional environment and population;
b. the SAR and ER fail to address the cumulative quantitative risk to the public of numerous dangerous facilities in one area and the interrelated transportation, sabotage, and accident risks arising from concentration of such facilities.
DISCUSSION: Castle Rock Contentions at 41-44; PFS Contentions Response at 381- 86; Staff Contentions Response at 109-11; Castle Rock Contentions Reply at 41- 43; Tr. at 621-34.
RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations, including 10 C.F.R. s 72.122; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

CASTLE ROCK 10--Retention Pond

CONTENTION: The Application, including the ER, is defective and therefore raises public health and safety risks because it does not adequately address the potential of overflow and groundwater contamination from the retention pond and the environmental hazards created by such overflow, in that
a. The ER fails to discuss potential for overflow and therefore fails to comply with 10 C.F.R. Part 51.
*217 b. ER is deficient because it contains no information concerning effluent characteristics and environmental impacts associated with seepage from the pond in violation of 10 C.F.R. s 51.45(b) and s 72.126(c) & (d).
c. The ER should address the applicability of the Utah Groundwater Protection Rules, which apply specifically to facilities such as the retention pond and generally require that such ponds be lined.
DISCUSSION: Castle Rock Contentions at 44-45; PFS Contentions Response at 386- 90; Staff

Contentions Response at 111; Castle Rock Contentions Reply at 43-44; Tr. at 360-66.
RULING: Admissible in that this contention and its supporting basis are sufficient to establish a genuine material dispute adequate to warrant further inquiry.
Because of the similarity of this contention to Utah O, which Castle Rock Land/Skull Valley have incorporated by reference, with one exception the Board consolidates this contention and its supporting basis into that issue statement. See supra p. 193. The exception is paragraph c, which is consolidated into Utah T, also incorporated by reference by Castle Rock Land/Skull Valley. See supra p. 198. The Board has set forth the consolidated contentions at pp. 254 and 255-56 of Appendix A to this Memorandum and Order.

CASTLE ROCK 11--Radiation and Environmental Monitoring

****59** CONTENTION: The Application poses undue risk to the public health and safety and fails to comply with 10 C.F.R. s 72.24, s 72.122(b)(4), and s 72.126 because it fails to provide for adequate radiation monitoring necessary to facilitate radiation detection, event classification, emergency planning, and notification, including systematic baseline measurements of soils, forage, and water either near the PFSF site, or at Petitioners' adjoining lands in that:
a. PFS has taken no background radiological samples of nearby vegetation and groundwater.
b. PFS has provided no radioactive effluent monitoring system to detect radioactive contamination in surface runoff water that collects in a retention pond on the PFSF site.
DISCUSSION: Castle Rock Contentions at 45-47; PFS Contentions Response at 390- 96; Staff Contentions Response at 112-13; Castle Rock Contentions Reply at 44; Tr. at 381-85, 388.
RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, ii, v above.

***218** CASTLE ROCK 12--Permits, Licenses, and Approvals

CONTENTION: The Application violates NRC regulations and NEPA because the ER fails to address adequately the status of compliance with all Federal, State, regional and local permits, licenses and approvals required for the proposed PFSF facility (see, e.g., 10 C.F.R. ss 51.45(d) and 51.71(d)) in that:
a. The ER does not contain a list of all permits, etc. which must be obtained as required by 10 C.F.R. s 51.45(d).
b. The ER fails to include a discussion of the status of compliance with applicable environmental quality standards and requirements as required by 10 C.F.R. s 51.45(d) in that:
i. the discussion of the Army Corps of Engineers permitting requirements for construction along the new corridor is inadequate;
ii. the discussion of requirements at the Site is inadequate; and
iii. the conclusory sentence that no air quality permitting requirements apply is inadequate.
c. Section 9.2 of the ER discussing Utah permitting requirements is inadequate.
d. Sections 4.1.3 and 4.2.3 of the ER concerning Utah air quality permits are inadequate.
e. ER discussion of widening Skull Valley Road is inadequate.
DISCUSSION: Castle Rock Contentions at 47-50; PFS Contentions Response at 397- 407; Staff Contentions Response at 114; Castle Rock Contentions Reply at 44-45; Tr. at 494-503.

RULING: Admissible in that the contention and its supporting bases are sufficient to establish a genuine material dispute adequate to warrant further inquiry, with the caveat that the approvals and entitlements properly at issue under these allegations are limited to those involving appropriate governmental (as opposed to nongovernmental/private) entities.

****60** As we noted above, see supra p. 198, because of the similarity of this contention to Utah T, which Castle Rock Land/Skull Valley have incorporated by reference, the Board consolidates this contention and its supporting bases into that issue statement. The Board has set forth the consolidated contentions at pp. 255-56 of Appendix A to this Memorandum and Order.

CASTLE ROCK 13--Inadequate Consideration of Alternatives

CONTENTION: The Application violates NRC regulations and NEPA because the ER fails to give adequate consideration to alternatives, including alternative sites, alternative technologies, and the no-action alternative, see 10 C.F.R. s 51.45(c), in that:

a. There is no discussion in the ER on the required topics of environmental effects and impacts, economic, technical and other costs and benefits of the alternatives.

***219** b. The evaluation and comparison of the no build or no action alternative is inadequate.

c. The analyses of alternatives ignores every potential negative factor with respect to the PFSF. Such an analysis must include:

i. the environmental and safety benefits associated with maintaining and expanding a decentralized, onsite storage system;

ii. the environmental and safety impacts and risks associated with the proposed privately operated, centralized system;

iii. the state-by-state, plant-by-plant facts which create the need PFS asserts is present for moving the spent fuel to another location;

iv. the environmental impacts and safety hazards associated with moving so many casks from various locations across the country to a centralized location; and

v. the environmental benefits of a combination of expanded onsite storage and regional ISFSIs.

DISCUSSION: Castle Rock Contentions at 50-52; PFS Contentions Response at 407- 19; Staff Contentions Response at 114-15; Castle Rock Contentions Reply at 45- 47; Tr. at 684-89, 692-93.

RULING: Admissible as to paragraph a, in that this portion of the contention and its supporting basis are sufficient to establish a genuine material dispute adequate to warrant further inquiry, with the caveat that the scope of this portion of the contention is limited to the issue of the adequacy of the PFS alternative site analysis. Inadmissible as to paragraphs b and c in that these portions of the contention and their supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above. We also note that the lack of any ER discussion of a HLW storage legislative solution and the 2002 Winter Olympic games as bases were withdrawn. See Tr. at 684-85, 686-87.

As we noted above, see supra p. 203, because of the similarity of the admitted portion of this contention to Utah AA, which Castle Rock Land/Skull Valley have incorporated by reference, the Board consolidates the admitted portion of this contention and its supporting basis into that issue statement. The Board has set forth the consolidated contention at p. 256 of Appendix A to

this Memorandum and Order.

CASTLE ROCK 14--Inadequate Consideration of Impacts

**61 CONTENTION: The Application violates NRC regulations and NEPA because the ER fails to give adequate consideration to the adverse impacts of the proposed PFSF, including the risk of transportation accidents, the risks of contamination of human and livestock food sources, the risks of contamination of water sources (including ground water *220 contamination arising from leaching of contaminated soils), the risks of particulate emissions from construction and cement activities and similar risks (10 C.F.R. s 72.100) in that:

a. Section 5.2 discussing transportation accidents contains no site specific information on the "effects on populations in the region" as required by the rule.

b. Chapter 4 of the ER contains no meaningful evaluation of impact of unlined retention pond and other PFSF operations on surrounding subsoils and ground water.

c. The ER fails to give adequate consideration to the adverse impacts of the PFSF, including the risks of contamination of human and livestock food sources.

d. The ER fails to give adequate consideration to the adverse impacts of the PFSF, including the risks of particulate emissions from construction and cement activities.

DISCUSSION: Castle Rock Contentions at 52-53; PFS Contentions Response at 420- 25; Staff Contentions Response at 115-16; Castle Rock Contentions Reply at 47; Tr. at 621-34.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

CASTLE ROCK 15--Cost-Benefit Analysis

CONTENTION: The Application violates NRC regulations and NEPA because the ER does not contain a reasonable and legitimate comparison of costs and benefits, 10 C.F.R. s 51.45(c), in that:

a. ER Chapter 7 cost-benefit analysis is overly simplistic and fails to account for the true environmental, safety, social and economic costs associated with the proposed PFSF in Skull Valley.

b. Cost-benefit analysis fails to account for the "loss of property values, economic opportunities and other business and economic losses" imposed by mere existence of PFSF.

c. Chapter 7 of the ER fails to discuss applicant's financial arrangements with the Skull Valley Band which is essential to the cost-benefit analysis.

d. The Castle Rock Petitioners intend to offer evidence on true costs of the proposed facility.

DISCUSSION: Castle Rock Contentions at 53; PFS Contentions Response at 425-30; Staff Contentions Response at 116-17; Castle Rock Contentions Reply at 47; Tr. at 745-50.

*221 RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, v above.

CASTLE ROCK 16--Impacts on Flora, Fauna, and Existing Land Uses

**62 CONTENTION: The Application violates NRC regulations and NEPA because the ER does not adequately address the impact of the proposed PFSF upon the agriculture, recreation, wildlife, endangered or threatened species, and land quality of the area, see 10 C.F.R. s 72.100(b), in that:

a. the ER fails to evaluate both usual and unusual site characteristics throughout all of Northwestern Utah;

b. the ER fails to provide sufficient facts to enable one to understand the true impacts of the PFS on the environment, including without limitation information from a survey of endangered or threatened species in the area (including small spring parsley, Pohl's milkvetch, peregrine falcon, and the Skull Valley Pocket gopher);

c. the precise transportation corridor has not been identified, and thus the Application does not contain specific information about affected species in the transportation corridor.

DISCUSSION: Castle Rock Contentions at 54-55; PFS Contentions Response at 430- 37; Staff Contentions Response at 117-18; Castle Rock Contentions Reply at 47- 48; Tr. at 783-90.

RULING: Admissible as to paragraph b in that this portion of the contention and its supporting basis is sufficient to establish a genuine material dispute adequate to warrant further inquiry, with the caveat that it is limited to the small spring parsley, Pohl's milkvetch, and pocket gopher. Inadmissible as to paragraphs a and c in that these portions of the contention and their supporting bases fail to establish with specificity any genuine dispute; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, v above.

As we noted above, see supra p. 206, because of the similarity of the admitted portions of this contention to portions of Utah DD, which Castle Rock Land/Skull Valley have incorporated by reference, the Board consolidates the admitted portion of this contention and its supporting bases into that issue statement. The Board has set forth the consolidated contention at pp. 256-57 of Appendix A to this Memorandum and Order.

CASTLE ROCK 17--Inadequate Consideration of Land Impacts

CONTENTION: The Application violates NRC regulations and NEPA because the ER does not adequately consider the impact of the facility upon such critical matters as future economic and residential development in the vicinity, potential differing land uses, property values, the tax base, and the loss of revenue and opportunity for agriculture, recreation, beef and dairy production, residential and commercial development, and investment opportunities, *222 all of which have constituted the economic base and future use of Skull Valley and the economic interests of Petitioners, or how such impacts can and must be mitigated, see, e.g., 10 C.F.R. ss 72.90(e), 72.98(c)(2) and 72.100(b), in that:

a. the ER does not recognize the potential use of the areas surrounding the PFSF for residential or commercial development;

**63 b. the ER paints a misleading picture of the area population by ignoring a majority of the Salt Lake Valley;

c. the ER fails to consider the effect of the PFSF on the present use of Castle Rock's lands for farming, ranch operations and residential purposes or the projected use of such lands for dairy operations, residential development, or commercial development;

d. the ER provides no, or inaccurate, information on the economic value of current agricultural/ranching operations conduct on Castle Rock's lands; and

e. the ER fails to discuss the impact of placing a spent fuel storage facility near a national

wilderness area.
DISCUSSION: Castle Rock Contentions at 56-58; PFS Contentions Response at 437- 48; Staff Contentions Response at 118-19; Castle Rock Contentions Reply at 48- 50; Tr. at 634-44.
RULING: Admissible in that this contention and its supporting bases are sufficient to establish a genuine material dispute adequate to warrant further inquiry.

CASTLE ROCK 18--Impacts on Public Health

CONTENTION: The Application violates NRC regulations and NEPA because the Environmental Report (ER) does not adequately consider the impact of the proposed PFSF upon the production of the agricultural products for human consumption by Petitioners, their tenants and others in the area (see 10 C.F.R. s 72.98(b)) in that:
a. The ER fails to analyze, evaluate, or consider the potential impacts on the regional population associated with potential contamination of plants or animals destined for human consumption.
b. The ER provides no detailed description at all of the coordinated ranching, farming, and livestock production activities currently carried on by Petitioners.
DISCUSSION: Castle Rock Contentions at 58; PFS Contentions Response at 448-55; Staff Contentions Response at 119; Castle Rock Contentions Reply at 50; Tr. at 634-44.
RULING: Inadmissible in that this contention and its supporting bases fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

*223 CASTLE ROCK 19--Septic Tank

CONTENTION: The Application violates NRC regulations and NEPA because the ER does not adequately consider the impact of a septic tank system on the ground water and ecology of the area and the related potential of this system to injure Petitioners (see 10 C.F.R. ss 72.98(b) and 72.100(b)), in that:
a. The ER contains very little information on how sewage wastes will be managed at the proposed facility during both the construction and operation of the facilities.
b. The ER fails to discuss in detail how the septic system will be designed so as to eliminate the risk of contamination to groundwater and Petitioner's property.
DISCUSSION: Castle Rock Contentions at 58-59; PFS Contentions Response at 455- 57; Staff Contentions Response at 120; Castle Rock Contentions Reply at 51; Tr. at 360-66.
**64 RULING: Inadmissible in that this contention and its supporting bases fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

CASTLE ROCK 20--Selection of Road or Rail Access to PFSF Site

CONTENTION: The Application violates NRC regulations and NEPA because it fails to describe the considerations governing selection of either the Skull Valley Road or the rail spur access alternative over the other and the implications of such selection in light of such considerations. See 10 C.F.R. ss 51.45(c) and 72.100(b), in that:
a. The ER is deficient because it fails to properly analyze the transportation alternatives.

b. The ER is incomplete because investigations and studies have not been performed which will have a direct bearing on the environmental effects of the alternative selected.

c. The ER is defective because PFS is considering a third option not discussed in the ER.

d. The ER fails to mention some significant environmental effects of the transportation alternatives such as increased traffic and noise.

DISCUSSION: Castle Rock Contentions at 59-60; PFS Contentions Response at 457- 60; Staff Contentions Response at 120; Castle Rock Contentions Reply at 51; Tr. at 518-22.

RULING: Admissible in that this contention and its supporting bases are sufficient to establish a genuine material dispute adequate to warrant further inquiry.

*224 CASTLE ROCK 21--Exact Location of Rail Spur

CONTENTION: The Application violates NRC regulations and NEPA because it fails to describe in detail the route of the potential rail spur, property ownership along the route, and property rights needed to construct and operate the rail spur (see 10 C.F.R. s 72.90(a)), in that:

a. The ER fails to provide any detail concerning location of the rail spur and impact on property rights along the route.

b. Upon information and belief, ER is defective because PFS is considering two locations for the rail spur.

DISCUSSION: Castle Rock Contentions at 60-61; PFS Contentions Response at 460- 62; Staff Contentions Response at 120-21; Castle Rock Contentions Reply at 51- 52; Tr. at 518-22.

RULING: Admissible in that this contention and its supporting bases are sufficient to establish a genuine material dispute adequate to warrant further inquiry.

CASTLE ROCK 22--Road Expansion Authorizations

CONTENTION: The Application violates NRC regulations and NEPA because it fails to describe adequately the nature and ownership of right-of-way that would permit PFS's contemplated improvements of the Skull Valley Road and what permits and approval from, or agreements with, the owner or owners thereof are needed for such improvements. See 10 C.F.R. s 72.90(a).

DISCUSSION: Castle Rock Contentions at 61-62; PFS Contentions Response at 462- 64; Staff Contentions Response at 121; Castle Rock Contentions Reply at 52; Tr. at 518-22.

**65 RULING: Admissible in that this contention and its supporting bases are sufficient to establish a genuine material dispute adequate to warrant further inquiry, with the caveat that the approvals properly at issue under these allegations are limited to those involving appropriate governmental (as opposed to nongovernmental/private) entities.

As we noted above, see supra p. 198, because of the similarity of this contention to a portion of Utah T, which Castle Rock has incorporated by reference, the Board consolidates this contention and its supporting bases into that issue statement. The Board has set forth the consolidated contentions at pp. 255-56 of Appendix A to this Memorandum and Order.

CASTLE ROCK 23--Existing Land Uses

CONTENTION: The Application violates NRC regulations and NEPA because it fails to describe with particularity, using appropriate maps, land use patterns and ownership as to lands

in the vicinity of the proposed PFSF and along the 24-mile access route, including *225 without limitation, homes, outbuildings, corrals and fences, roads and trails, pastures, crop producing areas, water wells, tanks and troughs, ponds, ditches and canals. See 10 C.F.R. ss 72.90(a) & (c), 72.98(b), in that:

a. PFS fails to discuss in detail the various impacted property rights and owners around the site and along the 24-mile transportation corridor.

b. PFS fails to discuss the legal basis for the right of way along the 24- mile transportation corridor.

c. PFS fails to identify existing structures that would be impacted by the ISFSI and the various transportation corridors suggested by PFS.

d. PFS fails to discuss impacts to existing grazing patterns and rights that would be impacted by the ISFSI and the various transportation corridors proposed by PFS.

e. PFS fails to discuss all impacts to those living near to the ISFSI and the proposed transportation corridors.

f. The PFS application has "other deficiencies."

DISCUSSION: Castle Rock Contentions at 62-63; PFS Contentions Response at 464- 73; Staff Contentions Response at 122-23; Castle Rock Contentions Reply at 52- 53; Tr. at 523-25.

RULING: Inadmissible in that this contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

CASTLE ROCK 24--Adoption by Reference

CONTENTION: Petitioners Castle Rock and Skull Valley Co. by this reference adopt in its entirety each and every contention filed by the State of Utah and incorporate each herein by this reference.

DISCUSSION: Castle Rock Contentions at 63; PFS Contentions Response at 473-74; Staff Contentions Response at 123; Castle Rock Contentions Reply at 53; Tr. at 89-93.

**66 RULING: Inadmissible in that this is an inappropriate subject for a contention. As is outlined in section II.B.1.c above, the Board will permit Castle Rock to incorporate the State's contentions, some of which we have found inadmissible, subject to the restrictions described in section III.A below.

*226 4. OGD Contentions

OGD A--Lack of Sufficient Provisions for Prevention of and Recovery from Accidents

CONTENTION: The license application poses undue risk to public health and safety because it lacks sufficient provisions for prevention of and recovery from accidents during storage resulting from such causes as sabotage, fire, cask drop and bend, lid drop damage and/or improper welds.

1. The license application does not address the full range of accidents which could occur.

2. The license application does not adequately address the accident impacts of human error or intentional human actions.

3. The license application does not include a "hot cell" and the associated remote fuel handling equipment to safely unload, replace or reload a damaged fuel canister.

4. The ever present risk of accidents will adversely impact members of OGD.
DISCUSSION: OGD Contentions at 1-5; PFS Contentions Response at 474-86; Staff Contentions Response at 76-78; Tr. at 219-22.
RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. [FN28] See section II.B.1.a.i, ii, v, vi above. Moreover, to the extent this contention seeks to introduce the issue of "psychological stress," it does not have a cognizable basis. See Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766, 772-79 (1983).

OGD B--Emergency Plan Fails to Address the Safety of Those Living Outside of the Facility

CONTENTION: The license application, specifically the emergency plan submitted with the license application fails to address the safety provisions made for those individuals living outside of the facility within a five mile radius of the facility. The emergency plan addresses only those measures that pertain to employees and have not addressed the provisions that would apply to those people living around the facility. The emergency plan does not address a warning system such as would be implemented to put the residents on notice of an accident.
1. Adequate backup means for offsite communications for notification of emergencies or requests for assistance are not included in the license application.
*227 2. Means for compliance with the Emergency Planning and Community Right-To-Know Act of 1986, Title III, Pub.L. 99-499 is lacking in the license application.
3. The license application fails to meet all the requirements of 10 C.F.R. s 72.32(a)(8).
**67 DISCUSSION: OGD Contentions at 6; PFS Contentions Response at 486-93; Staff Contentions Response at 78-79; Tr. at 803-09.
RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

OGD C--License Application Lacks Sufficient Provisions for Protection Against Transportation Accidents

CONTENTION: The license application poses undue risk to public health and safety because it lacks sufficient provisions for protection against transportation accidents, including a criticality accident.
1. The license application fails to provide sufficient protection against transportation accidents because of the design of the shipping cask.
2. The license application lacks sufficient measures for protection of shipping casks during harsh summers and sub-zero temperatures of winter.
3. The license application fails to consider the historical record and consequences of spent nuclear fuel transportation accidents and incidents as well as the number of incidents that might occur given that record.
4. The license application fails to provide sufficient information about the radiological characteristics of the spent fuel to be shipped to fully evaluate the impacts and risks of spent

nuclear fuel transportation to PFS.

5. The license application fails to provide sufficient detail about the anticipated shipment characteristics necessary for evaluation of transportation impacts and risks.

6. The license application ignores the potentially severe consequences of a successful terrorist attack against a spent fuel shipping cask using a high energy explosive device or an anti-tank weapon.

7. The license application ignores the significant radiation exposures which members of OGD and other residents of Skull Valley may receive as a result of gridlock traffic incidents and other routine transportation activities.

DISCUSSION: OGD Contentions at 6-16; PFS Contentions Response at 493-514; Staff Contentions Response at 79-82; Tr. at 593-600.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the ***228** Commission's regulations or generic rulemaking-associated determinations, including 10 C.F.R. s 51.52 (Summary Table S-4) and 10 C.F.R. Parts 71 and 73; raise issues beyond the scope of this proceeding; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iii, v, vi above. Moreover, to the extent this contention seeks to include consideration of "psychological stress" as an environmental impact under NEPA, it does not have a cognizable basis. See Metropolitan Edison Co., 460 U.S. at 772-79.

OGD D--License Application Lacks Procedures for Returning Damaged Casks to the Generating Reactor

****68** CONTENTION: The license application poses undue risk to public health and safety because it has not provided procedures for returning casks to the generating reactor. The SAR indicates that the casks will be inspected for damage prior to "accepting" the cask and before it enters the Restricted Area. SAR p. 5.1-4. If the casks are damaged or do not meet the criteria specified in LA AP. A, p. TS-19 there is no provision for housing the casks prior to shipping the cask back to the generating reactor.

DISCUSSION: OGD Contentions at 16; PFS Contentions Response at 514-21; Staff Contentions Response at 82-83; Tr. at 254-58.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; raise issues beyond the scope of this proceeding; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iii, v, vi above.

OGD E--License Application Fails to Provide Information and a Plan to Deal with Casks That May Leak or Become Contaminated During the 20 to 40 Year Storage Period

CONTENTION: The License Application poses undue risk to the public health and safety because it fails to provide information and a plan to deal with casks that may leak or become contaminated during the 20 to 40 year storage period. Sending such casks back to the generating reactor may not be an option for several reasons, such as: PFS does not have the facilities to repackage contaminated canisters, the casks may be too contaminated to transport, or the nuclear power plant from which the fuel originated may have been decommissioned, and there are no

assurances that the storage will be only "interim". The license application provides no assurance that there will be an alternative location to which canisters and/or casks can be shipped if they become defective while in storage at PFS.

1. The license application provides very little procedure for dealing with defective canisters and/or casks that may leak or become contaminated.

*229 2. No alternative location is designated in the license application should a canister become defective while in storage especially if the reactor that originally shipped the canister is decommissioned.

3. The license application does not adequately address the uncertainties about the suitability of Yucca Mountain as a repository site, and if ever, spent fuel stored at PFS should be shipped to Yucca Mountain.

DISCUSSION: OGD Contentions at 17-18; PFS Contentions Response at 521-29; Staff Contentions Response at 83-84; Tr. at 258-61.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations, including 10 C.F.R. s 51.23; lack materiality; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iv, v, vi above.

OGD F--License Application Fails to Make Clear Provisions for Funding of Estimated Construction Costs, Operating Costs, and Decommissioning Costs

**69 CONTENTION: The license application fails to make clear provisions for funding of estimated construction costs, operating costs, and decommission costs. It also fails to make clear as part of the construction costs who the contractors will be.

1. The license application does not demonstrate that PFS "either possesses the necessary funds, or ... has reasonable assurance of obtaining the necessary funds" as required by 10 C.F.R. s 72.22(e).

DISCUSSION: OGD Contentions at 18-19; PFS Contentions Response at 529-33; Staff Contentions Response at 84; Tr. at 241.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

OGD G--License Application Fails to Provide for Adequate Radiation Monitoring

CONTENTION: The license application poses undue risk to public health and safety because it fails to provide for adequate radiation monitoring to protect the health of the public and workers. It also fails to provide for adequate radiation monitoring necessary to facilitate radiation detection, event classification, emergency planning and notification.

1. The license application does not meet the requirements of 10 C.F.R. s 72.32(6).

2. The license application does not address releases outside of the ISFSI site.

*230 DISCUSSION: OGD Contentions at 19-20; PFS Contentions Response at 533- 44; Staff Contentions Response at 85-86; Tr. at 385-88.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with

specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.
The Board also notes that Petitioner's request for onsite radiation monitoring measures as specified in paragraphs A-D of its contention was withdrawn. See Tr. at 385-86.

OGD H--The License Application Poses Undue Risk to Public Health and Safety Because It Fails to Provide Adequate Protection of the Site Against Intruders

CONTENTION: The license application poses undue risk to public health and safety because it fails to provide adequate protection of the ISFSI against intruders. The site is in such a remote area that it would take at least two (2) hours for access to the [site] to be made by emergency personnel.
DISCUSSION: OGD Contentions at 20-22; PFS Contentions Response at 544-56; Staff Contentions Response at 86-89; Tr. at 465.
RULING: As is reflected in the record, see Tr. at 465, this contention was withdrawn by Petitioner OGD.

OGD I--The Cask Design Is Unsafe and Untested for Long Periods of Time

**70 CONTENTION: The license application poses undue risk to public health and safety because it calls for use of a cask whose design is unsafe and untested for long periods of time and which has not been certified for either transportation or long term storage.
1. The license application fails to meet the requirements of 10 C.F.R. s 72.22(e) because the cask design is not certified.
2. No meaningful EIS under NEPA can be completed until the cask design is certified.
DISCUSSION: OGD Contentions at 22; PFS Contentions Response at 556-62; Staff Contentions Response at 89-90; Tr. at 290-91.
RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; and/or lack adequate factual or expert opinion support. See section II.B.1.a.i, ii, v above.

*231 OGD J--The License Application Fails to Address the Status of Compliance with All Permits, Licenses, and Approvals for the Facility

CONTENTION: The license application violates NRC regulations because the ER fails to address the status of compliance with all permits, licenses and approvals required for the facility.
DISCUSSION: OGD Contentions at 23-24; PFS Contentions Response at 562-70; Staff Contentions Response at 90-91; Tr. at 510-18.
RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; lack adequate factual and expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above. Moreover, to the extent this contention is footed in a purported "trust responsibility" owed to individual members of a Native American tribe by a federal regulatory agency exercising its undifferentiated statutory responsibility to protect the public health and safety and the environment, it lacks a

litigable basis.
We also note that OGD revised this contention to withdraw any portion of the contention that deals with OGD A. See Tr. at 510.

OGD K--There Are No Provisions for Paying for Casks That May Need to Be Returned to the Generating Facility

CONTENTION: The license application poses undue risk to public health and safety because it does not address how the facility will deal with paying for or returning casks that may prove unsafe should the generating reactor have been decommissioned.
DISCUSSION: OGD Contentions at 24-25; PFS Contentions Response at 570-78; Staff Contentions Response at 91-92; Tr. at 418-19.
RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

OGD L--Operators Will Not Be Trained for the Specific Job When Hired and Operators Will Undergo On-the-Job Training
**71 CONTENTION: The license application poses undue risk to public health and safety because it provides that operators will not be trained for the specific job when hired and that operators will undergo on-the-job training, and classroom training leading to certification. The license application states that "of necessity, the first individuals certified may have to improvise in certain situations to complete the practical factors." See, License Application, LA Chapter 7 p. 7.1. This doesn't protect public health and safety in any manner.
*232 1. The license application does not meet the requirements of 10 C.F.R. s 72.32, in that persons being trained on the job will not be able to carry out their responsibilities under 10 C.F.R. s 72.32(a)(7).
DISCUSSION: OGD Contentions at 25-26; PFS Contentions Response at 578-83; Staff Contentions Response at 92-93; Tr. at 264-68.
RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

OGD M--No Provisions for Transportation Accidents Are Made

CONTENTION: The license application poses undue risks to public health and safety because it makes no provisions for transportation accidents that might occur.
1. The license application does not adequately address the requirements of 10 C.F.R. s 72.32(a)(2) by failing to address transportation accidents near the site.
DISCUSSION: OGD Contentions at 26-27; PFS Contentions Response at 583-87; Staff Contentions Response at 93-94; Tr. at 328-31.
RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; raise issues beyond the scope of this proceeding; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS

application. See section II.B.1.a.i, ii, iii, v, vi above.

OGD N--There May Be a Leak That Contaminates the Present Water System

CONTENTION: The license application poses undue risk to public health and safety because it fails to address the possibility of a leak occurring that might contaminate the present water system that members of the community rely on. The application admits that several wells are going to have to be built to meet the demand that will be presented by the facility. Neither contingencies to deal with contamination nor lowering of the present water table are discussed.
DISCUSSION: OGD Contentions at 27; PFS Contentions Response at 587-91; Staff Contentions Response at 94-95; Tr. at 366-67.
RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above. Moreover, to the extent this contention is rooted in a purported "trust responsibility" owed to individual members *233 of a Native American tribe by a federal regulatory agency exercising its undifferentiated statutory responsibility to protect the public health and safety and the environment, it lacks a litigable basis.

OGD O--Environmental Justice Issues Are Not Addressed

**72 CONTENTION: The license application poses undue risk to public health and safety because it fails to address environmental justice issues. In, Executive Order 12898, 3 C.F.R. 859 (1995) issued February 11, 1994, President Clinton directed that each Federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in the United States." It is not just and fair that this community be made to suffer more environmental degradation at the hands of the NRC. Presently, the area is surrounded by a ring of environmentally harmful companies and facilities. Within a radius of thirty- five (35) miles the members of OGD and the Goshute reservation are inundated with hazardous waste from: Dugway Proving Ground, Utah Test and Training Range South, Deseret Chemical Depot, Tooele Army Depot, Envirocare Mixed Waste storage facility, APTUS Hazardous Waste Incinerator, Grassy Mountain Hazardous Waste Landfill and Utah Test and Training Range North.
DISCUSSION: OGD Contentions at 27-36; PFS Contentions Response at 591-611; Staff Contentions Response at 95-97; Tr. at 664-70, 707-16.
RULING: Admissible as supported by bases establishing a genuine material dispute adequate to warrant further inquiry, with the caveat that the contention is limited to the disparate impact matters outlined in bases one, five, and six. Moreover, basis six is limited to the effects of the PFS facility on property values in and around the Skull Valley Goshute community as a component in the "environmental justice" assessment of any disparate impacts suffered by minority and low-income communities. It also is not admissible to permit consideration of "psychological stress" as an environmental impact under NEPA, which is not a cognizable basis for the contention. See Metropolitan Edison Co., 460 U.S. at 772-79. Bases two, three, and four do not support admission of this contention because the facility cost-benefit issues they seek to raise are not relevant to this contention.

OGD P--Members of OGD Will Be Adversely Impacted by Routine Operations of the Proposed Storage Facility and Its Associated Transportation Activities

CONTENTION: The ability of OGD members to pursue the traditional Goshute life style will be adversely impacted by the routine operations at the storage facility. Obvious impacts resulting from the physical presence of the facility are: visual intrusion, noise, worker and visitor traffic to and from the storage site, and presence of strangers in the community. Those impacts that are not as obvious but nonetheless serious are: individual and collective social, psychological, and cultural impacts such as a sense of loss of well-being because of ***234** the dangerous wastes that are being stored near their homes, in their community, and on their ancestral lands.

****73** The ability of OGD members to pursue a traditional Goshute life style will be adversely affected by routine transportation operations of spent nuclear fuel and/or the presence of trucks, especially very large heavy haul trucks. The other obvious and other effects include the same kind of effects that are listed above, including fear that a transportation accident might happen, fear of acts of terrorism or sabotage which could expose members of OGD and their families, their homes, the community and their ancestral land.

DISCUSSION: OGD Contentions at 36-37; PFS Contentions Response at 612-29; Staff Contentions Response at 97-99; Tr. at 644-52.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above. Moreover, to the extent this contention seeks consideration of "psychological stress" as an environmental impact under NEPA, it does not have a cognizable basis. See Metropolitan Edison Co., 460 U.S. at 772-79.

5. Confederated Tribes Contentions

CONFEDERATED TRIBES A--Decommissioning Plan Deficiencies

CONTENTION: PFS has not provided reasonable assurance that the ISFSI can be cleaned up and adequately restored upon cessation of operations.

DISCUSSION: Confederated Tribes Contentions at 2-3; PFS Contentions Response at 619-29; Staff Contentions Response at 124-26; Tr. at 409-18.

RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; lack materiality; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iv, v, vi above.

CONFEDERATED TRIBES B--Lack of Protection Against Worst Case Accidents

CONTENTION: PFS has violated both NRC regulations and NEPA requirements by not adequately dealing with certain reasonably foreseeable accidents and failing to fully evaluate their potential impacts on health and the environment, to protect against them in an adequate manner, or to provide adequate emergency response measures.

DISCUSSION: Confederated Tribes Contentions at 3-4; PFS Contentions Response at 630-43;

Staff Contentions Response at 126-28; Tr. at 327-28.
*235 RULING: Admitted as supported by the basis in paragraph five regarding wildfires, which establishes a genuine material dispute adequate to warrant further inquiry. Inadmissible as to its other supporting bases in that the contention and these supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; raise issues beyond the scope of this proceeding; lack adequate factual and expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, iii, v, vi above.
**74 Because of the similarity of the admitted portion of this contention with Utah K and Castle Rock 6, see supra pp. 191, 214, the Board consolidates that portion of this contention and its supporting basis with those issue statements. The Board has set forth the consolidated contention at p. 253 of Appendix A to this Memorandum and Order.

CONFEDERATED TRIBES C--Inadequate Assessment of Costs under NEPA

CONTENTION: PFS has not adequately described or weighed the environmental, social, and economic impacts and costs of operating the ISFSI. Indeed, there is no adequate benefit-cost analysis which even demonstrates a need for the ISFSI. On the whole, Petitioners contend that the costs of the project far outweigh the benefits of the proposed action. See, e.g., Public Service Co. of New Hampshire, 6 NRC 33, 90 (1977).
DISCUSSION: Confederated Tribes Contentions at 5-7; PFS Contentions Response at 643-54; Staff Contentions Response at 128-30; Tr. at 750-64.
RULING: Inadmissible in that the contention and its supporting bases fail to establish with specificity any genuine dispute; impermissibly challenge the Commission's regulations or generic rulemaking-associated determinations; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

CONFEDERATED TRIBES D--Inadequate Discussion of No-Action Alternative

CONTENTION: PFS has failed to satisfy the requirements of NEPA because it does not adequately discuss the alternatives to the proposed action.
DISCUSSION: Confederated Tribes Contentions at 7; PFS Contentions Response at 654-58; Staff Contentions Response at 130-31; Tr. at 669-75.
RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

*236 CONFEDERATED TRIBES E--Failure to Give Adequate Consideration to Adverse Impacts on the Historic District

CONTENTION: PFS has failed to comply with NEPA in that it has not adequately discussed the impacts upon the historic district and the archeological heritage of the area.
DISCUSSION: Confederated Tribes Contentions at 7-8; PFS Contentions Response at 658-62; Staff Contentions Response at 131-32; Tr. at 790-92.
RULING: Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine dispute; lack adequate factual or expert opinion support; and/or fail

properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

CONFEDERATED TRIBES F--Failure to Adequately Establish Financial Qualifications

CONTENTION: PFS has failed to demonstrate that it is financially qualified to build and operate the ISFSI.
DISCUSSION: Confederated Tribes Contentions at 8-9; PFS Contentions Response at 662-71; Staff Contentions Response at 132; Tr. at 239-40.
**75 RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry.
Because of the similarity of this contention and its supporting bases to portions of contentions Utah E and Castle Rock 7, see supra pp. 187, 215, the Board consolidates this contention and its supporting bases with those issue statements. The Board has set forth the consolidated contention at pp. 251-52 of Appendix A to this Memorandum and Order.

CONFEDERATED TRIBES G--Adoption by Reference of Specified Castle Rock Contentions

CONTENTION: The Goshute Tribe hereby adopts and incorporates by reference the following Contentions and the Bases stated by Castle Rock Land & Livestock, L.C.:
1. Absence of NRC Authority. The Application is defective because NRC does not have authority to license a large-scale, off-site facility for the long- term storage of spent nuclear fuel such as the proposed ISFSI.
2. Non-Compliance with Regulations. PFS's Application is defective because it seeks a license for an ISFSI pursuant to 10 C.F.R. Part 72. However, the proposed storage installation is not an ISFSI and is otherwise not licensable under 10 C.F.R. Part 72.
3. Application for Permanent Repository. The proposed PFSF is properly characterized as a de facto permanent repository, and the Application fails to comply with the licensing requirements for a permanent repository.
*237 4. Inadequate Financial Qualifications. The Application does not provide assurance that PFS will have the necessary funds to cover estimated construction costs, operating costs, and decommissioning costs, as required by 10 C.F.R. s 72.22(e).
5. Regional and Cumulative Environmental Impacts. The Application fails to adequately discuss the regional and cumulative environmental impacts of the proposed PFSF, as required by 10 C.F.R. ss 72.98(b) & (c), NEPA.
DISCUSSION: Confederated Tribes Contentions at 10; PFS Contentions Response at 672; Staff Contentions Response at 132-33; Tr. at 89-93.
RULING: Inadmissible in that this is an inappropriate subject for a contention. As is outlined in section II.B.1.C above, however, the Board will permit Confederated Tribes to incorporate these five Castle Rock contentions, all of which we have found inadmissible, subject to the restrictions described in section III.A below.

CONFEDERATED TRIBES H--Adoption by Reference of Specified State Contentions

CONTENTION: The Goshute Tribe hereby adopts and incorporates by reference the Contentions and the Bases stated by the State of Utah including without limit the following:
A. Statutory Authority. Congress has not authorized NRC to issue a license to a private entity

for 4,000 cask, away-from reactor, centralized, spent nuclear fuel storage facility.

B. License Needed for Intermodal Transfer Facility. PFS's application should be rejected because it does not seek approval for receipt, transfer, and possession of spent nuclear fuel at the Rowley Junction Intermodal Transfer Point, in violation of 10 C.F.R. s 72.6(c)(1).

****76** DISCUSSION: Confederated Tribes Contentions at 10-11; PFS Contentions Response at 672; Staff Contentions Response at 134; Tr. at 89-93.

RULING: Inadmissible in that this is an inappropriate subject for a contention. As is outlined in section II.B.3 above, however, the Board will permit Confederated Tribes to incorporate these two State contentions, of which we have found only Utah B admissible, subject to the restrictions described in section III.A below.

6. Skull Valley Band Contention

CONTENTION: The License Application for the Private Fuel Storage facility filed by Private Fuel Storage, LLC is meritorious and should be granted.

DISCUSSION: Skull Valley Band Contention at 1-3; PFS Contentions Response at 20-21; Staff Contentions Response at 134-36; Tr. at 179-80.

***238** RULING: Admitted as supported by bases establishing a genuine material dispute adequate to warrant further inquiry. See Sheffield, ALAB-473, 7 NRC at 743. As is noted in section III.A below, the Skull Valley Band will be required to specify which of the admitted contentions of the other Intervenors it wishes to contest and will be subject to the limitation that, absent some other agreement with the Applicant, PFS is designated to serve as the "lead" party for litigation of all Intervenor issues that challenge the PFS application.

C. Castle Rock 10 C.F.R. s 2.758 Petition to Waive Commission Rules

1. Standards Governing Rule Waiver Petitions

Although, as we have previously observed, agency rules are not subject to challenge in adjudicatory proceedings, see section II.B.1.a.ii above, the Commission nonetheless has provided a procedure whereby a party to an agency hearing can seek a waiver of a regulation it believes should not be applicable. The standard for seeking such a waiver is set forth in 10 C.F.R. s 2.758(b), which provides:

The sole ground for petition for waiver or exception shall be that special circumstances with respect to the subject matter of the particular proceeding are such that the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted.

Procedurally, section 2.758(b) requires that the petition must be accompanied by an affidavit (1) identifying the specific aspect or aspects of the subject matter of the proceeding as to which the application of the rule would not serve the purposes for which it was adopted, and (2) setting forth with particularity the "special circumstances" alleged to justify the waiver or exception requested. Further, paragraphs (c) and (d) of section 2.758 state that a party's failure to make a prima facie showing on the section 2.758(b) standard precludes further consideration of the matter, while a presiding officer that finds a prima facie showing has been made must certify the petition to the Commission for its consideration.

In defining the scope and application of this rule, the Commission has further explained that a

Petitioner seeking to establish a prima facie case must make three showings. First, relative to establishing the requisite "special circumstances" exist to support the waiver, the petitioner must allege facts not in common with a large class of facilities that were not considered, either explicitly or by necessary implication, in the rulemaking proceeding for the rule sought to be waived. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-89-20, 30 NRC 231, 235 (1989). Put another way, the circumstances alleged must be unique to the particular facility at issue. See ***239** Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-653, 16 NRC 55, 72-74 (1981). Speculation about future events is, however, an inadequate basis to establish the necessary "special circumstances." See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-895, 28 NRC 7, 24-26, rev'd in part on other grounds, CLI- 88-10, 28 NRC 573 (1988).

****77** Also with respect to the need to demonstrate "special circumstances," the Petitioner must show application of the rule will not serve the purposes for which it was adopted. See Seabrook, CLI-89-20, 30 NRC at 235. Explicit statements in the statement of considerations are a primary source for determining the purposes for which the rule or regulation was adopted. See, e.g., Seabrook, CLI-88-10, 28 NRC at 598-600; Seabrook, ALAB-895, 28 NRC at 12. Further, in ascertaining a rule's purposes and whether those purposes would be impaired, it is permissible to consider future events the agency logically would have anticipated in promulgating its rules. See Houston Lighting and Power Co. (South Texas Project, Units 1 and 2), LBP-83-37, 18 NRC 52, 59 (1983). On the other hand, in seeking to establish that the rationale for the rule has been undercut, conjectural statements that merely highlight the uncertainty surrounding future events are not, in and of themselves, sufficient. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-89-10, 29 NRC 297, 301, rev'd, ALAB-920, 30 NRC 121, rev'd, CLI-89- 20, 30 NRC 231 (1989). Moreover, it has been established that a valid purpose for which the rule or regulation was adopted, within the meaning of 10 C.F.R. s 2.758, includes eliminating Staff case-by-case review of a generic issue in individual applications and removing such an issue from adjudication in any operating license proceeding. See Seabrook, ALAB-895, 28 NRC at 14, 16-17; see also Carolina Power and Light Co. (Shearon Harris Nuclear Power Plant), ALAB- 837, 23 NRC 525, 547 (1986).

The third showing that must be made by a rule waiver petition is that the circumstances involved are "unusual and compelling" such that it is evident from the petition and other allowed papers that a waiver is necessary to address the merits of a "significant safety problem" relative to the rule at issue. Seabrook, CLI-89-20, 30 NRC at 235. Justifying a waiver, therefore, requires that a Petitioner establish the issue raised is a significant safety problem, even if there clearly are special circumstances that undercut the rationale for the rule. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-920, 30 NRC 121, 129 (1989). Safety issues that are "conceivable" or "theoretical" do not fulfill this requirement, however. See Seabrook, CLI-89-20, 30 NRC at 243-44. Further, any claim of significance must be viewed in the context of any other protective measures that are in place to prevent safety problems. See id. at 244.

***240** With this background, we consider Castle Rock's request that we grant rule waivers in connection with two regulatory provisions--10 C.F.R. Part 72 and 10 C.F.R. s 51.23, often referred to as the Waste Confidence Decision--as they otherwise might apply to the licensing of the PFS facility.

2. Waiver of Authority to License PFS Facility Under 10 C.F.R. Part 72

**78 DISCUSSION: Castle Rock Waiver Petition at 4-17; State Castle Rock Waiver Petition Response at 2-5; PFS Castle Rock Waiver Petition Response at 12-41; Staff Castle Rock Waiver Petition Response at 4-10.

RULING: Putting aside the question of whether this portion of the petition, which is rooted in a lack of agency statutory authority to license the PFS facility under Part 72, see Castle Rock Waiver Petition at 17, even constitutes a legitimate section 2.758 waiver request, we find it must be denied for failing to meet the three-pronged test outlined above.

On the factor of whether special circumstances have been established by showing facts that apply uniquely to the PFS facility that were not considered in promulgating Part 72, as we observed in our analysis regarding Utah A, there was consideration of PFS-type circumstances as part of that rulemaking process. See supra pp. 183-84. Moreover, contrary to Castle Rock's assertions, we find nothing in the NWPA that supports the conclusion its provisions undercut the rationale for Part 72 so as to provide the requisite special circumstances. Among other things, the passage of NWPA section 135(h), 42 U.S.C. s 10155(h), the principal provision Castle Rock relies upon to support its conclusion the Commission is statutorily precluded from licensing a private, offsite ISFSI like that proposed by PFS, did not repeal or otherwise affect the Commission's preexisting AEA authority to license a private ISFSI, but simply indicated that nothing in the NWPA impacted on that AEA authority.

Finally, Castle Rock has failed to demonstrate there is a significant safety problem relative to the application of Part 72 to the PFS licensing request. Castle Rock declares that licensing the PFS facility under Part 72 raises questions about transportation risks, PFS financial stability, and the ultimate removal of spent fuel from the facility. See Castle Rock Waiver Petition at 3 n. 2. Putting aside the hypothetical nature of these asserted problems, as our various rulings in section II.B above indicate, these are all matters addressed in the context of existing protective measures, including 10 C.F.R. Part 71 dealing with transportation and various provisions of 10 C.F.R. Part 72 concerned with financial qualifications and facility decommissioning. As such, these claims do not provide the type of "significant safety problems" that support the grant of Castle Rock's waiver petition.

*241 3. Waiver of Waste Confidence Decision Embodied in 10 C.F.R. s 51.23

DISCUSSION: Castle Rock Waiver Petition at 18-24; State Castle Rock Waiver Petition Response at 6-8; PFS Castle Rock Waiver Petition Response at 41-52; Staff Castle Rock Waiver Petition Response at 10-22.

RULING: This portion of the Castle Rock petition challenges the continued applicability of the 1990 Commission generic determination in 10 C.F.R. s 51.23(a) that (1) reactor spent fuel can be safely stored without significant environmental impacts for at least 30 years beyond any current reactor's licensed operating life (as extended), and (2) at least one mined HLW geologic repository will be available within the first quarter of the twenty-first century and sufficient capacity for storage of spent fuel from operating reactors will be available at such facilities within the same 30-year "beyond operating life" time period. It also seeks a waiver of the rule's generic determination in section 51.23(b) that, in light of these findings, in a licensing proceeding such as this one there need be no EIS discussion of the impacts of ISFSI spent fuel storage following the term of the ISFSI license. In both instances, however, Castle Rock again fails to meet the three-pronged test set forth above.

**79 Castle Rock alleges various "significant" and "unexpected" technical events provide the

necessary "special circumstances" needed to support its request for a waiver of the Commission's generic repository determinations under section 51.23(a), including a 1992 earthquake near the proposed Yucca Mountain, Nevada HLW repository site and questions about Yucca Mountain groundwater percolation rates and groundwater contamination in areas surrounding the site. It also puts forth a variety of legal or policy matters, such as DOE's failure to meet mandatory NWPA deadlines, pending legislation that would provide for interim storage at the Yucca Mountain site, and official opposition from the State of Nevada. These considerations, however, are either inappropriately rooted in speculation about future events (e.g., the passage of pending legislation) or fail to present PFS-specific matters that were not considered, either explicitly or by implication, in the rulemaking proceeding for the Waste Confidence Decision, see 55 Fed.Reg. 38,474, 38,486 (1990) (tectonic uncertainties); id. at 38,488 (hydrology complexities); id. at 38,494-95 (DOE schedule slippage and unavailability of Yucca Mountain site); id. at 38,495-97 (Nevada opposition); id. at 38,498, 38506-07 (funding adequacy). Castle Rock also fails to make its case in connection with the "special circumstances" second prong as it requires a showing the rule will not serve the purposes for which it was adopted. The Commission has made clear the rule's generic approach was adopted to avoid just the kind of case-by-case adjudication PFS seeks. See 49 Fed.Reg. 34,658, 34,666 (1984). Castle Rock also does not fulfill the third prong because it does not establish a "significant safety problem" with the requisite concreteness.

***242** To secure a waiver of the EIS analysis provision of section 51.23(b), Castle Rock asserts the inability of the proposed HLW repository to absorb the PFS fuel in a timely manner provides the requisite factor one unique "special circumstances." Again, however, this purported circumstance is either inappropriately rooted in speculation, which seemingly is incorrect, about the rate at which PFS stored fuel can be transferred to the repository, see PFS Castle Rock Waiver Petition Response at 46-48, or fails to present a PFS- specific matter that was not considered, either explicitly or by implication, in the rulemaking proceeding for the rule, see 55 Fed.Reg. at 38,501-04. And, as with its challenge to the repository determinations portion of the rule, Castle Rock fails to show this section of the rule will not serve the "generic rather than case-by-case resolution" purpose for which it was adopted. Finally, Castle Rock's claim that the repository's inability to absorb the PFS stored fuel until "at least" the last quarter of the twenty-first century increases fuel removal and decommissioning costs, extends environmental impacts, and may cause funding shortfall-related safety problems, is insufficient to establish the requisite "significant safety problem" in light of the Commission's own Waste Confidence Decision pronouncement that spent fuel can be safely stored without significant environmental impact for "at least" 100 years, if necessary, see 55 Fed.Reg. at 38,513.

III. PROCEDURAL/ADMINISTRATIVE MATTERS

****80** As the foregoing discussion indicates, five Intervenors--the State, Castle Rock Land/Skull Valley, OGD, Confederated Tribes, and the Skull Valley Band--are admitted as parties to this proceeding because they have standing and have presented at least one admissible contention. Below, we provide procedural guidance regarding further litigation of the admitted matters by these parties, taking into account the parties' request they be provided an opportunity to present the Board with suggestions on a further schedule for litigation. See Tr. at 809-10.

A. Lead Parties

In accordance with 10 C.F.R. s 2.714(f)-(g), a presiding officer is authorized to control the general compass of the hearing by consolidating issues and limiting party participation to avoid the presentation of irrelevant, duplicative, or repetitive evidence. In this instance, as we have indicated above, some of the State's admitted contentions challenging the PFS application have been adopted by other Intervenors, while other contentions proposed by different parties challenging the application have been consolidated because of their related subject matter. In addition, one of the parties, the Skull Valley Band, *243 has filed a single contention expressing general support for the PFS application. In these circumstances, we find it appropriate to designate "lead" parties for the litigation of the various admitted contentions.

The party assigned the role of lead party has primary responsibility for litigating a contention. Absent some other Board directive, the party with the lead role in support of a contention is to conduct all discovery on the contention; file or respond to any dispositive or other motions regarding the contention; submit any required prehearing briefs on the issue; prepare prefiled direct testimony, conduct any redirect examination, and provide any surrebuttal testimony regarding the contention; and prepare posthearing proposed findings of fact and conclusions of law on the contention. The party that has the lead role in opposing a contention has similar duties, with its hearing responsibilities including conducting witness cross-examination and recross-examination and preparing rebuttal testimony as appropriate. For any given contention, the lead party is responsible for consulting with the other "involved" parties (i.e., any party that adopted its contention, filed a contention that has been consolidated, or has opposed the same contention) regarding litigation activities, but the ultimate litigating responsibility for the contention rests with the lead party. [FN29]

The party that proffered an admitted contention challenging the PFS application is the lead party for that contention if it has not been consolidated with another party's contention. Accordingly, for each of the admitted State contentions adopted by Castle Rock Land/Skull Valley and Confederated Tribes, the State is the lead party. Further, for those contentions that have been consolidated with the contentions of other parties, we suggest that the following parties serve as the "lead":

UTAH E/CASTLE ROCK 7/CONFEDERATED TRIBES F--Financial Assurance: Confederated Tribes

UTAH K/CASTLE ROCK 6/CONFEDERATED TRIBES B--Inadequate Consideration of Credible Accidents: State

UTAH O/CASTLE ROCK 8 and 10--Hydrology: State

UTAH S/CASTLE ROCK 7--Decommissioning: State

UTAH T/CASTLE ROCK 10, 12, and 22--Inadequate Assessment of Required Permits and Other Entitlements: State

UTAH AA/CASTLE ROCK 13--Range of Alternatives: Castle Rock

UTAH DD/CASTLE ROCK 16--Ecology and Species: State

**81 *244 If, after consultation between the lead party and all involved parties, the parties agree that a party other than the one we have suggested should be the lead party for a contention, they jointly should seek Board approval for this change in the "lead" designation in accordance with the schedule set forth below.

In the case of the Skull Valley Band, as part of the schedule set out below we require that it provide us with a statement indicating which of the admitted contentions it wishes to contest. In addition, we designate PFS as the lead party in opposition to all admitted contentions that are contested by PFS and the Skull Valley Band, subject to any joint request by PFS and the Skull Valley Band to designate the Skull Valley Band as the lead party in opposition to one or more of the contentions the Skull Valley Band wishes to oppose.

In recognition of its independent status, the Staff is not the subject of a lead party designation in connection with any contention.

B. Summary Disposition/Discovery

As part of the schedule set forth below, we request that the parties provide us with their views on which, if any, of the admitted contentions are subject to summary disposition either before or after discovery, and an appropriate schedule for filing such motions. In addition, we request that the parties provide us with their views on a schedule for discovery, taking into account any prediscovery dispositive motions, the timing of the Staff's Safety Evaluation Report (SER) and Final Environmental Impact Statement (FEIS), [FN30] and the time needed for the following two-step discovery process:

1. An initial informal discovery process during which lead parties and the Staff are to:

a. Provide opposing lead parties and/or the Staff with a description of the specific types of information, including documents, data compilations, and tangible things, to which they wish to have access as being relevant to the admitted contentions and their supporting bases.

b. Make available to opposing lead parties and/or the Staff a copy of all documents, data compilations, and tangible things in the possession, custody, or control of the lead party, other involved parties, and/of the Staff that have been requested by the opposing lead party and/or the Staff pursuant to paragraph 1.a above.

c. Make available to opposing lead parties and/or the Staff for interviews those individuals, particularly those persons whom it is anticipated may provide evidentiary hearing testimony on behalf of a lead party or the Staff, that have information relevant to the admitted contentions and their supporting bases.

*245 2. A formal discovery process during which lead parties and the Staff are subject to the following requirements:

a. Without prior leave of the Board or written stipulation, for each admitted contention:

i. the lead party supporting the contention may serve on the lead party challenging the contention and the Staff,

**82 ii. the lead party challenging the contention may serve on the lead party supporting the contention and the Staff, and

iii. the Staff may serve upon the lead party challenging the contention and the lead party supporting the contention not more than ten interrogatories per responding lead party or the Staff, including all discrete subparts, and not more than three deposition notices per responding lead party or the Staff.

b. As part of any motion for protective order/motion to compel filed by a lead party or the

Staff in connection with a formal discovery request, counsel for the moving party shall provide a certification that he or she previously has:

i. provided counsel for the lead party or the Staff to whom the motion is directed a clear and concise written statement of the asserted deficiencies or objections and the requested action relative to the discovery request, and

ii. after providing this statement, consulted with lead counsel or Staff counsel in an attempt to resolve all the disputed matters without Board action.

If counsel are able to resolve a potential objection on the basis of the presubmission conference, that resolution should be reduced to writing with copies provided to each counsel involved.

The Board expects that in the informal discovery process all parties will be specific in their information requests and provide access to requested information and knowledgeable individuals to the maximum degree possible. The Board anticipates monitoring the informal discovery process through a series of status reports and/or conferences. Failure to participate in the informal discovery process consistent with the outline set forth above will result in appropriate Board sanctions. In addition, the lead party is expected to coordinate informal or formal discovery requests in connection with a particular contention with all involved parties to ensure the discovery response includes all relevant materials from all parties with interests relating to the contention.

C. Joint Status Report, Other Filings, and Prehearing Conference

As was noted above, during the January 1998 prehearing conference, the parties indicated that once a determination on standing and contentions was issued, they would try to reach some agreement about future scheduling they would present to the Board. To this end, on or before Wednesday, May 6, 1998, the parties should file with the Board a joint status report that reflects their discussions regarding scheduling in light of this issuance.

***246** In that report, the parties should discuss scheduling for dispositive motions and discovery in light of the requirements set forth in section III.B above. They also should provide estimates of how long will be needed to try each of the admitted contentions if those issues go to hearing. [FN31] Further, they should discuss the status of any settlement negotiations relative to the admitted contentions, and indicate whether a "settlement judge" would be of assistance in connection with one or more of the admitted contentions. If the parties are unable to agree on any of these matters, separate views may be included as part of the report.

****83** In addition to this status report, in accordance with section III.A above, on or before Wednesday, May 6, 1998, the Skull Valley Band should file its designation of contested issues. Also by that date, any requests should be submitted for revision of the lead party designations set forth in section III.A.

With these filings and the joint status report in hand, the Board will conduct an additional prehearing conference to discuss scheduling and other matters. That conference will be held in the Atomic Safety and Licensing Board Hearing Room, Room T-3B45, Third Floor, Two White Flint North Building, 11545 Rockville Pike, Rockville, Maryland, on Tuesday, May 19, 1998, beginning at 1:00 p.m. EDT (11:00 a.m. MDT). The Board anticipates the prehearing conference will last no more than 2 hours. For this prehearing conference, counsel may appear in person or, assuming there is sufficient interest, participate by videoconference from Room 212 in Milton Bennion Hall on the University of Utah campus in Salt Lake City, Utah. [FN32] Counsel for

each party should advise the Board in writing on or before Wednesday, April 29, 1998, whether they intend to appear in person in Rockville or by videoconference from Salt Lake City.

D. Other Administrative Rulings

Previously, the Board has issued directives concerning same day submission of courtesy copies of filings (e.g., e-mail or facsimile transmission); a ten-page limitation on motions and responses; and requests for leave to extend a filing date, exceed the ten-page limit, or file a reply pleading. See Licensing Board Memorandum and Order (Memorializing Initial Prehearing Conference Directives) (Feb. 2, 1998) at 3-5 (unpublished); Licensing Board Memorandum and Order (Additional Guidance on Service Procedures) (Nov. 19, 1997) at ***247** 1-3 (unpublished); Licensing Board Memorandum and Order (Initial Prehearing Order) (Sept. 23, 1997) at 5-7 (unpublished). The parties are reminded of these requirements and the Board's expectation they will be complied with.

In this connection, the filings provided for in section III.C of this Memorandum and Order should be served on the Board, the Office of the Secretary, and counsel for the other parties by e-mail, facsimile transmission, or other means that will ensure receipt by close of business (4:30 p.m. EDT) on the day of filing.

IV. CONCLUSION

For the reasons set forth above, we find that Petitioners State of Utah, Castle Rock Land/Skull Valley, OGD, Confederated Tribes, and the Skull Valley Band, have established their standing to intervene and have put forth at least one litigable contention so as to be entitled to party status in this proceeding. The text of their admitted contentions is set forth in Appendix A to this decision. We also conclude the intervention petitions of David Pete, SSWS, and Ensign Ranches should be dismissed, the first having failed to establish his standing to intervene as of right, the second having failed to show it was entitled to either standing as of right or discretionary intervention, and the third having failed to put forth an admissible contention. Finally, we deny the request of Castle Rock for a waiver of 10 C.F.R. Part 72 and 10 C.F.R. s 51.23 as they are applicable to the PFS application, concluding Castle Rock has not made a prima facie showing that meets the standards set forth in 10 C.F.R. s 2.758 for obtaining a rule waiver.

****84** For the foregoing reasons, it is this twenty-second day of April 1998, ORDERED,

1. Relative to the contentions specified in paragraph three below, the State, Castle Rock Land/Skull Valley, OGD, Confederated Tribes, and the Skull Valley Band requests for a hearing/petitions to intervene are granted and these Petitioners are admitted as parties to this proceeding.

2. The requests for a hearing/petitions to intervene of David Pete, SSWS, and Ensign Ranches are denied.

3. The following intervenor contentions are admitted for litigation in this proceeding: Utah B (paragraphs one and four), Utah C (paragraphs three, four, and five), Utah E (as consolidated with portions of Castle Rock 7 and Confederated Tribes F), Utah F (as consolidated with a portion of Utah P), Utah G (bases one and four), Utah H, Utah K (in part, as consolidated with Castle Rock 6 and a portion of Confederated Tribes B), Utah L, Utah M, Utah N, Utah O (bases one, two (in part), three, and four, as consolidated with Castle Rock 8 ***248** and a portion of Castle Rock 10), Utah P (subparagraph b of paragraph seven, as consolidated with Utah F), Utah

R (paragraph one (in part) and subparagraph b of paragraphs three and four), Utah S (bases one, two, four, five, ten, and eleven, as consolidated with a portion of Castle Rock 7), Utah T (paragraphs two through eight, as consolidated with a portion of Castle Rock 10 and Castle Rock 12 and 22), Utah U (basis one), Utah V (paragraph two (in part)), Utah W (paragraph three (in part)), Utah Z, Utah AA (as consolidated with a portion of Castle Rock 13), Utah DD (subparagraphs c, d, g, and h of paragraph four, as consolidated with a portion of Castle Rock 16), Utah GG (paragraph five), Castle Rock 6 (as consolidated with portions of Utah K and Confederated Tribes B), Castle Rock 7 (paragraphs a through d, and f, as consolidated with Utah E and a portion of Utah S), Castle Rock 8 (as consolidated with a portion of Utah O), Castle Rock 10 (as consolidated with portions of Utah O and T), Castle Rock 12 (as consolidated with a portion of Utah T), Castle Rock 13 (paragraph a, as consolidated with Utah AA), Castle Rock 16 (paragraph b, as consolidated with Utah DD), Castle Rock 17, Castle Rock 20, Castle Rock 21, Castle Rock 22 (as consolidated with a portion of Utah T), OGD O (bases one, five, and six), Confederated Tribes B (basis five, as consolidated with portions of Utah K and Castle Rock 6), Confederated Tribes F (as consolidated with Utah E and a portion of Castle Rock 7), and the Skull Valley Band contention. [FN33]

4. The following Intervenor contentions are rejected as inadmissible for litigation in this proceeding: Utah A, Utah B (paragraphs two and three), Utah C (paragraphs one and two, paragraph six, and paragraphs seven and eight), Utah D, Utah G (bases two and three), Utah I, Utah J, Utah K (in part), Utah O (basis two (in part)), Utah P (paragraphs one through six, subparagraphs a and c through h of paragraph seven, and paragraphs eight and nine), Utah Q, Utah R (paragraphs one and two (in part), subparagraph a of paragraphs three and four, and paragraph five), Utah S (paragraph three and paragraphs six through nine), Utah T (paragraph one), Utah U (bases two through four), Utah V (paragraphs one and two (in part), paragraphs three and four), Utah W (paragraphs one and two, paragraph three (in part), and paragraphs four through six), Utah X, Utah Y, Utah BB, Utah CC, Utah DD (paragraphs one through three (in part), subparagraphs a, b, e, and f of paragraph four, and paragraphs five and six), Utah EE, Utah GG (paragraphs one through four), Castle Rock 1, Castle Rock 2, Castle Rock 3, Castle Rock 4, Castle Rock 5, Castle Rock 7 (paragraph e), Castle Rock 9, Castle Rock 11, Castle Rock 13 (paragraphs b and c), Castle Rock 14, Castle Rock 15, Castle Rock 16 (paragraphs a and c), Castle Rock 18, Castle Rock 19, Castle Rock 23, Castle Rock 24, OGD A, OGD B, OGD C, OGD D, OGD E, OGD F, OGD G, OGD I, OGD J, OGD K, OGD L, ***249** OGD M, OGD N, OGD O (bases two through four), OGD P, Confederated Tribes A, Confederated Tribes B (bases one through four), Confederated Tribes C, Confederated Tribes D, Confederated Tribes E, Confederated Tribes G, and Confederated Tribes H.

****85** 5. The December 19, 1997 State request to adopt the contentions of the other Petitioners opposing the PFS application is denied.

6. The January 21, 1998 petition of Castle Rock for waiver of the Commission's rules in 10 C.F.R. Part 72 and 10 C.F.R. s 51.23 is denied.

7. The parties are to make the filings required by section III.C above in accordance with the schedule established therein.

8. Motions for reconsideration of this Memorandum and Order must be filed on or before Monday, May 4, 1998, and are subject to the ten-page limitation described in section III.D above.

9. In accordance with the provisions of 10 C.F.R. s 2.714a(a), as it rules upon intervention petitions, this Memorandum and Order may be appealed to the Commission within 10 days after

it is served.
THE ATOMIC SAFETY AND LICENSING BOARD [FN34]

G. Paul Bollwerk, III
ADMINISTRATIVE JUDGE

Jerry R. Kline
ADMINISTRATIVE JUDGE

Peter S. Lam
ADMINISTRATIVE JUDGE
Rockville, Maryland
April 22, 1998

***250** Dissenting Opinion of Judge Lam on Denial of Discretionary Intervention to Petitioner Scientists for Secure Waste Storage

I join in this Memorandum and Order in all respects except the Board's denial of discretionary intervention to Petitioner Scientists for Secure Waste Storage (SSWS). After considering the arguments of the various Petitioners, Applicant Private Fuel Storage, L.L.C., and the NRC Staff, I conclude that (1) the broad knowledge and experience of the members of SSWS in nuclear science and technology would make a significant contribution to the development of a sound record; and (2) SSWS's intervention would not broaden the issues to be heard or inappropriately delay the proceeding because SSWS seeks to intervene only on issues already raised. Based on the Commission's guidelines in its Pebble Springs decision, see Portland General Electric Co. (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 614-17 (1976), and the Appeal Board's Sheffield ruling, see Nuclear Engineering Co. (Sheffield, Illinois, Low-Level Radioactive Waste Disposal Site), ALAB-473, 7 NRC 737, 743- 44 (1978), I would have granted SSWS discretionary intervention in this proceeding.

***251** APPENDIX A

ADMITTED CONTENTIONS

1. UTAH B--License Needed for Intermodal Transfer Facility

CONTENTION: PFS's application should be rejected because it does not seek approval for receipt, transfer, and possession of spent nuclear fuel at the Rowley Junction Intermodal Transfer Point ("ITP"), in violation of 10 C.F.R. s 72.6(c)(1), in that the Rowley Junction operation is not merely part of the transportation operation but a de facto interim spent fuel storage facility at which PFS will receive, handle, and possess spent nuclear fuel. Because the ITP is an interim spent fuel storage facility, it is important to provide the public with the regulatory protections that are afforded by compliance with 10 C.F.R. Part 72, including a security plan, an emergency plan, and radiation dose analyses.

2. UTAH C--Failure to Demonstrate Compliance with NRC Dose Limits

**86 CONTENTION: The Applicant has failed to demonstrate a reasonable assurance that the dose limits specified in 10 C.F.R. s 72.106(b) can and will be complied with in that:

1. License Application makes selective and inappropriate use of data from NUREG-1536 for the fission product release fraction.

2. License Application makes selective and inappropriate use of data from SAND80-2124 for the respirable particulate fraction.

3. The dose analysis in the License Application only considers dose due solely to inhalation of the passing cloud. Direct radiation and ingestion of food and water are not considered in the analysis.

3. UTAH E/CASTLE ROCK 7/CONFEDERATED TRIBES F--Financial Assurance

CONTENTION: Contrary to the requirements of 10 C.F.R. ss 72.22(e) and 72.40(a)(6), the Applicant has failed to demonstrate that it is financially qualified to engage in the Part 72 activities for which it seeks a license in that:

1. The information in the application about the legal and financial relationship among the owners of the limited liability company (i.e., the license Applicant PFS) is deficient because the owners are not explicitly identified, nor are their relationships discussed. See 10 C.F.R. ss 50.33(c)(2) and 50.33(f) and Appendix C, s II of 10 C.F.R. Part 50.

2. PFS is a limited liability company with no known assets; because PFS is a limited liability company, absent express agreements to the contrary, PFS's members are not individually liable for the costs of the proposed PFSF, and PFS's members are not required to advance equity contributions. PFS has not produced any documents evidencing its members' obligations, and thus, has failed to show that it has a sufficient financial base to assume all obligations, known and unknown, incident to ownership and operation of the PFSF; also, PFS may be subject to termination prior to expiration of the license.

*252 3. The application fails to provide enough detail concerning the limited liability company agreement between PFS's members, the business plans of PFS, and the other documents relevant to assessing the financial strength of PFS. The Applicant must submit a copy of each member's Subscription Agreement, see 10 C.F.R. Part 50, App. C., s II, and must document its funding sources.

4. To demonstrate its financial qualifications, the Applicant must submit as part of the license application a current statement of assets, liabilities and capital structure, see 10 C.F.R. Part 50, Appendix C, s II.

5. The Applicant does not take into account the difficulty of allocating financial responsibility and liability among the owners of the spent fuel nor does it address its financial responsibility as the "possessor" of the spent fuel casks. The Applicant must address these issues. See 10 C.F.R. s 72.22(e).

6. The Applicant has failed to show that it has the necessary funds to cover the estimated costs of construction and operation of the proposed ISFSI because its cost estimates are vague, generalized, and understated. See 10 C.F.R. Part 50, App. C, s II.

**87 7. The Applicant must document an existing market for the storage of spent nuclear fuel and the commitment of sufficient number of Service Agreements to fully fund construction of the proposed ISFSI. The Applicant has not shown that the commitment of 15,000 MTUs is sufficient to fund the Facility including operation, decommissioning and contingencies.

8. Debt financing is not a viable option for showing PFS has reasonable assurance of obtaining

the necessary funds to finance construction costs until a minimum value of service agreements is committed and supporting documentation, including service agreements, are provided.

9. The application does not address funding contingencies to cover on-going operations and maintenance costs in the event an entity storing spent fuel at the proposed ISFSI breaches the service agreement, becomes insolvent, or otherwise does not continue making payments to the proposed PFSF.

10. The Application does not provide assurance that PFS will have sufficient resources to cover non-routine expenses, including without limitation the costs of a worst case accident in transportation, storage, or disposal of the spent fuel.

4. UTAH F/UTAH P--Inadequate Training and Certification of Personnel

CONTENTION: Training and certification of PFS personnel, including radiation protection training, fails to satisfy Subpart I of 10 C.F.R. Part 72 and will not assure that the facility is operated in a safe manner.

5. UTAH G--Quality Assurance

CONTENTION: The Applicant's Quality Assurance ("QA") program is utterly inadequate to satisfy the requirements of 10 C.F.R. Part 72, Subpart G.

*253 6. UTAH H--Inadequate Thermal Design

CONTENTION: The design of the proposed ISFSI is inadequate to protect against overheating of storage casks and of the concrete cylinders in which they are to be stored in that:

1. Storage casks used in the License Application are not analyzed for the PFS maximum site design ambient temperature of 110 <<degrees>> F.

2. The maximum average daily ambient temperatures for unnamed cities in Utah nearest the site do not necessarily correspond to the conditions in Skull Valley; PFS should provide information on actual temperatures at the Skull Valley site.

3. PFS's projection that average daily temperatures will not exceed 100 << degrees>> F fails to take into account the heat stored and radiated by the concrete pad and storage cylinders.

4. In projecting ambient temperatures, PFS fails to take into consideration the heat generated by the casks themselves.

5. PFS fails to account for the impact of heating the concrete pad on the effectiveness of convection cooling.

6. PFS has not demonstrated that the concrete structure of the TranStor cask is designed to withstand the temperatures at the proposed ISFSI.

7. PFS has not demonstrated that the concrete structure of the HI-STORM cask is designed to withstand the temperatures at the proposed ISFSI.

7. UTAH K/CASTLE ROCK 6/CONFEDERATED TRIBES B--Inadequate Consideration of Credible Accidents

**88 CONTENTION: The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the ISFSI and the intermodal transfer site, including the

cumulative effects of the nearby hazardous waste and military testing facilities in the vicinity and the effects of wildfires.

8. UTAH L--Geotechnical

CONTENTION: The Applicant has not demonstrated the suitability of the proposed ISFSI site because the License Application and SAR do not adequately address site and subsurface investigations necessary to determine geologic conditions, potential seismicity, ground motion, soil stability and foundation loading.

9. UTAH M--Probable Maximum Flood

CONTENTION: The application fails to accurately estimate the Probable Maximum Flood (PMF) as required by 10 C.F.R. s 72.98, and subsequently, design structures important to safety are inadequate to address the PMF; thus, the application fails to satisfy 10 C.F.R. s 72.24(d)(2).

1. The Applicant's determination of the PMF drainage area to be 26 sq. miles is inaccurate because the Applicant has failed to account for all drainage sources that may impact the ISFSI site during extraordinary storm events.

***254** 2. In addition to design structures important to safety being inadequate to address the PMF, the consequence of an inaccurate PMF drainage area may negate the Applicant's assertion that the facility area is "flood dry."

10. UTAH N--Flooding

CONTENTION: Contrary to the requirements of 10 C.F.R. s 72.92, the Applicant has completely failed to collect and evaluate records relating to flooding in the area of the intermodal transfer site, which is located less than three miles from the Great Salt Lake shoreline.

11. UTAH O/CASTLE ROCK 8 and 10--Hydrology

CONTENTION: The Applicant has failed to adequately assess the health, safety and environmental effects from the construction, operation, and decommissioning of the ISFSI and the ITP, as required by 10 C.F.R. ss 72.24(d), 72.100(b) and 72.108, with respect to the following contaminant sources, pathways, and impacts:

1. Contaminant pathways from the Applicant's sewer/wastewater system; facility operations, including firefighting activities; and construction activities.

2. Contaminant pathways from the Applicant's retention pond in that:

a. The ER fails to discuss potential for overflow and therefore fails to comply with 10 C.F.R. Part 51.

b. ER is deficient because it contains no information concerning effluent characteristics and environmental impacts associated with seepage from the pond in violation of 10 C.F.R. s 51.45(b) and s 72.126(c) & (d).

3. Potential for groundwater and surface water contamination.

4. The effects of Applicant's water usage on other well users and on the aquifer.

5. Impact of potential groundwater contamination on downgradient hydrological resources.

12. UTAH R--Emergency Plan

CONTENTION: The Applicant has not provided reasonable assurance that the public health and safety will be adequately protected in the event of an emergency at the storage site or the transfer facility in that:

**89 1. PFS has not adequately described the ITP, the activities conducted there, or the area near the ITP in sufficient detail to evaluate the adequacy and appropriateness of the emergency plan.

2. PFS does not address response action, emergency information dissemination, or emergency response training programs for accidents at the ITP.

3. PFS has not adequately described the means and equipment for mitigation of accidents because it does not have adequate support capability to fight fires onsite.

*255 13. UTAH S/CASTLE ROCK 7--Decommissioning

CONTENTION: The decommissioning plan does not contain sufficient information to provide reasonable assurance that the decontamination or decommissioning of the ISFSI at the end of its useful life will provide adequate protection to the health and safety of the public as required by 10 C.F.R. s 72.30(a), nor does the decommissioning funding plan contain sufficient information to provide reasonable assurance that the necessary funds will be available to decommission the facility, as required by 10 C.F.R. s 72.22(e).

14. UTAH T/CASTLE ROCK 10, 12, and 22--Inadequate Assessment of Required Permits and Other Entitlements

CONTENTION: In derogation of 10 C.F.R. s 51.45(d), the Environmental Report does not list all Federal permits, licenses, approvals and other entitlements which must be obtained in connection with the PFS ISFSI License Application, nor does the Environmental Report describe the status of compliance with these requirements in that:

1. The Applicant has shown no proof of entitlement to build a transfer facility at Rowley Junction or right to use the terminal there.

2. The Applicant has shown no authority to build a rail spur from the rail head at Rowley Junction to the proposed ISFSI site.

3. The Applicant has shown no basis that it is entitled to widen Skull Valley Road in that the application does not describe and identify State and local permits or approvals that are required.

4. The Applicant's air quality analysis does not satisfy the requirements of 10 C.F.R. s 51.45 in that the Applicant has failed to adequately analyze whether it will be in compliance with the health-based National Ambient Air Quality Standards, whether it is subject to section 111 of the Clean Air Act, and whether it is a major stationary source of air pollution requiring a Prevention of Significant Deterioration permit; the Applicant's analysis of air quality impacts as it relates to Utah air quality permits in ER sections 4.1.3 and 4.2.3 is inadequate; and a state air quality approval order under Utah Code Ann. s 19-2-108 will be required.

5. The Applicant has not addressed the requirement to obtain a Utah Groundwater Discharge Permit or the applicability of the Utah Groundwater Protection Rules, which apply specifically to facilities such as the retention pond and generally require that such ponds be lined.

6. The Applicant's analysis of other required water permits lacks specificity and does not satisfy the requirements of 10 C.F.R. s 51.45 in that the Applicant merely states that it "might"

need Army Corps of Engineers and State approvals in connection with any Clean Water Act (CWA) Section 404 dredge and fill permit for wetlands along the Skull Valley transportation corridor; PFS provides an inadequate discussion of Site requirements relative to the Skull Valley Band of Goshute's CWA permitting authority; and PFS will be required to consult with the State on the effects of the intermodal transfer site on the neighboring Timpie Springs Wildlife Management Area.

****90 *256** 7. The Applicant must show legal authority to drill wells on the proposed ISFSI site by identifying and describing the State approvals that are required.

15. UTAH U--Impacts of Onsite Storage Not Considered

CONTENTION: Contrary to the requirements of NEPA and 10 C.F.R. 51.45(c), the Applicant fails to give adequate consideration to reasonably foreseeable potential adverse environmental impacts during storage of spent fuel on the ISFSI site.

16. UTAH V--Inadequate Consideration of Transportation-Related Radiological Environmental Impacts

CONTENTION: The Environmental Report ("ER") fails to give adequate consideration to the transportation-related environmental impacts of the proposed ISFSI in that PFS does not satisfy the threshold condition for weight specified in 10 C.F.R. s 51.52(a) for use of Summary Table S-4, so that the PFS must provide "a full description and detailed analysis of the environmental effects of transportation of fuel and wastes to and from the reactor" in accordance with 10 C.F.R. s 51.52(b).

17. UTAH W--Other Impacts Not Considered

CONTENTION: The Environmental Report does not adequately consider the adverse impacts of the proposed ISFSI and thus does not comply with NEPA or 10 C.F.R. s 51.45(b) in that the Applicant has not considered the impact of flooding on the intermodal transfer point.

18. UTAH Z--No Action Alternative

CONTENTION: The Environmental Report does not comply with NEPA because it does not adequately discuss the "no action" alternative.

19. UTAH AA/CASTLE ROCK 13--Range of Alternatives

CONTENTION: The Environmental Report fails to comply with the National Environmental Policy Act because it does not adequately evaluate the range of reasonable alternatives to the proposed action.

20. UTAH DD/CASTLE ROCK 16--Ecology and Species

CONTENTION: The Applicant has failed to adequately assess the potential impacts and effects from the construction, operation and decommissioning of the ISFSI and the transportation of

spent fuel on the ecology and species in the region as required by 10 C.F.R. ss 72.100(b) and 72.108 and NEPA in that the License Application has not estimated potential impacts to ecosystems and "important species" as follows:

1. The License Application fails to address all possible impacts on federally endangered or threatened species, specifically the peregrine falcon nest in the Timpie Springs Waterfowl Management Area.

2. The License Application fails to include information on pocket gopher mounds which may be impacted by the proposal.

*257 3. The License Application has not adequately identified plant species that are adversely impacted or adequately assessed the impact on those identified, specifically the impact on two "high interest" plants, Pohl's milkvetch and small spring parsley.

4. The License Application does not identify, nor assess the adverse impacts on, the private domestic animal (livestock) or the domestic plant (farm produce) species in the area.

21. UTAH GG--Failure to Demonstrate Cask-Pad Stability During Seismic Event for TranStor Casks

**91 CONTENTION: 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. ss 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.

22. CASTLE ROCK 17--Inadequate Consideration of Land Impacts

CONTENTION: The Application violates NRC regulations and NEPA because the ER does not adequately consider the impact of the facility upon such critical matters as future economic and residential development in the vicinity, potential differing land uses, property values, the tax base, and the loss of revenue and opportunity for agriculture, recreation, beef and dairy production, residential and commercial development, and investment opportunities, all of which have constituted the economic base and future use of Skull Valley and the economic interests of Petitioners, or how such impacts can and must be mitigated, see, e.g., 10 C.F.R. ss 72.90(e), 72.98(c)(2) and 72.100(b), in that:

a. the ER does not recognize the potential use of the areas surrounding the PFSF for residential or commercial development;

b. the ER paints a misleading picture of the area population by ignoring a majority of the Salt Lake Valley;

c. the ER fails to consider the effect of the PFSF on the present use of Castle Rock's lands for farming, ranch operations and residential purposes or the projected use of such lands for dairy operations, residential development, or commercial development;

d. the ER provides no, or inaccurate, information on the economic value of current agricultural/ranching operations conduct on Castle Rock's lands; and

e. the ER fails to discuss the impact of placing a spent fuel storage facility near a national wilderness area.

23. CASTLE ROCK 20--Selection of Road or Rail Access to PFSF Site

CONTENTION: The Application violates NRC regulations and NEPA because it fails to describe the considerations governing selection of either the Skull Valley Road or the rail ***258** spur access alternative over the other and the implications of such selection in light of such considerations. See 10 C.F.R. ss 51.45(c) and 72.100(b), in that:

a. The ER is deficient because it fails to properly analyze the transportation alternatives.

b. The ER is incomplete because investigations and studies have not been performed which will have a direct bearing on the environmental effects of the alternative selected.

c. The ER is defective because PFS is considering a third option not discussed in the ER.

d. The ER fails to mention some significant environmental effects of the transportation alternatives such as increased traffic and noise.

24. CASTLE ROCK 21--Exact Location of Rail Spur

****92** CONTENTION: The Application violates NRC regulations and NEPA because it fails to describe in detail the route of the potential rail spur, property ownership along the route, and property rights needed to construct and operate the rail spur (see 10 C.F.R. s 72.90(a)), in that:

a. The ER fails to provide any detail concerning location of the rail spur and impact on property rights along the route.

b. Upon information and belief, ER is defective because PFS is considering two locations for the rail spur.

25. OGD O--Environmental Justice Issues Are Not Addressed

CONTENTION: The license application poses undue risk to public health and safety because it fails to address environmental justice issues. In, Executive Order 12898, 3 C.F.R. 859 (1995) issued February 11, 1994, President Clinton directed that each Federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in the United States." It is not just and fair that this community be made to suffer more environmental degradation at the hands of the NRC. Presently, the area is surrounded by a ring of environmentally harmful companies and facilities. Within a radius of thirty-five (35) miles the members of OGD and the Goshute reservation are inundated with hazardous waste from: Dugway Proving Ground, Utah Test and Training Range South, Deseret Chemical Depot, Tooele Army Depot, Envirocare Mixed Waste storage facility, APTUS Hazardous Waste Incinerator, Grassy Mountain Hazardous Waste Landfill and Utah Test and Training Range North.

26. SKULL VALLEY BAND CONTENTION

CONTENTION: The License Application for the Private Fuel Storage facility filed by Private Fuel Storage, LLC is meritorious and should be granted.

FN1 The Board granted PFS leave to file a supplemental answer regarding the last six State contentions because PFS apparently was served inadvertently with a copy of the State's

contentions that did not contain those six contentions. See Licensing Board Order (Granting Leave to File Response to Contentions and Schedule for Responses to Late-Filed Contentions) (Dec. 31, 1997) (unpublished).

FN2 Currently pending with the Chief Administrative Judge is a PFS motion seeking reconsideration of his action creating the new PSP Board. See Applicant's Request for Reconsideration of Establishment of a Separate Licensing Board for Security Plan Matters (Apr. 6, 1998).

FN3 In addition, agency rules of practice afford states, counties, and municipalities that do not seek or qualify for full party status the opportunity to participate in proceedings in which they have an interest. As interested governmental entities, they are afforded the opportunity to introduce evidence or interrogate witnesses, albeit without any requirement to take a position regarding any of the issues that are the subject of litigation. See id. s 2.715(c).

FNBoth Confederated Tribes and the Skull Valley Band have argued, in the alternative, they are entitled to participate as an interested governmental entity. See Confederated Tribes/Pete Petition at 2; Skull Valley Band Petition at 2-3. Because we find both the Confederated Tribes and the Skull Valley Band have standing, and neither has expressed any interest in participating regarding any issue without taking a position on that issue, we see no reason to reach the issue whether, as a federally recognized Native American tribe, either is entitled to interested governmental entity status under section 2.715(c).

FN4 Chairman Pete has made no attempt to seek discretionary intervention status.

FN5 Although there apparently is no definitive authority on whether a filing seeking discretionary intervention submitted beyond the deadline for filing intervention petitions must meet the late-filing standards, we find nothing in the general terms of 10 C.F.R. s 2.714 governing intervention petitions that would exempt a discretionary intervention request from its late-filing provisions.

FN6 The State makes the point that the SSWS petition, as supplemented, is not accompanied by any affidavits of members declaring the organization has the right to represent their interests. The closest thing, the State asserts, is a February 3, 1998 affidavit of Robert J. Hoffman that appoints SSWS spokesman Wilson as his representative and was not timely filed. See State SSWS First Intervention Petition Supplement Response at 3 n. 1. Because we find SSWS has failed to demonstrate any of its members has the requisite injury in fact to provide it with organizational standing as of right, we need not determine whether this affidavit is adequate.

FN7 Both PFS and SSWS seek to support SSWS's discretionary admission by reference to the Appeal Board's decision in Sheffield, ALAB-473, 7 NRC at 743- 44, remanding to the Licensing Board the petition of a local chapter of the American Nuclear Society (ANS) for consideration of whether it should be afforded discretionary intervention. This intervenor subsequently was admitted to the proceeding. See Nuclear Engineering Co. (Sheffield, Illinois, Low-Level Radioactive Waste Disposal Site), ALAB-494, 8 NRC 299, 300 n. 1 (1978). Although there is no published opinion providing the basis for the Licensing Board's ruling admitting the local ANS

chapter, SSWS has quoted a portion of the Board's unpublished decision in its final intervention petition supplement. See SSWS Second Intervention Petition Supplement at unnumbered 30.

FNBesides being of questionable significance as an unpublished decision, the quoted portion of the Licensing Board's Sheffield ruling tells us nothing about the Board's analysis of the Pebble Springs factors. Lacking any knowledge of the exact basis for that Board's determination on remand, we simply note that any number of factors, such as a further showing about the nature of the organization's interest, may have counseled a different result there. See Sheffield, ALAB-473, 7 NRC at 741 & n. 3 (many of local ANS organization's members assertedly involved in work utilizing the facility in question and whether they would be harmed by license termination or conditions would depend on nature of work and availability of other similar facilities).

FN8 Applicant PFS apparently did have discussions with the Confederated Tribes concerning language changes in contentions it had adopted and was told the Confederated Tribes would advise the Board on its position. See Applicant's Response to Revised Contentions and Proposed Transcript Corrections (Feb. 17, 1998) at 3. We, however, have heard nothing from the Confederated Tribes in this regard.

FN9 Although we agree with Petitioner Confederated Tribes' point that an adjudicatory body generally has the authority to consider its own jurisdiction, see Tr. at 100, in this instance we do not find sufficient ambiguity in the Commission's regulatory declaration of its jurisdiction (and concomitantly ours) to permit further inquiry into that question consistent with the dictates of 10 C.F.R. s 2.758.

FN10 Although PFS suggests the issue of license authority over the Rowley Junction ITP is outside the scope of this proceeding, see PFS Contentions Response at 158-59, this seemingly runs contrary to the Staff's apparent belief that it may, in the context of acting on the PFS license, exert regulatory authority relative to PFS activities at Rowley Junction, see Staff Contentions Response at 19 n. 29.

FN11 In discussing this paragraph of the contention, the State asserts that a central concern is that any Part 72 license not be issued until the certification process is completed for the storage casks PFS proposes to use at its facility. See State Contentions Reply at 20-21. The Staff agrees that this will not happen. See Tr. at 174-75, 183-84. As a consequence, we find nothing to litigate regarding this paragraph.

FN12 In admitting this contention, we note that further litigation on its merits may be subject to any merits disposition of Utah B.

FN13 In considering this contention, we agree with the Staff that the State has not provided any basis for challenging the PFS determination that its facility is sufficiently far from Skull Valley Road that an explosion involving Dugway military ordinance being transported on the road will not exceed the 1 pound per square inch (psi) overpressure requirement at the facility. See Staff Contentions Response at 33. Further, although the Staff observes that portions of the bases for Utah K could be construed as a challenge to the discussion of transportation accident risk in the

PFS ER, see id., we do not interpret it that way. Even if it is, however, that same issue is considered below in the context of Utah V.

FN14 In response to a Staff concern regarding a portion of the basis for this contention, the State agreed that its contention should not be construed as asking for evaluation of faults other than "capable faults" as they are defined in 10 C.F.R. Part 100, App. A. See Tr. at 332.

FN15 In admitting this contention, we note that further litigation on its merits may be subject to any merits disposition of Utah B.

FN16 In admitting this contention, we include its bases relating to construction-related groundwater impacts and groundwater impacts relative to the Rowley Junction ITP. We note, however, that further litigation on this contention's merits relative to the ITP may be subject to any merits disposition of Utah B.

FN17 Some of the bases for this contention rely upon the possibility of accidents at the Rowley Junction ITP, which we have found to be a permissible subject for other State contentions. In this instance, however, the basis for the contention concerns purported accidents involving storage casks rather than shipping casks, the latter being the casks that would be handled at the ITP.

FN18 In admitting this contention as it relates to the Rowley Junction ITP, we note that further litigation on its merits may be subject to any merits disposition of Utah B.

FN19 Further litigation on the merits of this contention relative to basis eleven regarding the ITP may be subject to any merits disposition of Utah B.

FN20 Further litigation on the merits of this contention relative to paragraph two regarding the ITP may be subject to any merits disposition of Utah B. In this regard, however, we are unable to find admissible the language of paragraph two that relies on rail shipment volume as a basis for the contention. As with Utah B, see supra p. 184, we consider this an insufficient basis to merit the admission of paragraph two. Accordingly, we appropriately revise paragraph two of Utah T, which is set forth at p. 255 of Appendix A to this Memorandum and Order.

FN21 Regarding this contention, the Board also notes that an allegation concerning compliance with the requirements of 10 C.F.R. Part 75 was withdrawn. See Tr. at 486-87.

FN22 Further litigation on the merits of this contention relative to basis one regarding the ITP may be subject to any merits disposition of Utah B.

FN23 Notwithstanding our admission of Utah B dealing with the need for licensing of the Rowley Junction ITP and our general agreement with the State's observation that "where the intermodal transfer facility constitutes part of the storage facility for purposes of compliance with safety regulations, its environmental impacts must nevertheless be addressed by the Applicant and the NRC," State Contentions Reply at 88, we are unable to find that paragraph 3.a of this contention is admissible because it relies on rail shipment volume, a consideration we consider insufficient to support the admission of Utah B or this contention.

FN24 Further litigation on the merits of this contention relative to paragraph three regarding the ITP may be subject to any merits disposition of Utah B.

FN25 In this regard, while our decision to reject Utah EE as late-filed means we need not address its admissibility, we note that based on our review of the parties' submissions, see State Contentions EE and FF at 4-12; PFS State Contentions EE and FF Response at 8-45; Staff State Contentions EE and FF Response at 7; State Contentions EE and GG Reply at 13-27, even if timely filed, the bases for the contention, as supported by the witness affidavits, would have been sufficient to gain admission only for portions of the contention, in particular, subparagraph d of paragraph three and paragraph seven. The other portions (paragraphs one and two, subparagraphs a through c and e of paragraph three, paragraphs four through six, and paragraph eight) would have been inadmissible as failing to establish with specificity any genuine dispute; impermissibly challenging the Commission's regulations and/or generic rulemaking-associated determinations; lacking adequate factual and expert opinion support; and/or failing properly to challenge the PFS application. See section II.B.1.a.i, ii, v, vi above.

FN26 While not requiring the same level of protection that must be afforded the safeguards information involved in the contentions that are before the PSP Licensing Board, dealing with proprietary information nonetheless requires the use of separate, closed hearing sessions, and potentially separate, public and nonpublic versions of any Board issuances.

FNIn this regard, responding to our inquiry, the parties have advised us that the terms of Utah EE and Utah GG do not include proprietary information. See Letter from Ernest L. Blake, Counsel for PFS, to Licensing Board 1 (Mar. 18, 1998); NRC Staff's Response to Memorandum and Order (Request for Information Regarding Contentions Involving Proprietary and Safeguards Material) Dated March 9, 1998 (Mar. 18, 1998) at 1 n. 1; see also [State] Response to the Board's Request for Information Regarding Contentions Involving Proprietary and Safeguards Information (Mar. 18, 1998) at 1-2.

FN27 Although we need not reach the issue, we note that paragraphs one and two would have been inadmissible as failing to establish with specificity any genuine dispute; lacking adequate factual and expert opinion support; and/or failing properly to challenge the PFS application. See section II.B.1.a.i, v, vi above.

FN28 Although this contention seeks to litigate issues involving the Rowley Junction ITP, we find it inadmissible because those issues, whether raised in connection with the PFS facility or the ITP, lack a sufficient basis.

FN29 The Board anticipates that consultation between the lead party and any involved parties will ensure involved parties' litigation interests and concerns regarding any particular contention are accommodated. If an instance arises when such discussions fail to yield a resolution, the involved parties may request Board consideration of the matter. Such a request must be in writing, on the record, and presented in a time frame that will allow for Board resolution without requiring the extension of any outstanding schedules.

FN30 During the January prehearing conference, the Board discussed the status of the Staff's

preparation of its SER and FEIS and the potential impact of those activities on the litigation schedule for this proceeding. See Tr. at 812-15. We anticipate that the status of these Staff activities, including any Staff decision on segmentation of the SER, would be reflected in any schedules proposed by the parties as part of the filing requested below, see supra section III.C.

FN31 With regard to Utah T/Castle Rock 10, 12, and 22, concerning the assessment of required permits and other entitlements, in describing any schedule for the litigation of this contention the parties should provide their views about the propriety and efficiency of seeking an opinion/judgment in some other judicial forum relative to questions such as the scope of State regulatory authority on tribal lands. Compare Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), LBP-85-12, 21 NRC 644, 896 (at behest of Licensing Board, intervenors sought state court declaratory judgments on validity of state statutory limitations on utility emergency plan responses), aff'd, ALAB-818, 22 NRC 651, rev'd on other grounds, CLI-86-13, 24, NRC 22 (1985).

FN32 This is the same room that was used for the videoconferencing demonstration during the January 1998 prehearing conference.

FN33 The language of these admitted contentions is set forth in Appendix A to this Memorandum and Order.

FN34 Copies of this Memorandum and Order were sent this date to counsel for the Applicant PFS, and to counsel for Petitioners Skull Valley Band, OGD, Confederated Tribes/Pete, Castle Rock, SSWS, and the State by Internet e-mail transmission; and to counsel for the Staff by e-mail through the agency's wide area network system.
END OF DOCUMENT

54 N.R.C. 163
(Cite as: 54 N.R.C. 163, 2001 WL 34050842 (N.R.C.))

**1 IN THE MATTER OF PRIVATE FUEL STORAGE, L.L.C.
(Independent Spent Fuel Storage Installation)

Nuclear Regulatory Commission

Atomic Safety and Licensing Board
Docket No. 72-22-ISFSI
(ASLBP No. 97-732-02-ISFSI)

LBP-01-23

August 1, 2001

***163** Before Administrative Judges: G. Paul Bollwerk, III, Chairman; Dr. Jerry R. Kline; Dr. Peter S. Lam

In this proceeding concerning the application of Private Fuel Storage, L.L.C. (PFS), under 10 C.F.R. Part 72 to construct and operate an independent spent fuel storage installation (ISFSI), acting pursuant to 10 C.F.R. § 2.749, the Licensing Board grants a PFS request for summary disposition in its favor regarding contention Utah Z, No Action Alternative, finding that a discussion in the NRC Staff's June 2000 draft environmental impact statement (DEIS) that analyzes both the advantages and disadvantages of the no-action alternative moots this contention asserting that such a discussion was missing from the PFS environmental report (ER).

RULES OF PRACTICE: SUMMARY DISPOSITION (BURDEN OF PERSUASION; BURDEN OF PROOF)

Under 10 C.F.R. § 2.749(a), (d) summary disposition may be entered with respect to any matter (or all of the matters) in a proceeding if the motion, along with any appropriate supporting material, shows that there is "no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter ***164** of law." The movant bears the initial burden of making the requisite showing that there is no genuine issue as to any material fact, which it attempts to do by means of a required statement of material facts not at issue and any supporting materials (including affidavits, discovery responses, and documents) that accompany its dispositive motion. An opposing party must counter each adequately supported material fact with its own statement of material facts in dispute and supporting materials, or the movant's facts will be deemed admitted. See Advanced Medical Systems, Inc. (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102-03 (1993).

RULES OF PRACTICE: CONTENTIONS (MODES OF FORMULATION)

At a petitioner's choosing, a contention can take three forms: a challenge to the application's adequacy based on the validity of the information that is in the application; a challenge to the application's adequacy based on its alleged omission of relevant information; or some combination of these two challenges. See 10 C.F.R. § 2.714(b)(2)(iii).

RULES OF PRACTICE: CONTENTIONS (SCOPE)

In determining which of the three forms is involved in any contention, a presiding officer should look first to the language of the contention. If that proves unavailing, the language of the bases provided to support the contention may be examined to discern the sponsor's intent relative to the contention's scope and meaning. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-899, 28 NRC 93, 97 (1988) (explaining that when "the issue is the scope of a contention, there is no good reason not to construe the contention and its bases together in order to get a sense of what precise issue the party seeks to raise").

***165** RULES OF PRACTICE: CONTENTIONS (SCOPE)

NEPA: CONTENTIONS (SCOPE; AMENDMENT)

****2** When a superseding DEIS includes an analysis that discusses matters specifically identified by the intervenor in a contention as missing from the discussion in the applicant's environmental report, and what the intervenor now questions is the adequacy of that DEIS analysis, the intervenor can do so in the context of a timely, properly framed new or amended contention outlining the intervenor's concerns about the DEIS discussion.

RULES OF PRACTICE: CONTENTIONS (SCOPE)

NEPA: CONTENTIONS (SCOPE)

A contention contesting an applicant's ER may be viewed as a challenge to the Staff's subsequently issued DEIS/EIS. See Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 84 (1998). This "migration" tenet does not, however, change the basic form of the contention, i.e., whether it challenges the soundness of the information provided or claims that necessary information has been omitted (or some combination of the two).

MEMORANDUM AND ORDER

(Granting Summary Disposition Motion Regarding Contention Utah Z)

Pending before the Licensing Board in this 10 C.F.R. Part 72 proceeding concerning the application of Private Fuel Storage, L.L.C. (PFS), for authorization to construct and operate an independent spent fuel storage installation (ISFSI) in Skull Valley, Utah, is a motion for summary disposition filed by PFS regarding contention Utah Z, No Action Alternative. With contention Utah Z, Intervenor State of Utah (State) challenges the adequacy of the "no-action" alternative discussion in the environmental report (ER) that accompanied the PFS ISFSI application. The NRC Staff supports the PFS summary disposition request, while the State opposes this motion.

Pursuant to 10 C.F.R. § 2.749, for the reasons set forth below we grant the PFS dispositive motion.

I. BACKGROUND

In June 1997, as part of its license application for its proposed ISFSI, PFS submitted an ER addressing various issues pertaining to the National Environmental Policy Act of 1969 (NEPA). See 10 C.F.R. §§ 51.45, 51.60(b)(iii). On November 23, 1997, the State filed its safety and environmental contentions relating to the PFS application, including a challenge to the adequacy of the ER's discussion of the no-action alternative under NEPA. See [State] Contentions on the Construction and Operating License Application by [PFS] for an Independent Spent Fuel Storage Facility (Nov. 23, 1997) [hereinafter Utah Contentions]. The contention now at issue -- contention Utah Z -- was admitted in its entirety by the Licensing Board in its April 1998 ruling on standing and contentions. See ***166** LBP-98-7, 47 NRC 142, 203, aff'd on other grounds, CLI-98-13, 48 NRC 26 (1998).

As admitted, that contention reads:

> The Environmental Report does not comply with NEPA because it does not adequately discuss the "no action" alternative.

Id. at 256. In describing the basis for the admitted portions of this contention, the State declared that PFS's ER focused "solely on the perceived disadvantages of the no build alternative" and therefore "fail[ed] to provide [a] balanced comparison of environmental consequences among alternatives." See Utah Contentions at 169. To illustrate this failure, the State listed several advantages of the no-action alternative that PFS allegedly ignored in its ER: (1) the benefits of foregoing shipment of 4000 casks of spent fuel rods thousands of miles across the country; (2) the diminished potential for sabotage at a centralized storage facility; (3) the decreased risk of accidents from additional cask handling; and (4) the Safety gains in storing spent fuel at the reactor sites, whose spent fuel pools will be accessible for transfers or inspections. See id. at

the aforementioned sabotage aspects of contention Utah Z. See LBP-98-10, 47 NRC 288, 296 (1998). Additionally, in a November 9, 2000 memorandum and order, the Board further clarified the scope of Utah Z by limiting it to environmental impacts and excluding economic impacts. See Licensing Board Memorandum and Order (Ruling on Contention Utah Z Discovery Production Requests) (Nov. 9, 2000) at 4 (unpublished).

In June 2000, the Staff issued its draft environmental impact statement (DEIS) regarding the PFS facility. See Draft Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, NUREG-1714 (June 2000) [hereinafter DEIS]. Among other things, the DEIS provided a "no-action alternative" discussion containing an expanded analysis of the environmental impacts that might stem from the PFS proposal. Compare ER at 8.1-2 to -4 with DEIS at 6-43 to -47, 9-8 to -9 & Table 9.1 (summary and comparison of potential environmental impacts).

On February 14, 2001, PFS filed a motion for summary disposition of contention Utah Z, which is presently before us for resolution, supported by a statement of material facts not in dispute. The premise of this motion is that there is no genuine dispute of material fact with respect to the State's no-action alternative contention Utah Z challenging the ER in that the State's contention was rendered moot by the Staff's subsequent coverage of the no-action alternative ***167** in the DEIS. See [PFS] Motion for Summary Disposition of Utah Contention Z -- No Action Alternative (Feb. 14, 2001) at 6-18 [hereinafter PFS Dispositive Motion]; see also id. Statement of Material Facts on Which No Genuine Dispute Exists [hereinafter PFS Undisputed Facts].

In its March 6, 2001 response to the PFS summary disposition motion, the Staff declared its support for this PFS request. In its response, which is supported by the affidavit of Scott C. Flanders, a Senior Project Manager in the Spent Fuel Project Office of the Office of Nuclear Material Safety and Safeguards, the Staff agrees with PFS that the DEIS renders contention Utah Z moot. See NRC Staff's Response to [PFS] Motion for Summary Disposition of Utah Contention Z -- No Action Alternative (March 6, 2001) at 5-7 [hereinafter Staff Response]; see also id. Attach. A (Affidavit of Scott C. Flanders Concerning Utah Contention Z) [hereinafter Flanders Affidavit]. The State, on the other hand, opposes the PFS motion in all respects, supported by a statement of disputed and relevant and material facts and the affidavit of Dr. Marvin Resnikoff, a senior associate with the private consulting firm Radioactive Waste Management Associates. See [State] Response to [PFS] Motion for Summary Disposition on Utah Contention Z (Mar. 13, 2001) at 4-18 [hereinafter State Response]; see also id. [State] Statement of Disputed and Relevant Material Facts; id. Attach. A (Declaration of Dr. Marvin Resnikoff Regarding Material Facts in Dispute with Respect to Contention Utah Z). Thereafter, pursuant to 10 C.F.R. § 2.749 and in accordance with a Board scheduling order, see Licensing Board Order (General Response Schedules) (Apr. 23, 1999) (unpublished), the State expressed its disagreement with the Staff response as well. See [State] Reply to Staff's Response to [PFS] Motion for Summary Disposition on Utah Contention Z (March 22, 2001) [hereinafter State Reply].

II. DISCUSSION

A. Summary Disposition Standards

**4 We have articulated the standard governing the consideration of a motion for summary disposition several times in this proceeding in ruling on previous PFS dispositive motions and rely on that same standard here:

Under 10 C.F.R. § 2.749(a), (d) summary disposition may be entered with respect to any matter (or all of the matters) in a proceeding if the motion, along with any appropriate supporting material, shows that there is "no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law." The movant bears the initial burden of making the requisite showing that there is no genuine issue as to any material fact, which it attempts to do by means of a required statement of material facts not at issue and any supporting materials (including affidavits, discovery responses, and documents) that accompany its dispositive motion. An opposing party must counter each adequately supported material fact with its own ***168** statement of material facts in dispute and supporting materials, or the movant's facts will be deemed admitted. See Advanced Medical Systems, Inc. (One Factory Row, Geneva, Ohio 44041), CLI-93- 22, 38 NRC 98, 102-03 (1993).

LBP-01-19, 53 NRC 416, 421-22 (2001) (quoting cited cases from this proceeding).

With these general principles in mind, we turn to the PFS summary disposition motion regarding contention Utah Z.

B. Contention Utah Z

1. PFS Position

In this instance, PFS has provided a statement of purportedly undisputed material facts indicating that the State-alleged deficiencies regarding the no- action alternative discussion in the ER (i.e., the supposed PFS discussion only of the disadvantages of the no-action alternative) are, in fact, addressed in the Staff-issued DEIS. Initially, PFS notes that the DEIS specifically acknowledges in chapter six:

"Under the no-action alternative, no PFS [facility] and no transportation facilities would be constructed in Skull Valley. The impacts described in Chapters 4 and 5 of the DEIS would not occur, and Skull Valley would remain as it is today (see Chapter 3)."

PFS Dispositive Motion at 9 (quoting DEIS at 6-43). According to PFS, DEIS chapters four and five are, respectively, sixty-five page discussions of PFS facility construction and operation impacts and transportation impacts. Also relevant to the State's concerns, PFS declares, is the portion of DEIS chapter six that assesses the impact of the no-action alternative for future at-reactor ISFSIs relative to geology/minerals/soils, water resources, air quality, ecological/ socioeconomic/community/cultural resources, and human health. See id. at 910; see also DEIS at 6-45 to -47. And as further evidence that the State's contention Utah Z concern regarding the

no-action alternative analysis has now been addressed, PFS maintains that DEIS chapter 9 contains a comparative table summary of the impacts of alternative actions considered in the DEIS, including the no-action alternative. See PFS Dispositive Motion at 10.

5 Moreover, according to PFS, several sections of the DEIS address the particular assertions that form the basis of the State's contention Utah Z challenge to the PFS ER relative to its discussion of the environmental advantages and disadvantages of the no-action alternative. [FN1] In connection with the State's contention Utah Z ***169 concern about the transportation effect advantages of the no-action alternative, PFS highlights the DEIS chapter five discussion of the effects of transporting 4000 casks of spent fuel across the country, the statement in DEIS chapter six indicating that the impacts described in chapters four and five would not occur if the proposed ISFSI were not built, and the chapter nine table comparison of transportation impacts, including the no-action alternative. See PFS Dispositive Motion at 11-13; see also DEIS at 5-35, 6-43, 9-34 to -35 (Table 9.1). Relative to the State's contention Utah Z challenge to the lack of ER discussion about the accident risk increase associated with cask handling, PFS points out there is a measurement in DEIS chapter four of the impact of cask handling accidents as well as a conclusion that the effects of such an accident would be insignificant. See PFS Dispositive Motion at 13-15; see also DEIS at 4-48. Finally, with respect to the State's contention Utah Z challenge regarding the failure to outline the safety advantages of onsite waste storage at existing reactors, PFS declares that the DEIS recognizes another advantage of the no- action alternative, specifically that at-reactor storage is safe and will not have any significant incremental environmental impact. See PFS Dispositive Motion at 15-17; see also DEIS at 6-44.

Based on this DEIS consideration of the no-action alternative, PFS thus asserts that the concerns raised by contention Utah Z regarding the inadequate PFS ER discussion of the advantages of the no-action alternative have been satisfied. According to PFS, this renders moot any State assertion that a balanced discussion of the no-action alternative was lacking, thus entitling it to summary disposition in its favor on contention Utah Z. See PFS Dispositive Motion at 18.

2. Staff Position

For its part, the Staff agrees with PFS, declaring that the DEIS sufficiently covers both the advantages and disadvantages of the no-action alternative so as to satisfy NEPA's requirements as well as the points highlighted by the State as the basis for contention Utah Z. See Staff Response at 8-13; see also Flanders Affidavit at 2-3. Thus, the Staff concludes that by virtue of the DEIS, there no longer is any genuine issue of material fact relative to contention Utah Z so that summary disposition in favor of PFS is appropriate.

3. State Position

In opposing the PFS dispositive motion, the State rejects the PFS assertion that contention Utah Z is merely a challenge to the failure of the ER to address the advantages of the no-action alternative. The State asserts that this interpretation is contrary to the plain language of contention Utah Z in that the contention ***170** does not state that the ER is devoid of all

discussion of the no-action alternative. Instead, the State maintains that the ER did not properly consider the no-action alternative and failed to provide a balanced comparison between the advantages and disadvantages of the option. According to the State, the contention was intended as a challenge to the adequacy of the qualitative discussion of the no-action alternative in the ER. See State Response at 5; see also State Reply 2-3.

****6** Based on this interpretation of the scope of contention Utah Z, the State insists that PFS has failed to meet its burden relative to its summary disposition request. According to the State, as was the case with the ER, the DEIS presents the no-action alternative in a conclusory, biased manner by claiming and emphasizing the disadvantages of that alternative without justifying them. See State Response at 5-7; see also State Reply at 4-8, 9-10. The State asserts that this is apparent from the DEIS discussion of the three disadvantages that also were identified in the ER -- spent fuel storage space loss leading to power generation loss; delays in reactor decommissioning activities and associated expenses incurred for continued at-reactor spent fuel storage; and the need to construct additional reactor storage sites -- each of which is inadequately supported and analyzed. See State Response at 7-14; see also State Reply at 8. Further, the State declares, as was the case with the ER, the DEIS still fails to discuss adequately each of the three specific ""advantage" items referenced in the basis statement to contention Utah Z. According to the State, relative to the question of transportation impacts, the DEIS fails to recognize that postponing spent fuel shipments until a final repository is constructed will result in reduced radioactivity levels, and so reduced occupational and public doses, relative to the transported fuel. So too, the State asserts the DEIS fails to analyze adequately the no-action impacts of reduced exposures and other environmental benefits that would result from (1) fewer fuel handling operations; (2) fewer managerial actions and human errors that could result in transportation accidents or en route delays; and (3) the likelihood that existing reactor facilities will continue to store fuel onsite, regardless of whether an offsite facility like the PFS proposal is constructed. Finally, the State declares that the DEIS no-action alternative analysis is deficient because it does not recognize the benefits of onsite storage at existing reactor facilities vis-a-vis the possibility of military aircraft crash-related radiological releases, which the State asserts are a concern only with regard to the PFS facility. See State Response at 14-18; see also State Reply at 9.

4. Board Ruling

From this discussion, it is apparent that the parties' submissions relative to the PFS dispositive motion highlight the initial, and potentially determinative, question that must be answered relative to contention Utah Z, i.e., what is the scope of this State issue statement? In this regard, the Commission has made ***171** it clear that in drafting contentions regarding a challenged licensing action, the application (including an accompanying Safety Analysis Report and ER) is to be the initial focus of any issue statements and their supporting bases. As the Commission also has made clear, at the petitioner's choosing, such statements can take three forms: a challenge to the application's adequacy based on the validity of the information that is in the application; a challenge to the application's adequacy based on its alleged omission of relevant information; or some combination of these two challenges. See 10 C.F.R. § 2.714(b)(2)(iii). Further, it is apparent that in determining which of these three forms is involved in any contention, we look first to the language of the contention. Yet, if that proves unavailing, the language of the bases

provided to support the contention may be examined to discern the sponsor's intent relative to the contention's scope and meaning. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-899, 28 NRC 93, 97 (1988) (explaining that when "the issue is the scope of a contention, there is no good reason not to construe the contention and its bases together in order to get a sense of what precise issue the party seeks to raise").

**7 In this instance, the contention in question is relatively succinct, declaring simply that the PFS ER did not "adequately discuss" the no-action alternative. On its face, it is unclear which of the three forms of application challenges outlined above this issue statement is intended to encompass. To ascertain the scope of this contention, therefore, we must examine the two-page basis statement provided by the State. As was noted above, see supra p. 166, the basis for contention Utah Z declares the ER does not meaningfully discuss the no build alternative because PFS focuses "solely on the perceived disadvantages of the no build alternative." It then provides three examples of this purported deficiency -- transportation, spent fuel handling, and existing onsite storage expansion -- that the State asserts are not considered at all so as to render the PFS discussion "one-sided." Moreover, in seeking to support this challenge to the "adequacy" of the ER, the State also relied on four judicial decisions, all of which are described as supporting the proposition that an agency failure to discuss the no-build alternative is improper. [FN2]

Under the circumstances, it is apparent that contention Utah Z, as framed by the State, was an "omission" challenge to the no-action alternative aspect of the ER that was based on the alleged PFS failure to include a discussion of certain information, specifically the disadvantages of the no-action alternative. Putting aside the question of whether or not an ER (or DEIS/EIS) lacking such a discussion would be adequate, the superseding DEIS includes a no-action *172 alternative analysis that discusses both the advantages and disadvantages of the proposed course of action, including the three matters specifically identified by the State. What also is apparent is that the State now questions the adequacy of that analysis in the DEIS. This is certainly something the State can do, so long as it does so in the context of a timely, properly framed contention. As proffered and admitted, however, contention Utah Z does not provide the vehicle to pursue such a challenge. Rather, what is needed is a new or amended contention outlining the State's concerns about the DEIS discussion of the no-action alternative. [FN3] At this point, more than a year after the DEIS was issued, whether the State could gain the admission of such an issue seems problematic. In any event, because the State has made no such request, that is not a matter we need resolve at this juncture.

Instead, relative to the matter before us, for the reasons set forth above, we find that PFS has met its burden of showing there are not material facts at issue so as to be entitled to summary disposition regarding contention Utah Z, as admitted, in that the State concern framed by that issue statement is now moot. [FN4]

III. CONCLUSION

With regard to contention Utah Z, No Action Alternative, based on the inclusion of a discussion in the DEIS that analyzes both the advantages and disadvantages of the no-action alternative, PFS has established that there are no genuine issues as to any material fact and that it is entitled

to judgment in its favor as a matter of law regarding that State issue statement, which is now moot.

**8 For the foregoing reasons, it is, this first day of August 2001, ORDERED that the February 14, 2001 PFS motion for summary disposition of contention Utah Z is granted and, for the reasons set forth in section II.B.4 of this Memorandum *173 and Order, a decision regarding contention Utah Z is rendered in favor of PFS on the ground that issue is now moot.

THE ATOMIC SAFETY AND LICENSING BOARD [FN5]

G. Paul Bollwerk, III, Chairman

ADMINISTRATIVE JUDGE

Dr. Jerry R. Kline

ADMINISTRATIVE JUDGE

Dr. Peter S. Lam

ADMINISTRATIVE JUDGE

FN1. PFS notes that the other specific basis for the State's no-action alternative contention -- sabotage avoidance -- was dismissed by the Board. See PFS Dispositive Motion at 2 (citing LBP-98-10, 47 NRC 288, 296 (1998)).

FN2. As PFS points out, only three of these cases actually involve a failure to discuss the no-build alternative. See PFS Dispositive Motion at 11. The fourth, Van Abbema v. Fornell, 807 F.2d 633, 640-43 (7th Cir. 1986), is based on an agency's reliance on a record containing known factual inconsistencies and ambiguities that the agency made no attempt to resolve, a situation unlike that before the Board.

FN3. As the parties noted, the Commission has recognized that a contention contesting an applicant's ER may be viewed as a challenge to the Staff's subsequently issued DEIS/EIS. See, e.g., Staff Response at 9-10 (citing Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 84 (1998)). This "migration" tenet does not, however, change the basic form of the contention, i.e., whether it challenges the soundness of the information provided or claims that necessary information has been omitted (or some combination of the two).

FN4. Although the issue of the qualitative validity of the DEIS no-action analysis is not now

before us, the Staff's DEIS analysis nonetheless is facially sufficient to support the PFS argument regarding the mootness of contention Utah Z in connection with the asserted failure to discuss the disadvantages of the no-action alternative.

FN5. Copies of this Memorandum and Order were sent this date by Internet e-mail transmission to counsel for (1) Applicant PFS; (2) Intervenors Skull Valley Band of Goshute Indians, Ohngo Gaudadeh Devia, Confederated Tribes of the Goshute Reservation, Southern Utah Wilderness Alliance, and the State; and (3) the Staff.

END OF DOCUMENT

48 N.R.C. 286
(Cite as: 48 N.R.C. 286, 1998 WL 850237 (N.R.C.))

Nuclear Regulatory Commission

Atomic Safety and Licensing Board

LBP-98-29
**1 IN THE MATTER OF
PRIVATE FUEL STORAGE, L.L.C.
(Independent Spent Fuel Storage Installation)
Docket No. 72-22-ISFSI
ASLBP No. 97-732-02-ISFSI

November 30, 1998

Before Administrative Judges: G. Paul Bollwerk, III, Chak, III, Chairman; Dr. Jerry R. Kline; Dr. Peter S. Lam

***286** In this proceeding concerning the application of Private Fuel Storage, L.L.C. (PFS) under 10 C.F.R. Part 72 to construct and operate an independent spent fuel storage installation (ISFSI), the Licensing Board denies Intervenor requests to accept late-filed contentions concerning a revised proposal to construct a rail spur that would be used to transport spent fuel shipping casks to the PFS facility.

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (GOOD CAUSE FOR DELAY)

In considering whether under factor one of the 10 C.F.R. § 2.714(a)(1) standards there is good cause for late-filing based on the time it took an intervenor to prepare and file its contentions regarding the application amendment, such a finding depends in each instance on the scope and complexity of the 'new' information the intervenor relies upon as the basis for late- filing.

***287** RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (GOOD CAUSE FOR DELAY)

In instances in which a new contention purportedly is based on information contained in a document recently made publically available, an important consideration in judging the contention's timeliness is the extent to which the new contention could have been put forward with any degree of specificity in advance of the document's release. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-737, 18 NRC 168, 172 n.4 (1983);

see also Yankee Atomic Electric Co. (Yankee Nuclear Power Station), LBP-96-15, 44 NRC 8, 26(1996).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (GOOD D CAUSE FOR DELAY)

Among the five late-filing standards of 10 C.F.R. § 2.714(a)(1), the good cause factor has been accorded a preeminent role such that the moving party's failure to satisfy this requirement mandates a compelling showing in connection with the other four factors. See Commonwealth Edison Co. (Braidwood Nuclear Power Station, Units 1 and 2), CLI-86-8, 23 NRC 241, 244(1986).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS

Among the four remaining late-filing standards of 10 C.F.R. § 2.714(a)(1), factors two and four -- availability of other means to protect the petitioner's interests and extent of representation of petitioner's interests by existing parties -- are accorded less weight than factors three and five -- assistance in developing a sound record and broadening the issues/delaying the proceeding. See Braidwood, CLI-86-8, 23 NRC at 245.

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (SOUND RECORD DEVELOPMENT)

Relative to factor three -- assistance in developing a sound record -- for a contention that is essentially a legal question, an intervenor failure to specify witnesses or testimony does not count as heavily against admissibility as it otherwise might have. At the same time, in line with the Commission's Braidwood reasoning, see CLI-86-8, 23 NRC at 246, a strong showing under this factor for a legal contention may require a more detailed description of the authority for the intervenor's legal claim.

***288** ATOMIC ENERGY ACT: LICENSE REVIEW

LICENSE APPLICATION: AMENDMENT OR MODIFICATION

RULES OF PRACTICE: CONTENTIONS (LICENSE REVIEW-RELATED D ACTIVITIES)

****2** The agency's licensing review procedures comtemplate a dynamic process in which an application may be modified or improved without 'renoticing' the application. At the same time,

an intervenor is free to mount an adjudicatory challenge to any application revisions proffered after the deadline for filing contentions, at least so long as the new or amended contentions meet the late- filing criteria of section 2.714(a)(1). See Baltimore Gas and Electric Co. (Calvert Cliffs Nuclear Power Plant, Units 1 and 2), LBP-98-26, 48 NRC 232, 243 (1998), %appeal pending.

MEMORANDUM AND ORDER

(Ruling on Late-Filed Contentions Regarding August 1998 Low, Utah Rail Spur License Application Amendment)

In filings dated September 29, October 14, and November 2, 1998, respectively, intervenors State of Utah (State or Utah), the Confederated Tribes of the Goshute Reservation (Confederated Tribes), and Ohngo Gaudadeh Devia (OGD) submitted late-filed contentions relating to an August 28, 1998 amendment to the pending 10 C.F.R. Part 72 application of Private Fuel Storage, L.L.C. (PFS). In its license request, PFS seeks authorization under 10 C.F.R. Part 72 to construct and operate an independent spent fuel storage installation (ISFSI) on the Skull Valley, Utah reservation of intervenor Skull Valley Band of Goshute Indians (Skull Valley Band). The August 28 license application amendment, among other things, outlines a revised proposal to construct a rail spur off the existing Union Pacific rail mainline that would be used to transport flatbed rail cars holding spent fuel shipping casks to the PFS facility approximately thirty miles to the south. In responses to these intervenor filings, applicant PFS and the staff assert that none of the State, Confederated Tribes, or OGD contentions are admissible.

For the reasons set forth below, we find these parties' late-filed contentions relating to the August 1998 application amendment are not litigable.

*289 I. BACKGROUND

As originally submitted in June 1997, the PFS applicatiS application proposed that shipping casks containing nuclear reactor spent fuel rods would be moved into the Skull Valley area via a Union Pacific rail mainline that runs along the southern shore of the Great Salt Lake. It further stated that "shipping casks are shipped from the railroad mainline to the [Private Fuel Storage Facility (PFSF)] either by rail on a railroad spur or by highway." [PFS], Safety Analysis Report [for PFSF] at 4.5-1 (rev. 0 June 1997) [hereinafter SAR]. The application then went on to detail the "highway shipment" alternative. First, the shipping casks would be offloaded from rail cars onto heavy haul tractor/trailers at an intermodal transfer point (ITP) located near Rowley Junction, Utah. Rowley Junction is a highway interchange at the intersection of Interstate 80 (I-80), which runs east and west along the Great Salt Lake's southern shore, and the Skull Valley Road (also known as Federal Aid Secondary Road 108), which goes south toward the Skull Valley Band reservation. From the Rowley Junction ITP, the truck trailers would transport the shipping casks some twenty-four miles south down the Skull Valley Road, then west via an access road onto the Skull Valley Band reservation and into the PFSF. See id. at 4.5-1 to -4. In addition, the application described the rail option, stating that "[t]he railroad will consist of a single track installed parallel to the existing Skull Valley Road." [PFS], Environmental Report

[for PFSF] at 4.4-1 (rev. 0 June 1997) [hereinafter ER]; see also SAR at 4.5-4 (rev 0 June 1997). The application description further indicated that while a feasibility study would be done to determine on which side of the Skull Valley Road the rail spur would run, the spur would be located "adjacent to the edge of the existing road pavement." ER at 4.4-1 (rev. 0 June 1997).

**3 The August 1998 application amendment makes several chaseveral changes to this transportation scheme. First, it makes clear the preferred transportation method for shipping spent fuel casks to the PFSF is by rail. See SAR at 3.1-3 (rev. 2 Aug. 1998); ER at 2.1-3, 3.2-6 (rev. 1 Aug. 1998). Also, it relocates the beginning of the proposed rail spur from Rowley Junction seventeen miles west to a point on the Union Pacific mainline near Low Junction, another I-80 interchange. From there, using a two-hundred-foot-wide public lands corridor for which PFS has applied to the United States Bureau of Land Management (BLM) for a right of way, the spur runs thirty-two miles to the PFSF. Specifically, from a Low Junction siding the spur would backtrack southeast approximately three miles along the south side of I-80; then turn due south for some twenty-six miles along the eastern edge of the Cedar Mountains that form the western boundary of Skull Valley; and finally go east three miles into the PFSF located on the Skull Valley Band reservation. See ER at 3.2-6 (rev. 1 Aug. 1998). In addition, the amendment moves the ITP for the train/truck transportation alternative 1.8 miles to the west of its original location at Rowley Junction. See id. at 3.2-5; SAR at 3.1-3 (rev. 2 Aug. 1998).

*290 Three intervenors responded to this amendment with late-filed contentions. On September 29, the State filed two new contentions, Utah HH and Utah II, and a revised contention, Utah B-1. See [State] Contentions Relating to the Low Rail Transportation License Amendment (Sept. 29, 1998) [hereinafter State Low Rail Contentions]. Approximately two weeks later, asserting that it had not been served with the August 28 amendment until September 29, intervenor Confederated Tribes sought admission of six new contentions, Confederated Tribes I through Confederated Tribes N. See Contentions of [Confederated Tribes] Relating to the Low Rail License Amendment (Oct. 14, 1998) [hereinafter Confederated Tribes Low Rail Contentions]. Then, some two weeks after that, intervenor OGD submitted ten new contentions, OGD Q through OGD Z. See [OGD] Contentions Relating to the Low Rail Transportation License Amendment (Nov. 2, 1998) [hereinafter OGD Low Rail Contentions]. In their initial filings, the State and the Confederated Tribes asserted their contentions merit admission under the five criteria for late-filing set forth in 10 C.F.R. § 2.714(a)(1), while all three intervenors maintained their contentions meet the standards for admissibility outlined in section 2.714(b)(2).

In response, PFS declared that none of the contentions filed by the State, the Confederated Tribes, or OGD meets either the section 2.714(a)(1) late filing standards or the section 2.714(b)(2) admissibility standards. See Applicant's Answer to [State] Contentions Relating to the Low Rail Transportation License Amendment (Oct. 14, 1998) [hereinafter PFS State Low Rail Contentions Response]; Applicant's Answer to Confederated Tribes' Contentions Relating to the Low Rail Transportation License Amendment (Oct. 26, 1998) [hereinafter PFS Confederated Tribes Low Rail Contentions Response]; Applicant's Answer to OGD's Contentions Relating to the Low Rail Transportation License Amendment (Nov. 12, 1998) [hereinafter PFS OGD Low Rail Contentions Response]. The staff took a similar, albeit not identical approach. It declared that (1) with the exception of contentions Utah II and Utah B-1, the State, Confederated Tribes, and OGD contentions fail to meet the section 2.714(a)(1) late-filing criteria; and (2) with the exception of portions of Utah HH and Utah B-1 as it seeks to amend the basis for admitted contention Utah B, the State, Confederated Tribes, and OGD contentions do not satisfy the

admissibility standards of section 2.714(b)(2). See NRC Staff's Response to [State] Contentions Relating to the Low Rail Transportation License Amendment (Oct. 14, 1998) [hereinafter Staff State Low Rail Contentions Response]; NRC Staff's Response to Contentions of [[Confederated Tribes] Relating to the Low Rail License Amendment (Oct. 26, 1998) [hereinafter Staff Confederated Tribes Low Rail Contentions Response]; NRC Staff's Response to "[OGD] Contentions Relating to the Low Rail Transportation License Amendment" (Nov. 12, 1998) [hereinafter Staff OGD Low Rail Contentions Response].

****4 *291** Subsequently, in a reply filing submitted with leave of the Board, the State continued to maintain its contentions are admissible under both the criteria of section 2.714(a)(1) and section 2.714(b)(2). See [State] Reply to Applicant's and Staff's Responses to Low Rail Contentions (Oct. 26, 1998) [[hereinafter State Low Rail Contentions Reply]. On October 30, PFS countered with a pleading, also filed with leave of the Board, addressing the State's reply argument that its challenge to the Low rail spur was not untimely because the use of rail transportation was only presented as a limited option in the original application. See Applicant's Surreply to [State] Reply to Applicant's and Staff's Responses to Low Rail Contentions (Oct. 30, 1998) [hereinafter PFS State Low Rail Contentions Surreply]. Thereafter, with leave of the Board OGD lodged a reply filing, likewise asserting its late-filed contentions are admissible under both the criteria of section 2.714(a)(1) and section 2.714(b)(2). See [OGD] Reply to the Applicant's and Staff's Responses to Low Rail Contentions (Nov. 23, 1998) [hereinafter OGD Low Rail Contentions Reply].

II. ANALYSIS

A. Standards Governing Admissibility of Late-Filed Contentions

The deadline for filing timely contentions in this proc eeding has long passed. See LBP-98-12, 47 NRC 343, 363 (1998). Accordingly, the contentions now before us, as well as any that might be proffered in the future, must meet the five late-filing criteria of 10 C.F.R. § 2.714(a)(1). And, even if they meet these specifications, they also must pass muster under the admissibility standards set forth in section 2.714(b)(2), (d), and (e).

We have discussed both the general standards for contention admissibility and the late-filing criteria in previous decisions in this case, and thus will not repeat those here. See LBP-98-7, 47 NRC 142, 178-83 (general admissibility and late-filing criteria), as modified, LBP-98-10, 47 NRC 288, aff'd on other grounds, CLI-98-13, 48 NRC 26 (1998); LBP-98-13, 47 NRC 360, 365 (1998) (general admissibility criteria). An assessment of each of the intervenors' contentions relative to those standards follows.

***292** B. State Contentions [FN1]

Utah HH--The Low Rail Corridor and Fire Hazards

The Applicant's Environmental Report ("ER") fails to give adequate consideration to the potential for fire hazards and the impediment to response to wild fires associated with constructing and operating the Applicant's proposed rail line in the Low corridor, in that:

1. The ER fails to recognize that the Applicant's proposed movement of casks by locomotive in the Low rail line corridor presents a new wildfire ignition source in an area prone to wildfires, such as (a) the "welding, grinding of rail and the presence of fuel for the operation of machinery" associated with rail construction, (b) sparks from friction or train exhaust, and (c) the shearing off of a hot brake shoe during rail operation.

****5** 2. The ER fails to evaluate the increased risk of wildfires caused by an increase of human activity near the railroad.

3. The ER fails to address how the Applicant's proposed rail line and the spent fuel transported on it will create an impediment to fighting wildfires.

DISCUSSION regarding Late-Filing Standards: State Low Rail Contentions at 18- 19; PFS State Low Rail Contentions Response at 2-4; Staff State Low Rail Contentions Response at 3-8; State Low Rail Contentions Reply at 2-3; PFS State Low Rail Contentions Surreply at 1-4.

RULING: Concerning the first late-filing criterion--good cause for filing late--in instances such as this one in which a new contention purportedly is based on information contained in a document recently made publically available, an important consideration in judging the contention's timeliness is the extent to which the new contention could have been put forward with any degree of specificity in advance of the document's release. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-737, 18 NRC 168, 172 n. 4 (1983); see also Yankee Atomic Electric Co. (Yankee Nuclear Power Station), LBP-96-15, 44 NRC 8, 26 (1996). In this instance, there are differences between the original application and the August 1998 amendment that might provide material for new issues. For example, besides following a route that physically is ten or more miles to the west of the passageway previously proposed, the Low rail spur is to be built on open rangeland rather than immediately adjacent to, and within the right of way of, an existing highway.

The State, however, does not utilize this or any other information to show what is different about the revised rail route that establishes the wildfire ignition source, human activity, and firefighting impediment issues in contention Utah ***293** HH could not have been specified previously. [FN2] Instead, the State asserts the rail line alternative as outlined in the original application was not a sufficiently concrete possibility to warrant its effort in formulating any contentions regarding that option. See State Low Rail Contentions Reply at 2-3. The State's protests to the contrary notwithstanding, the rail option was specified in the original PFS application in a manner that made it clear rail-only transportation was on an equal footing with the rail/truck option. [FN3] See [PFS] License Application for [PFSF] at 1-1 (rev. 0 June 1997). Consequently, that the State may have chosen, for whatever reason, not to address the rail line option in its original contentions does not provide good cause for its failure to answer the central issue of what difference exists between the rail option as set forth in the original applicantion and the option as described in the August 1998 amendment so as to show there is "good cause" for filing contention Utah HH late.

Because the State has failed to demonstrate the information upon which it places substantial reliance as the basis for contention Utah HH was not available in November 1997 when its contentions on the non-physical security plan portions of the PFS application were due, we conclude the State lacks good cause for filing this contention late. [FN4]

****6** Among the five late-filing standards of section 2.714(a)(1), the good cause factor has been accorded a preeminent role such that the moving party's failure to satisfy this requirement mandates a compelling showing in connection with the other four factors. See Commonwealth Edison Co. (Braidwood Nuclear Power Station, Units 1 and 2), CLI-86-8, 23 NRC 241, 244 (1986). Reviewing ***294** the remaining four factors, however, we are unable to conclude they support such a showing here.

The State correctly declares that factors two and four--availability of other means to protect the petitioner's interests and extent of representation of petitioner's interests by existing parties--favor late admission of this contention. On the other hand, factors three and five--assistance in developing a sound record and broadening the issues/delaying the proceeding--provide little, if any, support for its admission. Relative to factor three, the State has submitted an affidavit from a forestry ecosystem manager in support of the contention and asserts that other, unnamed experts will be available to support its position on the contention. See State Low Rail Contentions at 18-19. But this proffer falls considerably short of the specificity regarding witness identification and testimony summaries the Commission has indicated is needed if this factor is to provide strong support for admissibility. [FN5] See LBP-98-7, 47 NRC at 208-09. As for factor five, it is true (as it is for most of the intervenors' Low rail spur contentions) the fact formal discovery has not yet commenced means prompt admission of this contention likely will not result in a protracted delay in this proceeding. Nonetheless, this is offset by the fact this contention will broaden the issues because the admitted wildfire- related contention--Utah R--concerns onsite rather than offsite fire protection.

Bearing in mind that factors two and four are accorded less weight than factors three and five, see Braidwood, CLI-86-8, 23 NRC at 245, despite the fact the former factors support the admission of this contention, a balancing of all four criteria clearly does not provide the requisite compelling showing needed to overcome the lack of good cause for its late filing. [FN6]

Utah II--Costs and effects associated with the Low Rail Corridor

The Low Corridor License Amendment does not comply with 10 C.F.R. § 72.100(b) or NEPA, including 10 C.F.R. § 51.45(c), and 40 C.F.R. § 1508.25 because it fails to evaluate, quantify, and analyze the costs and cumulative impacts associated with constructing and operating the rail line on the regional environment, in that:

1. The ER fails to quantify the costs and evaluate the cumulative impacts associated with fires potentially ignited as a result of activities occurring in the rail corridor.

***295** 2. The ER fails to quantify the costs and sufficiently analyze the impacts of the construction and operation of the rail line on species in the rail corridor, including species habitat, food base, mating and breeding habits, noise levels, and barriers to migration.

**7 3. The ER fails to take account of the visual impact the railroad will have on the BLM Cedar Mountains Wilderness Study Area or other locations in Skull Valley.

4. The ER fails to quantify the costs associated with noise levels from the construction and operation of the railroad on the surrounding wilderness and recreational areas.

5. The ER fails to demonstrate how the Applicant plans to carry out the revegetation of the rail corridor and fails to show where and how the Applicant will obtain access to needed water.

6. The ER does not quantify or otherwise evaluate the loss of historical resources that may occur where the rail line crosses the Hastings Trail and the Donner-Reed Trail.

7. The ER fails to quantify the costs or evaluate the cumulative impacts associated with the rail line's impeding recreational users' and ranchers' crossing of Skull Valley from east to west.

1. Late-Filing Standards

DISCUSSION: State Low Rail Contentions at 18-19; PFS State Low Rail Contentions Response at 9, 11, 13-14; Staff State Low Rail Contentions Response at 3-8; State Low Rail Contentions Reply at 2-3; PFS State Low Rail Contentions Surreply at 1-4.

RULING: Applicant PFS asserts that paragraphs one, two, and five of this contention should be dismissed because application of the five-factor test in section 2.714(a) does not weigh in favor of admissibility. Repeating its principal argument regarding Utah HH, PFS maintains that each of these paragraphs is not dependent on information new to the August 1998 application amendment and, accordingly, each lacks "good cause" under factor one. The staff is in accord for that portion of the contention footed in Utah HH, which the State references as a basis for paragraph one.

We conclude the State has not met its burden to establish good cause for the late-filing of paragraph one by showing it was based on significant new data first revealed in the application amendment. Further, for the reasons set forth in connection with contention Utah HH, we find an analysis of the other four factors is insufficient to offset this lack of good cause in the admissibility ***296** balance. [FN7] See supra pp. 12-14. The first portion of this contention thus is not admissible as late-filed.

The remainder of the contention, including paragraphs taragraphs two and five, appears to be based on significant new data that was first revealed in the application amendment, so as to provide the requisite good cause under late- filing factor one. Placing this factor one support for admission into the balance with the other four factors as described above, see supra pp. 12-14, we conclude relative to paragraphs two through seven that the admission of the contention is not precluded by the fact it was late-filed.

2. Admissibility

DISCUSSION: State Low Rail Contentions at 7-12; PFS State Low Rail Contentions Response at 9-17; Staff State Low Rail Contentions Response at 12-18; State Low Rail Contentions Reply at 6-7.

**8 RULING: In connection with paragraphs two through seven, these portions of the contention are inadmissible because these parts of the contention and their supporting bases impermissibly challenge the Commission's regulations or rulemaking-associated generic determinations (paragraphs two, four, six, and seven); [FN8] lack adequate factual or expert opinion support (paragraphs two, four, five, six, and seven); and/or fail properly to challenge the PFS application, as amended (paragraphs three, four, six, and seven). [FN9] See LBP-98-7, 47 NRC at 179-81.

Utah B-1--License Needed for Intermodal Transfer Facility

CONTENTION: PFS's application should be rejected becauscted because it does not seek approval for receipt, transfer, and possession of spent nuclear fuel at the Rowley Junction Intermodal Transfer Point ("ITP"), in violation of 10 C.F.R. § 72.6(c)(1), in that the Rowley Junction operation is not merely part of the transportation operation but a de facto interim spent fuel storage facility at which PFS will receive, handle, and possess spent nuclear fuel. Because the ITP is an interim spent fuel storage facility, it is important to provide the public with the regulatory protections that are afforded by compliance with 10 C.F.R. Part 72, including a security plan, an emergency plan, and radiation dose analyses.

*297 DISCUSSION: State Low Rail Contentions at 12-17; PFS State Low Rail Contentions Response at 17-20; Staff State Low Rail Contentions Response at 18- 20; State Low Rail Contentions Reply at 7-8.

RULING: With this "contention," the State seeks to amend the basis for already admitted contention Utah B to "account for proposed changes at the ITP" resulting from the August 1998 amendment. State Low Rail Contentions at 13 n. 2. The applicant opposes this request, asserting the contention should remain as originally admitted except to note that the Rowley Junction ITP is now 1.8 miles west of its original location. The staff takes a somewhat more expansive view. Declaring that in addition to the location change, factual statements in the State's revised basis concerning the viability of the ITP pending completion of the BLM approval process and a revised description of the Rowley Junction facility, equipment, and expected shipping volume could be admitted, the staff opposes any basis revisions that would expand the contention beyond the scope established in the Board's original admission ruling or that are speculative and unsupported.

Although we see no need to adopt a renumbered contention Utah B as proposed by the State, bearing in mind the admonition that "[t]he reach of a contention necessarily hinges upon its terms coupled with its stated bases," Public Service Company of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-899, 28 NRC 93, 97 (1988), we will deem the bases of that contention amended to incorporate: (1) the new location of the proposed Rowley Junction ITP, see State Low Rail Contentions at 13; (2) the assertion about the continuing viability of the ITP proposal pending BLM approval of the right of way for the Low rail spur, see id. at 13 n. 3; and

(3) the description of the ITP facility and equipment, per statements in the August 1998 PFS application amendment, see id. at 14. In so doing, however, we intend no change in the scope of our original ruling admitting this contention on a limited basis. See LBP-98-7, 47 NRC at 184-85.

C. Confederated Tribes Contentions

Confederated Tribes I

**9 The Goshute Tribe hereby adopts and restates as though set forth in full herein the additional Contentions and Supporting Bases of the State of Utah filed with the Board on September 29, 1998, relating to the Low Rail Transportation License Amendment.

DISCUSSION: Confederated Tribes Low Rail Contentions at 1, 6; PFS Confederated Tribes Low Rail Contentions Response at 1-2; Staff Confederated Tribes Low Rail Contentions Response at 6.

RULING: As we have held previously, a contention that seeks to adopt another intervenor's contention by reference is inadmissible. See LBP-98-7, 47 NRC at 236-37. Although we would permit the Confederated Tribes *298 to incorporate these State contentions, see id., none of them has been found admissible. [FN10] See section II.B above.

Confederated Tribes J

The Applicant's Environmental Report fails to provide adequate consideration to the potential fire hazards and the impediment to response to wild fires associated with constructing and operating the proposed rail line in the Low corridor.

DISCUSSION regarding Late-Filing Standards: ConfederateConfederated Tribes Low Rail Contentions at 6; PFS Confederated Tribes Low Rail Contentions Response at 3-5; Staff Confederated Tribes Low Rail Contentions Response at 2-6.

RULING: Relative to the first factor, the Confederated Tribes has failed to demonstrate the information upon which it places significant reliance as the basis for this contention was not available relative to the original application. See supra pp. 9-11. The Confederated Tribes thus lacks good cause for filing this contention late.

Nor has the Confederated Tribes made the compelling showing in connection with the other four factors that is needed to overcome a lack of good cause for late filing. As with the State's late-filed contentions, factor two--availability of other means to protect the petitioner's interests--favors late admission of this contention. But unlike the State's late-filed issues, factor four--extent of representation of petitioner's interests by existing parties--does not. This contention essentially tracks Utah HH, and, based on our previous experience, we have no

difficulty in concluding the State is well able to represent the interests of the Confederated Tribes (or any other intervenor) relative to such an issue. See Licensing Board Memorandum and Order (Memoralizing Prehearing Conference Rulings) (May 20, 1998) at 2 (approving request to change lead party for consolidated contention from Confederated Tribes to State) (unpublished).

So too, factors three and five--assistance in developing a sound record and broadening the issues/delaying the proceeding--do not support admission. In connection with factor three, the Confederated Tribes has not provided any information regarding witnesses or testimony that it would proffer in order to develop a record in support of this contention. And relative to factor five, although the fact formal discovery has not yet commenced means prompt admission of this contention likely will not result in a protracted delay in this proceeding, admission of this contention will broaden the issues because the admitted wildfire-related contention--Utah R--concerns onsite rather than offsite fire protection.

****10 *299** A balancing of the other four factors thus clearly does not provide the requisite compelling showing needed to overcome the lack of good cause for the contention's late filing. [FN11]

Confederated Tribes K

The "Amended" Application fails to account for the costs associated with the construction, maintenance, operation, and decommissioning of the rail line and the costs associated with the ultimate removal of the stored fuel at the end of the lease.

DISCUSSION regarding Late-Filing Standards: Confederated Tribes Low Rail Contentions at 6; PFS Confederated Tribes Low Rail Contentions Response at 7; Staff Confederated Tribes Low Rail Contentions Response at 2-6.

RULING: The Confederate Tribes has not met its burden to establish good cause for the late-filing by showing that significant new data was first revealed in the application amendment. Further, for the reasons set forth in connection with contention Confederated Tribes J, we find that an analysis of the other four factors is insufficient to offset this lack of good cause in the admissibility balance. [FN12] See supra pp. 21-22. This contention thus is not admissible as late-filed. [FN13]

Confederated Tribes L

The intermodal transfer point (ITP), under the proposed "Amendment," becomes a temporary storage facility which requires a separate and additional license. 10 CFR § 72.6(c)(1).

DISCUSSION regarding Late-Filing Standards: Confederated Tribes Low Rail Contentions at 6; PFS Confederated Tribes Low Rail Contentions Response at 9; Staff Confederated Tribes Low Rail Contentions Response at 2-6.

RULING: The Confederate Tribes again has not met its burden to establish good cause for the late-filing by showing that significant new data was first revealed in the application amendment. Further, for the reasons set forth in connection with contention Confederated Tribes J, we find that an analysis of ***300** the other four factors is insufficient to offset this lack of good cause in the admissibility balance. [FN14] See supra pp. 21-22. This late-filed contention thus is not admissible. [FN15]

Confederated Tribes M

The proposed rail line will increase hazards to the public.

DISCUSSION regarding Late-Filing Standards: Confederated Tribes Low Rail Contentions at 6; PFS Confederated Tribes Low Rail Contentions Response at 11- 12; Staff Confederated Tribes Low Rail Contentions Response at 2-6.

RULING: The Confederate Tribes once again has not met its burden to establish good cause for the late-filing by showing that significant new data was first revealed in the application amendment. Factor two and, in contrast to contentions Confederated Tribes J through L, factor four--extent of representation of petitioner's interests by existing parties--support admission of this contention. As we have already noted, however, factors two and four are accorded less weight than factors three and five. See supra p. 13. Consequently, when considered with factors three and five that, for the reasons set forth in connection with contention Confederated Tribes J, do not support admission, see supra pp. 21-22, we are unable to conclude the combined weigh of these four factors is sufficient to offset the lack of good cause in the admissibility balance. [FN16] This late-filed contention is not admissible as well. [FN17]

Confederated Tribes N

****11** The "Amendment" fails to provide adequate notice to the public of the changes, which are substantial.

***301** 1. Late-filing Standards

DISCUSSION: Confederated Tribes Low Rail Contentions at 6; PFS Confederated Tribes Low Rail Contentions Response at 12-13; Staff Confederated Tribes Low Rail Contentions Response at 4-6.

RULING: Challenging, as it does, the adequacy of the procedures under which the August 1998 application amendment is being considered by the agency, the contention raises a concern that could not have been proffered prior to that amendment. There thus is the requisite good cause under factor one. Notwithstanding the fact that factors three and five do not support admission of this contention as described in connection with contention Confederated Tribes J, [FN18] see

supra p. 21-22, placing the factor one support for admission into the balance along with the support accorded by factors two and four as described above relative to contention Confederated Tribes M, see supra p. 25, we conclude that the admission of the contention is not precluded by the fact it was late-filed.

2. Admissibility

DISCUSSION: Confederated Tribes Low Rail Contentions at 5-6; PFS Confederated Tribes Low Rail Contentions Response at 12-13; Staff Confederated Tribes Low Rail Contentions Response at 12-13.

RULING: This is essentially a legal contention; nonetheon; nonetheless, it must have a basis sufficient to warrant its admission. Assuming that changes in a license application of sufficient magnitude could provide cause for renoticing the application, compare Rochester Gas & Electric Corp. (R.E. Ginna Nuclear Plant, Unit 1), LBP-83-73, 18 NRC 1231, 1233-36 (1983) (delay in proceeding of five years pending staff application review renders original notice of hearing sufficiently stale to require renoticing of proceeding), the Confederated Tribes conclusory assertions that "changes on virtually every page" of the application as a result of the August 1998 amendment indicate "substantial changes in the nature of the license" being sought, Confederated Tribes Low Rail Contentions at 5, are wholly inadequate to support admission of this contention.

***302** D. OGD Contentions

OGD Q

In acting on the proposed license and amendments prior to completing an Environmental Impact Statement (EIS) as required by the National Environmental Policy Act (NEPA), the NRC has made irretrievable commitments of resources resulting in severe prejudice to the EIS process. In particular, the present procedure employed for the PFS license and license amendments prejudices the NRC's ability to fairly assess alternatives to the proposed PFS facility and the transportation of high level spent fuel.

DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: As we noted above, consistent with longstanding agency practice, all contentions filed subsequent to November 1997 (other than those physical security plan contentions for which the Board granted a filing extension, see LBP-98-13, 47 NRC at 363) are late-filed. Consequently, OGD's arguments to the contrary notwithstanding, [FN19] this contention (and all its other Low rail spur-related contentions) cannot be accepted unless a balancing of the five factors set forth in section 2.714(a) supports its admission.

**12 Concerning factor one--good cause for late filing--while this issue statement is predominately a legal contention, OGD nonetheless has failed to demonstrate the information upon which it places significant reliance as the basis for this contention was not available relative to the original application. See supra pp. 9-11. It thus lacks good cause for filing this contention late.

OGD also failed to make a compelling showing in connection with the other four factors so as to counterbalance the lack of good cause for late filing. Factors two and four--availability of other means to protect the petitioner's interests and extent of representation of petitioner's interests by existing parties--do favor late admission of this contention. As we have noted, however, they are given significantly less weight in the balance as compared to factors three and five. See supra p. 13. Although, in the context of this legal contention, OGD's lack of a witness and testimony proffer means that factor three--assistance in developing a sound record--does not necessarily weigh as heavily as it might against late admission, see supra note 18, this is certainly not the case with factor five--broadening the issues/delaying the proceeding--which *303 does not support admission given the significant new element this contention would introduce into the proceeding. Even with factors two and four on the admissibility side of the balance, there is not sufficient support to overcome the lack of good cause, rendering this contention inadmissible. [FN20]

OGD R

OGD and its members will be adversely impacted by the routine operation of the Low rail spur and will be seriously impacted by any transportation-related accidents.

DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: Because OGD has failed to show the information upon which it places significant reliance as the basis for this contention was not available relative to the original application, we find it lacks good cause for late submission of this contention. And lacking factor one support, OGD also has failed to make the compelling showing regarding the other four factors that is necessary to gain this contention's admission. While factors two and four-- availability of other means to protect the petitioner's interests and extent of representation of petitioner's interests by existing parties--once again favor late admission of this contention, in this instance both factors three and five do not. Relative to factor three--assistance in developing a sound record--OGD has not provided any information regarding witnesses or testimony that it would proffer in order to develop a record in support of this contention. Further, concerning factor five--broadening the issues/delaying the proceeding--although the fact formal discovery has not yet commenced means prompt admission of this contention likely will not result in a protracted delay in this proceeding, admission of this contention (and indeed any of OGD's remaining contentions) will broaden the issues. With factors three and five thus weighing against admission, the support provided by the less important factors two and four clearly is insufficient to provide sufficient support for admitting this contention. [FN21]

*304 OGD S

**13 OGD and its members are adversely affected by the potential sabotage of spent nuclear fuel during transportation along the proposed rail spur.

DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: For the reasons set forth in our ruling regarding contention OGD R, we find this contention inadmissible. [FN22] See supra pp. 30-31.

OGD T

OGD and its members are adversely affected by the failure of PFS and/or the NRC to fully evaluate the potential failure of the flat bed rail cars that will transport the spent nuclear fuel along the rail spur.

DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: For the reasons set forth in our ruling regarding contention OGD R, we find this contention inadmissible. [FN23] See supra pp. 30-31.

OGD U

OGD and its members are adversely affected by potential fires caused by or enhanced by rail activities.

DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

*305 RULING: For the reasons set forth in our ruling regarding contention OGD R, we find this contention inadmissible. [FN24] See supra pp. 30-31.

OGD V

OGD and its members are adversely affected by the potential human health and environmental safety problems associated with any type of failure of the casks that may be used to ship spent

nuclear fuel to the proposed PFS facility along the proposed rail spur.

DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5.

RULING: For the reasons set forth in our ruling regarding contention OGD R, we find this contention inadmissible. [FN25] See supra pp. 30-31.

OGD W

OGD and its members are adversely affected by potential human errors, accidents, and/or other malfunctions involving the 1) loading of shipping casks, 2) transportation of shipping casks to a railhead, and 3) transportation of shipping casks via rail, including the proposed rail spur to the proposed PFS facility.

DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: For the reasons set forth in our ruling regarding contention OGD R, we find this contention inadmissible. [FN26] See supra pp. 30-31.

***306** OGD X

OGD and its members are adversely affected by the failure of PFS and/or the NRC to assess environmental justice issues caused by the proposed amendment to transport high level spent nuclear fuel into the Skull Valley area via rail spur.

****14** DISCUSSION regarding Late-Filing Standards: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: For the reasons set forth in our ruling regarding contention OGD R, we find this contention inadmissible. [FN27] See supra pp. 30-31.

OGD Y

OGD and its members are adversely affected by the taking and use of lands proposed for the construction and operation of the proposed rail spur because they will be deprived of the opportunity to utilize these lands for grazing animals.

DISCUSSION regarding Late-filing Standards: PFS OGD Low Rail Contentions Response at

1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: For the reasons set forth in our ruling regarding contention OGD R, we find this contention inadmissible. [FN28] See supra pp. 30-31.

OGD Z

The construction and operation of the proposed rail spur will permanently damage the historically and culturally significant trail used by the Goshute and others who used the area planned for the Low Corridor Rail Spur to travel through the Skull Valley region.

***307** 1. Late Filing Standards

DISCUSSION: PFS OGD Low Rail Contentions Response at 1-5; Staff OGD Low Rail Contentions Response at 3-5; OGD Low Rail Contentions Reply at 1-5.

RULING: Because OGD has made a showing that, by reason of the rail spur's relocation, there are now historical or cultural concerns that previously would not have been implicated, we find there is good cause for filing this particular contention late. Notwithstanding the fact that factors three and five provide little, if any support for admission of this contention as described in connection with contention OGD Y, see supra p. 36 & n. 28, placing the factor one support for admission into the balance along with the support accorded by factors two and four as described above relative to contention OGD R, see supra p. 31, we conclude that the admission of the contention is not precluded by the fact it was late-filed.

2. Admissibility

Inadmissible in that the contention and its supporting basis fail to establish with specificity any genuine material dispute; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application, as amended. See LBP-98-7, 47 NRC at 179-81.

III. CONCLUSION

For the reasons set forth above, we find that the late-filed contentions submitted by the State, the Confederated Tribes, and OGD regarding an August 1998 amendment to the PFS application that proposes, among other things, to construct and operate a rail spur between Low Junction, Utah, and its Skull Valley ISFSI are not subject to consideration in this proceeding either because these intervenors have failed to establish (1) a balancing of the five factors in 10 C.F.R. § 2.714(a)(1) governing late-filing supports admitting the contentions; or (2) the standards in

section 2.714(b)(2) support admission of the contentions. Further, although we find contention Utah B-1 inadmissible, we permit the basis for admitted contention Utah B to be amended to incorporate certain information about the proposed Rowley Junction ITP that arises from the August 1998 application amendment.

****15** For the foregoing reasons, it is this thirtieth day of November 1998, ORDERED, that

***308** 1. The basis for admitted contention Utah B is amended as specified in section II.B. above.

2. The following late-filed contentions submitted by the State, the Confederated Tribes, and OGD in filings dated September 29, 1998, October 14, 1998, and November 2, 1998, respectively, are rejected as inadmissible: Utah HH, Utah II, Utah B-1, Confederated Tribes I, Confederated Tribes J, Confederated Tribes K, Confederated Tribes L, Confederated Tribes M, Confederated Tribes N, OGD Q, OGD R, OGD S, OGD T, OGD U, OGD V, OGD W, OGD X, OGD Y, and OGD Z.

THE ATOMIC SAFETY AND LICENSING BOARD [FN29]

G. Paul Bollwerk, III

ADMINISTRATIVE JUDGE

Dr. Jerry R. Kline

ADMINISTRATIVE JUDGE

Dr. Peter S. Lam

ADMINISTRATIVE JUDGE

Rockville, Maryland
November 30, 1998

FN1 The wording of contentions Utah HH and Utah II reflect the applicant's suggested revisions as adopted and further revised (with PFS's acquiescence) by the State. See PFS Low Rail Contentions Response App. A at 1-2; State Low Rail Contentions Reply at 1-2.

FN2 An affidavit accompanying the State's contention filing does state the "area" in which the Low rail spur will run is "prone" to wildfires. See State Low Rail Contentions Exh. 1, at 3 (affidavit of David C. Schen). But see PFS Low Rail Contentions Response at 3 n. 3 (contesting Schen affidavit on this point). In explaining this conclusion, however, the affidavit states that such fires frequently are the result of fires that originate to the west in the Cedar Mountains and then spread to the east to cover the western part of Skull Valley. It is not apparent how this bears any relationship to the possibility of fires originating from the proposed Low rail spur. In fact, the more relevant consideration is the local vegetation, which the affidavit describes as being

essentially uniform across Skull Valley. As a consequence, nothing presented by the State suggests there is anything unique about the Low rail spur, in contrast to the Skull Valley Road rail spur, that would make its wildfire ignition, human activity, or firefighter impediment concerns peculiar to the Low rail spur.

FN3 An argument like the State's might have more resonance if an application set out a number of vaguely described options that suggested the applicant was simply trying to "keep all its options open." We do not see this as being the case here, however.

FN4 The State's Low rail spur late-filed contentions, as well as those of the Confederated Tribes and OGD, were filed within approximately 30 days of the date the August 1998 application amendment was provided to them. Neither PFS nor the staff has argued a lack of good cause for late filing based on the time it took the intervenors to prepare and file their contentions regarding the application amendment.

FNGiven the nature of the August 1998 amendment, we do not base our various findings concerning a lack of good cause under late-filing factor one on the timeliness of the actual submission of the intervenors' contentions. We note, however, that such a finding depends in each instance on the scope and complexity of the "new" information the intervenor relies upon as the basis for late-filing. Further, as this proceeding moves forward, the time involved in preparing and submitting late-filed contentions may well become an element in determinations regarding factor five--broadening or delaying the proceeding.

FN5 At best, the affidavit accompanying the State's filing provides very weak support in the admissibility balance.

FN6 At the same time, while we need not reach the question of its admissibility under section 2.714(b), based on our review of the parties' filings, we would have admitted only the portion of paragraph three of this contention dealing with impediments to four-wheel drive vehicle firefighting activities as being supported by a basis establishing a genuine material dispute adequate to warrant further inquiry. The other portions of this contention and their supporting bases would be inadmissible as impermissibly challenging the Commission's regulations or generic rulemaking-associated determinations (paragraph three as it relates to firefighter response hesitation); and/or lacking adequate factual or expert opinion support (paragraphs one and two). See LBP-98-7, 47 NRC at 179, 180-81.

FN7 In this regard, we note that for each paragraph, admission of the contention would broaden the issues in the proceeding. Further, in connection with factor three we observe there is even less provided concerning identification of witnesses and testimony than there was for contention Utah HH.

FN8 Although agency regulations implementing the National Environmental Policy Act of 1969 (NEPA) mandate cost quantification of environmental impacts as practicable in an environmental report, they impose a burden on the applicant to provide a quantification discussion only "to the fullest extent practicable." See 10 C.F.R. § 51.45(c).

FN9 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings, the first paragraph of the contention also would be inadmissible as impermissibly challenging the Commission's regulations or rulemaking-related generic determinations; and/or as lacking adequate factual or expert opinion support. See LBP-98-7, 47 NRC at 179-80.

FN10 We previously permitted Confederated Tribes to incorporate contention Utah B. See LBP-98-7, 47 NRC at 237. Our ruling regarding the revised basis for that contention, see supra p. 19, would reach that incorporation ruling as well.

FN11 While we need not reach the question of its admissibility under section 2.714(b), based on our review of the parties' filings, we would not have admitted the contention because the contention and its supporting basis impermissibly challenge the Commission's regulations or generic rulemaking- associated determinations, including 10 C.F.R. Part 71; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application, as amended. See LBP-98-7, 47 NRC at 179, 180-81.

FN12 In this regard, relative to factors four and five we note that this contention essentially tracks contention State II and that admission of the contention would broaden the issues in the proceeding.

FN13 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings this contention also would be inadmissible because the contention and its supporting basis lack adequate factual or expert opinion support; fail properly to challenge the PFS application, as amended; and/or seek to litigate issues already rejected by the Board relative to contention Confederated Tribes A. See LBP-98-7, 47 NRC at 180-81, 234.

FN14 In this regard, relative to factors four and five we note that this contention essentially tracks contention State B-1 and that admission of this contention would broaden the issues in the proceeding.

FN15 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings this contention also would be inadmissible because the contention and its supporting basis impermissibly challenge agency regulations or rulemaking-associated generic determinations, including 10 C.F.R. Part 71; lack adequate factual or expert opinion support; fail properly to challenge the PFS application; and/or seek to litigate

issues already rejected by the Board relative to contention Utah B. See LBP-98-7, 47 NRC at 179-81, 184.

FN16 In this regard, relative to factor five we note that admission of the contention would broaden the issues in the proceeding.

FN17 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings this contention also would be inadmissible in that the contention and its supporting basis impermissibly challenge agency regulations or rulemaking-associated generic determinations, including 10 C.F.R. Parts 71 and 73; lack adequate factual or expert opinion support; and/or seek to litigate issues already rejected by the Board relative to contention OGD C. See LBP-98-7, 47 NRC at 179-80, 227-28.

FN18 In this regard, relative to factor five we note that admission of the contention would broaden the issues in the proceeding. We also note relative to factor three that because this is essentially a legal question, the Confederated Tribes failure to specify witnesses or testimony does not count as heavily against admissibility as it otherwise might have. At the same time, in line with the Commission's Braidwood reasoning, see CLI-86-8, 23 NRC at 246, a strong showing under this factor for a legal contention may require a more detailed description of the authority for the intervenor's legal claim then has been provided here.

FN19 OGD asserts its Low rail spur-related contentions are not late-filed because there was no new hearing notice issued about the amendment and, therefore, its contentions need not meet the section 2.714(a)(1) late-filing criteria. See OGD Low Rail Contentions Reply at 1-2. The agency's licensing review procedures contemplate a dynamic process in which an application may be modified or improved without "renoticing" the application. At the same time, an intervenor is free to mount an adjudicatory challenge to any application revisions proffered after the deadline for filing contentions, at least so long as the new or amended contentions meet the late-filing criteria of section 2.714(a)(1). See Baltimore Gas and Electric Company (Calvert Cliffs Nuclear Power Plant, Units 1 and 2), LBP-98-26, 48 NRC 232, 243 (1998), appeal pending.

FN20 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis impermissibly challenge the basic structure of the Commission's regulatory process; lack adequate factual or expert opinion support; and/or fail to establish with specificity any genuine dispute. See LBP-98-7, 47 NRC at 178-81.

FN21 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis lack adequate factual or expert opinion support; fail properly to challenge the PFS application, as amended; and/or seek to litigate issues already rejected by

the Board relative to contention OGD P. See LBP-98-7, 47 NRC at 180-81, 233-34.

FN22 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis impermissibly challenge the Commission's regulations or generic rulemaking- associated determinations, including 10 C.F.R. Parts 71 and 73; raise issues beyond the scope of this proceeding; lack adequate factual or expert opinion support; and/or seek to litigate issues already rejected by the Board relative to contention OGD C. See LBP-98-7, 47 NRC at 179-81, 227-28.

FN23 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis impermissibly challenge the Commission's regulations or generic rulemaking- associated determinations, including 10 C.F.R. Parts 71 and 73; raise issues outside the scope of the proceeding; and/or lack adequate factual or expert opinion support. See LBP-98-7, 47 NRC at 179-181.

FN24 In doing so, we note that to the degree this contention attempts to raise some of the same issues as were put forth in contention Utah HH, this weakens the OGD showing relative to factor four--extent of representation of petitioner's interests by existing parties--given the State is fully qualified to represent its interest relative to these issues. See supra p. 21.

FNFurther, although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application, as amended. See LBP-98-7, 47 NRC at 180-81.

FN25 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis impermissibly challenge the Commission's regulations or generic rulemaking- associated determinations, including 10 C.F.R. § 51.52 (Summary Table S-4); lack adequate factual or expert opinion support; and/or seek to litigate issues already rejected by the Board relative to contentions OGD C and OGD I. See LBP- 98-7, 47 NRC at 179-181, 227-28, 230.

FN26 Although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis impermissibly challenge the Commission's regulations or generic rulemaking- associated determinations, including 10 C.F.R. § 51.52 (Summary Table S-4); lack adequate factual or expert opinion support; and/or seek to litigate issues already rejected by the Board relative to contention Utah V. See LBP-98-7, 47 NRC at 179-81; 200-01.

FN27 Because there already is an admitted contention, OGD O, concerning environmental justice, factor five--broadening the issues/delaying the proceeding--seemingly would provide somewhat less support on the "inadmissibility" side of the balance than for contention OGD R, albeit not enough to provide the compelling showing needed to overcome the lack of good cause relative to factor one.

FNAdditionally, although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis raise issues outside the scope of this proceeding; lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application, as amended. See CLI-98-13, 48 NRC at 36; LBP-98-7, 47 NRC at 179-81.

FN28 OGD maintains good cause exists for late-filing this contention because one of its members use of grazing land is limited to a part of the Skull Valley Band reservation on which the relocated rail spur will run. See OGD Low Rail Contention Reply at 14. The cited affidavit does not, however, support this assertion.

FNAlso in this regard, we observe relative to factor three that the affidavit accompanying the OGD filing provides, at best, very weak support in the admissibility balance that clearly is inadequate, even in combination with factors two and four, to provide the compelling support needed to overcome the lack of good cause.

FNAdditionally, although we need not reach the issue of its admissibility under section 2.714(b), based on our review of the parties' filings we would not have admitted the contention because the contention and its supporting basis lack adequate factual or expert opinion support; and/or fail properly to challenge the PFS application, as amended. See LBP-98-7, 47 NRC at 180-81.

FN29 Copies of this memorandum and order were sent this date by Internet e-mail transmission to counsel for (1) applicant PFS; (2) intervenors Skull Valley Band, OGD, Confederated Tribes, Castle Rock Land and Livestock, L.C./Skull Valley Company, LTD., and the State; (3) petitioner Southern Utah Wilderness Alliance; and (4) the staff.

END OF DOCUMENT

52 N.R.C. 216
(Cite as: 52 N.R.C. 216, 2000 WL 1719916 (N.R.C.))

**1 IN THE MATTER OF
PRIVATE FUEL STORAGE, L.L.C.
(Independent Spent Fuel Storage Installation)

Nuclear Regulatory Commission

Atomic Safety and Licensing Board

LBP-00-27
Docket No. 72-22-ISFSI
ASLBP No. 97-732-02-ISFSI

October 30, 2000

***216** Before Administrative Judges: G. Paul Bollwerk, III, Chairman; Dr. Jerry R. Kline; Dr. Peter S. Lam

In this 10 C.F.R. Part 72 proceeding concerning the application of Private Fuel Storage, L.L.C. (PFS), for a license to construct and operate an independent spent fuel storage installation (ISFSI) on the reservation of the Skull Valley Band of Goshute Indians in Skull Valley, Utah, the Licensing Board denies the request of Intervenor State of Utah (State) for admission of late- filed contention Utah KK, Military Training Impacts, finding that a balancing of the five late-filing criteria found in 10C.F.R. § 2.714(a)(l), does not warrant entertaining the contention.

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (GOOD CAUSE FOR DELAY)

To justify a presiding officer's consideration of the "merits" of a late- filed contention, i.e., whether the contention fulfills the admissibility standards specified in 10 C.F.R. §2.714, a party must demonstrate that a balancing of the five factors set forth in section 2.714(a)(l)(i)-(v) supports acceptance of the petition. The first and foremost factor in this appraisal is whether good cause exists that will excuse the late-filing of the contention. See Commonwealth Edison ***217** Co. (Braidwood Nuclear Power Station, Units 1 and 2), CLI-86-8, 23 NRC 241, 244(1986).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (GOOD CAUSE FOR DELAY)

The good cause element has two components that impact on a presiding officer's assessment of the timeliness of the contention's filing: (1) when was sufficient information reasonably available to support the submission of the late-filed contention; and (2) once the information was available, how long did it take for the contention admission request to be prepared and filed. See

LBP- 99-3, 49 NRC 40, 46-48 (assessing late-filing factors relative to petition to intervene), aff'd. CLI-99-10,49 NRC 318 (1999).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (BALANCING OF 10 C.F.R. §2.714(a)(l) CRITERIA)

Relative to the other four factors, in the absence of good cause there must be a compelling showing on the four remaining elements, of which factors two and four ?? availability of other means to protect the petitioner's interest and extent of representation of petitioner's interest by other parties ?? are to be given less weight than factors three and five ?? assistance in developing a strong record and broadening the issues/delaying the proceeding. See Braidwood, CLI-86-8, 23 NRC at 244-45.

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (NEPA ISSUES)

NEPA: ADMISSIBILITY OF LATE-FILED CONTENTIONS

An intervenor must file contentions on the basis of an applicant's environmental report and does not have good cause for delaying its filing until issuance of a Staff environmental document unless it establishes that new or different data or conclusions are contained in the Staff document. Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station); LBP-93- 23,38 NRC 200,251 (1993), petition/or review and motion for directed certification denied, CLI-94-2, 39 NRC 91 (1994); see Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 and 2), LBP- 82-79, 16 NRC 1116, 1118 (1982) (contention based on draft environmental statement that contains no new information relevant to the contention lacks good cause for late filing).

*218 RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTION (SIGNIFICANCE VS. DELAY)

The asserted' 'national significance" of an issue is not a compelling contributor to good cause in evaluating the timeliness of a late-filed contention. See South Carolina Electric and Gas Co. (Virgil C. Summer Nuclear Station, Unit 1), ALAB-642,13NRC 881, 887 n.5 (1981).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (NEPA ISSUES)

NEPA: ADMISSIBILITY OF LATE-FILED CONTENTIONS

An intervenor that awaits the publication of a draft or final environmental impact statement before filing a contention does so "at its peril." See Louisiana Energy Services, L.P. (Claiborne Enrichment Center), LBP-94-11, 39 NRC 205, 212(1994).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (SOUND

RECORD DEVELOPMENT)

With regard to factor three ?? assistance in developing a sound record ?? it has been observed that when a petitioner addresses this criterion it should set out with as much particularity as possible the precise issues it plans to cover, identify its prospective witnesses, and summarize their proposed testimony. Mississippi Power & Light Co. (Grand Gulf Nuclear Station, Units 1 and 2), ALAB- 704, 16 NRC 1725,1730 (1982).

RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS (SOUND RECORD DEVELOPMENT)

When an intervenor does little more than identify affiants that support the contention, without providing any "real clue" about what they would say to support the contention, factor three provides little if any weight in favor of admitting the contention. LBP-98-7,47 NRC at 208-09.

MEMORANDUM AND ORDER

(Denying Request to Admit Late-Filed Contention Utah KK)

In this 10 C.F.R. Part 72 proceeding concerning the application of Private Fuel Storage, L.L.C., (PFS) for a license to construct and operate an independent ***219** spent fuel storage installation (ISFSI) located on the reservation of the Skull Valley Band of Goshute Indians in Skull Valley, Utah, intervenor State of Utah (State) requests the admission of late-filed amended contention Utah KK, Military Training Impacts. With that contention, the State challenges the NRC staff's draft environmental impact statement (DEIS) for failing to assess adequately the proposed ISFSI's cumulative and socioeconomic impacts resulting from a purported loss of military operations area airspace. Both PFS and the staff oppose the State's request on a variety of grounds, including a failure to meet (1) the late-filing elements of 10 C.F.R. § 2.714 (a)(1); and (2) the general admissibility requirements for contentions as set forth in section 2.714(b)(2), (d).

For the reasons set forth below, we deny the State's request to admit contention Utah KK, finding that a balancing of the five late-filing criteria of section 2.714(a)(1) do not support entertaining the contention.

I. BACKGROUND

PFS filed a license application for the proposed Skull Valley ISFSI in June 1997. See LBP-98-7, 47 NRC 142, 157, reconsideration granted in part and denied in part, LBP-98-10, 47 NRC 288, aff'd, CLI-98-13, 48 NRC 26 (1998). The PFS application, which consisted of a number of documents, included an environmental report (ER) addressing various issues relating to compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. § 4321. See 47 NRC at 157. As the ER noted, the proposed ISFSI site is located near several military facilities, including Hill Air Force Base (HAFB), the Utah Test and Training Range (UTTR), and the Dugway Proving Ground (DPG). See [State] Request for Admission of

Late-Filed Utah Contention KK (Potential Impacts to Military Training and Testing and State Economy) (July 27, 2000) at 1-2 [hereinafter State Contention Request]; [PFS] Response to [State] Request for Admission of Late-Filed Utah Contention KK (Aug. 10, 2000) at 2 [hereinafter PFS Response]. Although the PFS site is not situated directly in the UTTR, it is located beneath the airspace of the Sevier B military operating area (MOA), one of several such areas that border the edges of the UTTR and are located adjacent to restricted airspace. See PFS Response at 2. The Sevier B MOA is used for air-to-air combat training, weapons testing, and "flight ingress and egress to restricted airspace over the UTTR-DPG land mass." State Contention Request at 2.

2 Pursuant to an October 1997 Board order, in late-November 1997 the State filed its safety and environmental contentions relating to the PFS application. See LBP-98-7, 47 NRC at 160-61 (1998). One of these contentions, Utah K, Inadequate Consideration of Credible Accidents, included safety concerns regarding credible accidents at the PFS facility caused by external events that could potentially occur ***220 as a result of the close proximity of military training facilities. See id. at 190. In April 1998, a number of the State's safety-related contentions, including Utah K, as well as contentions challenging the PFS ER, were eventually admitted for litigation in the proceeding. [FN1] See id. at 247-48.

More than two years later, on June 12, 2000, the staff notified the Board and the parties to this proceeding that the DEIS relating to the PFS facility had been completed on June 9, 2000, and, if possible, copies of the DEIS would be distributed to the Board and the parties at the PFS ISFSI evidentiary hearing scheduled to begin on June 19, 2000, in Salt Lake City, Utah. See Letter from Robert M. Weisman, NRC Staff Counsel, to the Licensing Board (June 12, 2000). The staff then supplied the State with a copy of the DEIS on June 19 at the evidentiary hearing [FN2]. See PFS Response at 3. The DEIS subsequently was made available to the public on June 23, 2000. See 65 Fed. Reg. 39,206 (2000). Thereafter, on July 27, 2000, the State requested the admission of late-filed contention Utah KK, Military Training Impacts, which provides:

The Draft Environmental Impact Statement fails to comply with the National Environmental Policy Act and 10 CFR §51.71(d) because it does not adequately assess the cumulative and socioeconomic impacts from loss of military operations area airspace use, including a reduction in military readiness and national security, and potential socioeconomic impacts to Utah communities that rely on employment and patrons of military agencies that use the Sevier B military operating area.

State Contention Request at 3. In responses filed August 10, 2000, both PFS and the staff contend that Utah KK should not be admitted in that it is (1) unjustifiably late, without a demonstration that the 10 C.F.R. § 2.714(a)(1) late-filing factors support its admission; and (2) unsupported by the necessary basis and does not demonstrate there is a dispute on a material issue of law or fact. See PFS Response at 5-15; NRC Staff's Response to "State of Utah's Request for Admission of Late-Filed Utah Contention KK (Potential Impacts to Military Training and Testing and State Economy)" (Aug. 10, 2000) at 4-16 [hereinafter Staff Response].

II. ANALYSIS

To justify a presiding officer's consideration of the "merits" of a late-filed contention, i.e., whether the contention fulfills the admissibility standards ***221** specified in 10 C.F.R. § 2.714, a party must demonstrate that a balancing of the five factors set forth in section 2.714(a)(1)(i)-(v) supports acceptance of the petition. The first and foremost factor in this appraisal is whether good cause exists that will excuse the late-filing of the contention. See Commonwealth Edison Co. (Braidwood Nuclear Power Station, Units 1 and 2), CLI-86-8, 23 NRC 241, 244 (1986). And relevant to our evaluation of that factor here, as we have noted previously (albeit in a somewhat different context), the good cause element has two components that impact on our assessment of the timeliness of a contention's filing: (1) when was sufficient information reasonably available to support the submission of the late-filed contention; and (2) once the information was available, how long did it take for the contention admission request to be prepared and filed. See LBP-99-3, 49 NRC 40, 46-48 (assessing late-filing factors relative to petition to intervene), aff'd, CLI-99-14, 49 NRC 361 (1999). Moreover, relative to the other four factors, in the absence of good cause there must be a compelling showing on the four remaining elements, of which factors two and four -- availability of other means to protect the petitioner's interest and extent of representation of petitioner's interest by other parties -- are to be given less weight than factors three and five -- assistance in developing a strong record and broadening the issues/delaying the proceeding. See Braidwood, CLI-86-8, 23 NRC at 244-45.

****3** In connection with factor one -- good cause for filing late -- the State asserts that it first became aware of the proposed ISFSI's potential impacts on the military as a result of a May 3, 1999 letter to Utah Governor Michael Leavitt from HAFB Vice Commander Ronald Oholendt. At the end of that month, it filed supplemental EIS scoping comments to inform the staff of those potential impacts. See State Contention Request at 8. The State argues that by taking these actions, it did not "idly" wait until the DEIS was published to make its concerns known, but adhered to the NEPA process by "timely making specific comments on the scope of the EIS," in the reasonable belief that the DEIS would address the cumulative and socioeconomic impacts of the proposed ISFSI. Id. at 8. Nor, according to the State, did it engage in any unreasonable delay in bringing its concerns to the attention of the Board. The State contends that because it received the DEIS during the June 2000 evidentiary hearings in Salt Lake City, it could not be expected to begin "copying and reviewing" the document until after the June 27 conclusion of the hearings. Id. Although acknowledging that it filed contention Utah KK more than thirty days from the date it contends it first received the DEIS, it nonetheless maintains that by filing the issue statement within thirty days of the conclusion of the evidentiary hearing it has provided the contention in a timely manner. See id. Additionally, the State argues that the Board should find good cause for admitting this contention as a result of the "national significance" of the issue in question. Id. at 8-9.

***222** PFS argues that the State's filing of contention Utah KK on July 27, 2000, was thirty-four days after the June 23, 2000 date on which the DEIS was made public and, therefore, exceeded the thirty days allotted by the Board for the filing of DEIS-related late-filed contentions. See PFS Response at 6. Additionally, PFS contends that NRC precedent does not support the State's

argument that the ongoing evidentiary hearing tolled the thirty-day response period until the conclusion of the hearing. See id. at 6. Both PFS and the staff also argue that contention Utah KK is unjustifiably late because the State had the requisite information to raise that issue statement by May 1999, and probably as early as November 1997. See id. at 7-9; Staff Response at 7-9.

Recognizing that the staff would be issuing a DEIS and a final environmental impact statement (FEIS) relative to the PFS application that, in accordance with section 2.714(b)(2)(iii), could be the genesis of additional, late-filed contentions, in June 1998 the Board indicated that (1) the staff should notify the intervening parties and the Board of its intent to make these documents public at least fifteen days prior to their public issuance; (2) the staff should take steps to notify the intervenors of actual public release of these documents and their availability on an expedited basis; and (3) any late-filed contentions should be filed within thirty days of these documents being made available to the public. See Licensing Board Memorandum and Order (General Schedule for Proceeding and Associated Guidance) (June 29, 1998) at 4-5 (unpublished); see also LBP-00-07, 51 NRC 139, 143 n.1 (2000). The intent of the Board in setting these guidelines was twofold. First, we wished to ensure that intervening parties would have fifteen days prior to the public release of the DEIS and the FEIS during which to secure the availability of their experts to review the documents immediately upon release. In addition, the Board wanted to provide a thirty-day period for parties to prepare and file a response to those staff environmental submissions. See Licensing Board Memorandum and Order (General Schedule for Proceeding and Associated Guidance) (June 29, 1998) at 5 (unpublished).

**4 The staff, however, did not adhere fully to these guidelines in that the intervenors were not provided with the full fifteen-day advance notification of the issuance of the DEIS. [FN3] As a result, the thirty-day period for submission of intervenor late-filed contentions commenced on June 27, 2000 (i.e., fifteen days after notice was given by the staff that the DEIS was being made public), rendering filings made by July 27, 2000 timely. Thus, contention Utah KK was filed within the time allotted by direction of the Board for contentions relating to the DEIS.

*223 This does not end the inquiry, however, for there is still the question of whether issuance of the DEIS was the appropriate trigger for the late-filing of contention Utah KK. In this regard we note that section 2.714 (b)(2)(iii) provides in part:

On issues arising under the National Environmental Policy Act, the petitioner shall file contentions based on the applicant's environmental report. The petitioner can amend those contentions or file new contentions if there are data or conclusions in the NRC draft or final environmental impact statement, environmental assessment, or any supplements relating thereto, that differ significantly from the data or conclusions in the applicant's document.

This regulatory directive previously has been interpreted (and we think appropriately so) to mean that "as a matter of law, an intervenor must file contentions on the basis of an applicant's ER, and does not have good cause for delaying its filing until issuance of a Staff document unless it establishes that new or different data or conclusions are contained in the Staff environmental

document." Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 NRC 200, 251 (1993), petition for review and motion for directed certification denied, CLI-94-2, 39 NRC 91 (1994); see Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 and 2), LBP-82-79, 16 NRC 1116, 1118 (1982) (contention based on draft environmental statement that contains no new information relevant to the contention lacks good cause for late filing). The State does not establish or even contend that the staff DEIS contains "new or different data or conclusions"; in fact, the State only asserts that certain concerns that were not dealt with in the ER have additionally not been dealt with in the DEIS. Indeed, it appears information was reasonably available to support contention Utah KK for a substantial period before the June 23, 2000 distribution of the DEIS. As is evidenced by the admitted portions of contention Utah K that relate to military training and testing, the State has been aware of the proposed PFS ISFSI's location under the Sevier B MOA portion of the UTTR since the filing of its first contentions in November 1997. Additionally, by its own admission, in May 1999 the State had information regarding the "the significance of the potential impacts to the military" of the PFS facility by reason of the aforementioned May 1999 letter to Governor Leavitt. State Contention at 8. Finally, we do not find the State's "national significance" argument a compelling contributor to good cause. See South Carolina Electric & Gas Co. (Virgil C. Summer Nuclear Station, Unit 1), ALAB-642, 13 NRC 881, 887 n.5 (1981).

**5 An intervenor that awaits the publication of a DEIS or FEIS before filing a contention for which the intervenor has sufficient information does so "at its peril." See Louisiana Energy Services, L.P. (Claiborne Enrichment Center), LBP-94-11, 39 NRC 205, 212 (1994). In this case, contention Utah KK could have been filed with the State's initial environmental contentions challenging the PFS ER or, at the very latest, in the May 1999 time frame following the Oholendt *224 letter. As a consequence, the State lacks the requisite good cause for its July 2000 submission of its concerns in connection with the staff's issuance of the DEIS.

With the good cause factor thus placed in the balance against admission, the Board likewise finds that factors three and five -- assistance in developing a strong record and broadening the issues/delaying the proceeding -- do not weigh in favor of admitting contention Utah KK. With regard to factor three, it has been observed that "when a petitioner addresses this criterion it should set out with as much particularity as possible the precise issues it plans to cover, identify its prospective witnesses, and summarize their proposed testimony." Mississippi Power & Light Co. (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-704, 16 NRC 1725, 1730 (1982). In this case, the State identifies its prospective witnesses and asserts the qualifications of each, but does little in the way of summarizing the witnesses' planned testimony or identifying the matters the State wishes to address. As has been found in the past, when an intervenor does little more than identify affiants that support the contention, without providing any "real clue" about what they would say to support the contention, factor three provides little if any weight in favor of admitting the contention. See LBP-98-7, 47 NRC at 208-09.

In addition, factor five does not favor the admission of contention Utah KK either in that it would most certainly broaden the issues and delay the proceeding. Although there are some similarities between contentions Utah K and Utah KK, the safety issues relating to the

occurrence of a potential accident identified in contention Utah K are significantly different from the concerns put forth in contention Utah KK regarding the environmental ramifications of the purported loss of military operations and airspace use that could potentially result from the construction of the proposed PFS ISFSI. Therefore, the issues in the proceeding would be broadened by the admission of this contention and the discovery and hearing time that would be required to litigate the broadened issues would almost certainly delay the proceeding.

As both PFS and the staff acknowledge, factors two and four -- availability of other means to protect the petitioner's interests and extent of representation of petitioner's interest by other parties -- do favor the admission of contention Utah KK. Yet, the support for admission provided by these factors, which are afforded less weight than factors three and five, does not outweigh the previous three factors. As a result, because the section 2.714(a)(1) balancing process does not support the admission oflate-filed contention Utah KK, we deny the State's request to admit this issue statement into this proceeding. [FN4]

*225 III. CONCLUSION

**6 Although filed within the Board-established deadline for the submission of late-filed contentions relating to the staff's June 2000 DEIS, the substance of late-filed contention Utah KK could have been raised long before issuance of that environmental document, thus placing the cardinal good cause factor on the "inadmissible" side of the section 2.714(a)(1) balance. This deficiency, in combination with the fact that of the four remaining factors, the two that are more heavily weighted also do not support admission, establishes that a balancing of the late-filing criteria of section 2.714(a)(1) compel the rejection of late-filed contention Utah KK.

For the foregoing reasons, it is this thirtieth day of October 2000, ORDERED, that the State's July 27, 2000 request for the admission of late-filed contention Utah KK is denied.

THE ATOMIC SAFETY AND LICENSING BOARD [FN5]

G. Paul Bollwerk, III

ADMINISTRATIVE JUDGE

Dr. Jerry R. Kline

ADMINISTRATIVE JUDGE

Dr. Peter S. Lam

ADMINISTRATIVE JUDGE

Rockville, Maryland
October 30, 2000

FN1. In fact, Utah K was consolidated with related contentions from other intervenors to form contention Utah K/Castle Rock 6/Confederated Tribes B, which subsequently was redesignated as contention Utah K/Confederated Tribes B when one of the sponsoring parties withdrew from this litigation. See LBP-99-6, 49 NRC 114, 121 (1999).

FN2. The State contends it received the DEIS "on or about June 21, 2000." State Contention Request at 8. This inconsistency regarding the precise date of receipt of the DEIS has no bearing on the timeliness of the filing of contention Utah KK.

FN3. A June 12, 2000 staff letter to the Board and the parties advising that the DEIS was going to be made public was received by the State only 11 days prior to the June 23, 2000 date on which the DEIS was actually made public. As a result, the full 15-day advance notification specified by the Board was not afforded to the State and the other intervening parties.

FN4. Our ruling on the late-filing criteria means we need not reach the question of this contention's admissibility under the section 2.714(b), (d) standards. Nonetheless, we note that we would have admitted contention Utah KK, with the additional observation that late-filing factor three and the basis and specificity requirement of section 2.714(b) are not necessarily synonymous.

FN5. Copies of this memorandum and order were sent this date by Internet e-mail transmission to counsel for (1) applicant PFS; (2) intervenors Skull Valley Band of Goshute Indians, Ohngo Gaudadeh Devia, Confederated Tribes of the Goshute Reservation, Southern Utah Wilderness Alliance, and the State; and (3) the staff.

END OF DOCUMENT

Copr. © West 2002 No Claim to Orig. U.S. Govt. Works

56 N.R.C. 340
Nuclear Reg. Rep. P 31,407
(Cite as: 56 N.R.C. 340, 2002 WL 31863340 (N.R.C.))

**1 IN THE MATTER OF PRIVATE FUEL STORAGE, L.L.C.
(Independent Spent Fuel Storage Installation)

Nuclear Regulatory Commission
Docket No. 72-22-ISFSI

CLI-02-25

December 18, 2002

*340 COMMISSIONERS: Richard A. Meserve, Chairman; Greta Joy Dicus; Nils J. Diaz; Edward McGaffigan, Jr.; Jeffrey S. Merrifield

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

SCOPE OF EIS: REMOTE AND SPECULATIVE EVENTS (TERRORISM)

An EIS is not an appropriate format to address the challenges of terrorism. The purpose of an EIS is to inform the decisionmaking agency and the public of a broad range of environmental impacts that will result, with a fair degree of likelihood, from a proposed project, rather than to speculate about "worst-case" scenarios and how to prevent them.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

SCOPE OF EIS: REMOTE AND SPECULATIVE EVENTS (TERRORISM)

The possibility of a terrorist attack on the PFS facility is speculative and simply too far removed from the natural or expected consequences of agency action to require a study under NEPA.

*341 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

SCOPE OF EIS: REMOTE AND SPECULATIVE EVENTS (TERRORISM)

Agencies have discretion to exclude high-consequence, low-probability events from a NEPA analysis. City of New York v. U.S. Department of Transportation, 715 F.2d 732, 750 (2d Cir. 1982), appeal

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

dismissed and cert. denied, 465 U.S. 1055 (1984).

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

SCOPE OF EIS: REMOTE AND SPECULATIVE EVENTS (TERRORISM)

The NEPA process is governed by a "rule of reason," which does not extend to all conceivable consequences of agency decisions, no matter how far down the causal chain from a nuclear licensing decision and no matter how unpredictable. See Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 295 n.41 (2002).

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

SCOPE OF EIS: PUBLIC PARTICIPATION

Using the NEPA process to consider terrorism would be incompatible with NEPA's (and the NRC's) public participation process. In the wake of the terrorist attacks on the Pentagon and World Trade Center that took place September 11, 2001, an overriding government priority is to avoid disclosing to terrorists themselves precisely where and how nuclear facilities might be most vulnerable and what steps are being taken to lessen terrorists' chance of success.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

SCOPE OF EIS: "WORST-CASE SCENARIOS"

NEPA does not call for a "worst-case" inquiry, which, it is now recognized, simply creates a distorted picture of a project's impacts and wastes agency resources. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 354-55 (1989). A theoretical possibility that a terrorist attack will occur is not the same as a "reasonably foreseeable" impact, the usual trigger point for NEPA reviews. Substituting theoretical possibility for probability analysis amounts to a worst-case approach, exaggerating a project's risks and unduly alarming the public.

*342 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

**2 SCOPE OF EIS: SAFEGUARDS INFORMATION

Because NRC is required by law to protect key security-related information ("safeguards information")

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

from unauthorized disclosures, it cannot make publicly available the kind of information necessary for a more than superficial NEPA review. See Atomic Energy Act, § 147, 42 U.S.C. § 2167. This limitation on information availability supports our decision not to use NEPA, in part a public information statute, as our vehicle to analyze terrorism. Cf. Public Citizen v. Federal Aviation Administration, 988 F.2d 186 (D.C. Cir. 1993) (FAA's statutory mandate to protect airport security overrides Administrative Procedure Act's notice-and-comment and publication requirements for rulemakings).

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

SCOPE OF EIS: SECURITY REQUIREMENTS

We have in place substantial security requirements for our facilities and are studying whether additional action is necessary. Thus, even if terrorism were a matter cognizable under NEPA -- and for the reasons given above we believe it is not -- it would elevate form over substance to insist that we supplement our ongoing comprehensive review with a duplicative or formalistic NEPA study. See Friends of the River v. Federal Energy Regulatory Comission, 720 F.2d 93, 106- 08 (D.C. Cir. 1983).

MEMORANDUM AND ORDER

On December 13, 2001, the Atomic Safety and Licensing Board referred to the Commission its decision denying admission of a late-filed contention of the State of Utah. Utah's contention related to the threat of a terrorist attack on Private Fuel Storage, L.L.C.'s (PFS) proposed independent spent fuel storage installation (ISFSI). [FN1] We subsequently accepted review, [FN2] and also agreed to review three *343 other cases raising terrorism-related issues. [FN3] The primary question in these cases is whether NEPA requires the NRC, in rendering licensing decisions, to consider the impacts of terrorism. We hold today that NEPA does not require a terrorism review. [FN4]

I. BACKGROUND

A. Overview

Below we consider in some detail the legal question whether NEPA requires an inquiry into the threat of terrorism at nuclear facilities. At the outset, however, we stress our determination, in the wake of the horrific September 11th terrorist attacks, to strengthen security at facilities we regulate. We currently are engaged in a comprehensive review of our security regulations and programs, acting under our AEA-rooted duty to protect "public health and safety" and the "common defense and security." [FN5] We are reexamining, and in many cases have already improved, security and safeguards matters such as guard force size, physical barriers, access control, detection systems, alarm stations, response strategies, security exercises, clearance requirements and background investigations for key employees, and fitness-for-duty requirements. More broadly, we are rethinking the NRC's threat assessment framework and design basis threat. We also are reviewing our own infrastructure, resources, and communications.

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

**3 Our comprehensive review may also yield permanent rule or policy changes that will apply to the proposed PFS facility and to other NRC-regulated facilities. The review process is ongoing and cumulative. It already has resulted in a number of security-related actions to address terrorism threats at both active and defunct nuclear facilities.

For instance, just after the September 11th terrorist attacks, we issued Threat Advisories to all licensees of nuclear power plants, nonpower reactors, nuclear fuel facilities, gaseous diffusion plants, and decommissioning reactors. The *344 Advisories indicated that these facilities should go to the highest level of security. As a result of our initial Advisories, nuclear power plant licensees increased patrols, augmented security forces and capabilities, added security posts, installed additional physical barriers, increased the standoff distance for vehicle checks, [FN6] enhanced coordination with law enforcement and military authorities, and imposed more restrictive site access controls for all personnel. We continue to provide updates to the licensees regarding our original Threat Advisories, having so far issued more than thirty such updates. NRC security specialists have performed numerous onsite physical security vulnerability assessments at licensed facilities to evaluate the effectiveness of our licensees' enhanced security measures.

On February 25, 2002, after further security reviews, we took the additional step of issuing orders to all 104 power reactor licensees requiring them to take interim compensatory security measures over and above those required by our regulations. The orders formalized steps that those licensees had voluntarily taken in response to our Threat Advisories, and also included additional measures to further protect nuclear power plants. The newly required safeguards measures (whose details are not available to the public) include more patrols, more security personnel, and physical and vehicle barrier modifications. The orders also require additional security measures pertaining to waterways and owner-controlled land outside the plants' protected areas. The NRC Staff has confirmed that, as of August 31st, all nuclear power plant licensees are in compliance with the requirements set forth in these orders. In addition, the Staff is conducting independent inspections at licensee sites.

We have subsequently issued similar security-driven orders to Honeywell International, Inc., for its uranium conversion facility in Metropolis, Illinois, on March 25th; to General Electric Company for its wet storage facility in Morris, Illinois, on May 23d; to twelve nuclear plants that are being decommissioned also May 23d; to two enriched uranium fuel fabricators (BWX Technologies, Inc. and Nuclear Fuel Services) on August 22d; and to independent spent fuel storage facilities using dry cask storage on October 23d.

This set of orders will remain in effect until either the threat environment changes or we determine that additional orders or rules are needed.

**4 In a related action, in January we increased the full-time staffing at the NRC Headquarters Operations Center, which takes in fast-breaking security and safety information. In April, we established a new Office of Nuclear Security and Incident Response. The new office is responsible for immediate operational security and safeguards issues as well as for long-term policy development. It works closely with law enforcement agencies and the Office of Homeland Security. It also coordinates the NRC's ongoing comprehensive security review, *345 including (for example) a major research effort to evaluate the vulnerabilities and potential effects of a large commercial aircraft crashing into a nuclear facility or into storage and transportation casks -- issues raised in this proceeding.

B. Facts and Procedural Posture of This Case

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

PFS seeks a license to operate an ISFSI on the Skull Valley Goshute Indian Reservation in Utah. During the course of this litigation and prior to September 11, 2001, the Licensing Board admitted numerous issues for hearing, many of which await final merits resolution. But the Board rejected various contentions relating to the risks of terrorism or sabotage at the proposed facility, finding each to be inadmissible. [FN7]

In response to the terrorist attacks of September 11, 2001, Intervenor Utah asked the Board to admit its late-filed contention Utah RR, Suicide Mission Terrorism and Sabotage, which claimed violations of both the AEA and NEPA. Utah contended that the events of September 11 had materially changed the circumstances under which the Board had rejected previously proffered terrorism-related contentions by showing that a terrorist attack is both more likely and potentially more dangerous than previously thought.

Utah's new AEA "terrorism" claim argued that PFS's Safety Analysis Report and the Staff's Safety Evaluation Report failed to identify and adequately evaluate external man-induced events such as suicide mission terrorism and sabotage, "based on the current state of knowledge about such events," as required by an NRC rule. [FN8] The Board found this argument an impermissible attack on NRC rules because, in promulgating security rules applicable to ISFSIs, the Commission had specifically considered and rejected requiring protection against the malevolent use of an airborne vehicle. [FN9]

Utah' s new NEPA "terrorism" claim argued that PFS's Environmental Report and the NRC Staff's draft Environmental Impact Statement (EIS) [FN10] were deficient in failing to consider the environmental consequences of terrorists flying a fully loaded commercial jumbo jet into the PFS facility. Relying on a 1973 Appeal Board decision in the Shoreham proceeding, [FN11] the Board found that the rationale for excluding acts of war in our safety analysis -- that this is the responsibility of the national defense establishment -- applies equally to a NEPA analysis. ***346** Therefore, the Board held that the NRC's NEPA responsibilities did not include considering the effects of terrorism. [FN12] The Board also cited a 1989 Third Circuit decision, Limerick Ecology Action v. NRC, [FN13] which found that NRC had no duty to perform a "probabilistic risk assessment" of the risk of sabotage in an EIS because the petitioners had failed to show that such an assessment was possible. [FN14] Noting, however, that the extraordinary events of September 11 may have changed what can be said to be "reasonably foreseeable," the Board referred its terrorism ruling for immediate Commission review. [FN15]

****5** We accepted review, asking parties to address all issues "the parties determine are relevant," and in addition the question: "What is an agency's responsibility under NEPA to consider intentional malevolent acts, such as those directed at the United States on September 11, 2001?" [FN16]

On review, Utah has abandoned its AEA-terrorism claim and focused on its NEPA- terrorism claim. [FN17] Its NEPA claim does not ask that the NRC Staff inquire into or predict the likelihood of a September 11-style terrorist attack on the proposed ISFSI, but argues that the mere fact that these attacks occurred at other U.S. targets makes such an attack a reasonably foreseeable environmental impact of erecting this facility, requiring a NEPA review. Utah asks the Commission simply to assume an attack and go straight to analyzing its consequences. Both PFS and the NRC Staff, citing the Shoreham and Limerick Ecology Action decisions, maintain that terrorism and other intervening malevolent acts lie outside NEPA and need not be considered under that statute.

II. ANALYSIS

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

A. Introduction

The issue here is whether an unquantifiable threat of terrorism, in this case a suicidal air crash of a jumbo jetliner into an ISFSI, raises the kinds of environmental concerns that call for a NEPA review in an EIS. That is, does it serve the purposes of NEPA to include in an EIS a discussion of the impact of a catastrophic event that is not directly linked to an NRC licensing decision and the likelihood of which is impossible to quantify?

*347 Terrorism differs from matters ordinarily considered in an EIS. The proposed PFS facility's EIS, for example, considers such matters as likely effects on local water, air quality, vegetation, wildlife, culture, and lifestyle. These effects are reasonably certain; an EIS can quantify them to a fair degree of precision. Terrorism, by contrast, comes in innumerable forms and at unexpected times and places. It is decidedly not predictable. And it is not a natural or inevitable byproduct of licensing the PFS facility. [FN18] In our view, an EIS is not an appropriate format to address the challenges of terrorism. The purpose of an EIS is to inform the decisionmaking agency and the public of a broad range of environmental impacts that will result, with a fair degree of likelihood, from a proposed project, rather than to speculate about "worst-case" scenarios and how to prevent them.

By its own terms, NEPA is not absolute. It directs federal agencies "to use all practicable means, consistent with other considerations of national policy," in environmental reviews. [FN19] The NEPA process is governed by a "rule of reason." [FN20] It does not extend to all conceivable consequences of agency decisions, no matter how far down the causal chain from a nuclear licensing decision and no matter how unpredictable. Using the NEPA process to consider terrorism also would be incompatible with NEPA's (and the NRC's) public participation process. In the wake of September 11, an overriding government priority is to avoid disclosing to terrorists themselves precisely where and how nuclear facilities might be most vulnerable and what steps are being taken to lessen terrorists' chance of success. Yet it would not be possible to embark upon a meaningful NEPA review of any type without engaging such subjects. NEPA does not override our concern for making sure that sensitive security-related information ends up in as few hands as practicable.

**6 We hasten to add that our decision against including terrorism within our NEPA reviews does not mean that we plan to rule out the possibility of a terrorist attack against NRC-regulated facilities. On the contrary, as we outlined above, the Commission and its Staff have taken steps to strengthen security and are in the midst of an intense study of the effects of postulated terrorist attacks and of our relevant security and safeguards rules and policies. These activities are rooted in the NRC's ongoing responsibilities under the AEA to protect public health and safety and the common defense and security. But we see no practical benefit in conducting that review, case-by- case, under the rubric of NEPA, nor *348 any legal duty to do so. Below we set out a series of factors cutting against using the NEPA framework to conduct a terrorism review and against admitting Utah's NEPA-terrorism contention for hearing. These factors stand singly, and cumulatively, as justification against invoking NEPA as the basis for our terrorism review in nuclear licensing cases.

B. NEPA's Goals and the Rule of Reason

We begin with general NEPA requirements. NEPA demands that federal agencies prepare a "detailed

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

statement ... on the environmental impact" of any proposed major federal action "significantly affecting the quality of the human environment." [FN21] Council on Environmental Quality (CEQ) regulations, which offer agencies guidance on NEPA compliance, provide that the EIS must discuss direct and indirect effects of the action. [FN22] Direct effects are "caused by the action and occur at the same time and place." [FN23] Indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable," such as growth-inducing effects. [FN24] CEQ regulations also caution that the EIS should not be overbroad. [FN25]

NEPA's "dual purpose" is to ensure that federal officials fully take into account the environmental consequences of a federal action before reaching major decisions, and to inform the public, Congress, and other agencies of those consequences. [FN26] These purposes inform our determination whether the potential impact of a terrorist attack is the type of information Congress intended for agencies to include in an EIS.

It is well established that NEPA requires only a discussion of "reasonably foreseeable" impacts. [FN27] Grappling with this concept, various courts have described it as a "rule of reason," [FN28] or "rule of reasonableness," [FN29] which excludes "remote ***349** and speculative" [FN30] impacts or "worst-case" scenarios. [FN31] Courts have excluded impacts with either a low probability of occurrence, [FN32] or where the link between the agency action and the claimed impact is too attenuated to find the proposed federal action to be the "proximate cause" of that impact. [FN33] NEPA does not call for "examination of every conceivable aspect of federally licensed projects." [FN34] Here, the possibility of a terrorist attack on the PFS facility is speculative and simply too far removed from the natural or expected consequences of agency action to require a study under NEPA.

****7** Two federal court of appeals decisions have addressed the issue of terrorism and NEPA in the area of nuclear regulation. Both decisions upheld, as reasonable, an agency refusal to consider terrorism under NEPA. In Limerick Ecology Action v. NRC, the Third Circuit determined that in licensing a nuclear power reactor the NRC could decline to consider the effects of terrorism in an EIS because the intervenors had not shown any way to predict or analyze the risk meaningfully. [FN35] Similarly, in City of New York v. U.S. Department of Transportation, the Second Circuit held that, in permitting the transport of nuclear materials, the Department of Transportation need not perform a NEPA analysis of the effects of sabotage -- because agencies had discretion to exclude such high-consequence, low-probability events:

DOT simply concluded that the risks of sabotage were too far afield for consideration. To a large degree this judgment was justified by the record. Substantial evidence indicated that sabotage added nothing to the risk of high-consequence accidents. Even the least sanguine commentators could say only that sabotage added an unascertainable risk. In light of these conflicting points of view, it was within DOT's discretion not to discuss the matter further beyond adopting the NRC security requirements. [FN36]

***350** In short, the only two directly pertinent court of appeals decisions, Limerick Ecology Action and City of New York, give us no reason to include terrorism within our NEPA review. [FN37]

It is sensible to draw a distinction between the likely impacts of the PFS facility and the impacts of a terrorist attack on the facility. Absent such a line, the NEPA process becomes truly bottomless, subject only to the ingenuity of those claiming that the agency must evaluate this or that potential adverse effect, no matter how indirect its connection to agency action. In our view, the causal relationship between approving the PFS facility and a third party deliberately flying a plane into it is too attenuated to require

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

a NEPA review, particularly where the terrorist threat is entirely independent of the facility. Nonetheless, we examine below the broad scope of NEPA law to determine if there is any reason to view terrorism differently today, in the wake of the notorious September 11 attacks on the World Trade Center and the Pentagon.

C. The Risk of a Terrorist Attack Cannot Be Adequately Determined

The horrors of September 11 notwithstanding, it remains true that the likelihood of a terrorist attack being directed at a particular nuclear facility is not quantifiable. Any attempt at quantification or even qualitative assessment would be highly speculative. In fact, the likelihood of attack cannot be ascertained with confidence by any state-of-the-art methodology. That being the case, we have no means to assess, usefully, the risks of terrorism at the PFS facility. Risk, of course, is generally thought of as "the product of the probability of occurrence [and] the consequences." [FN38] Here, though, we have no way to calculate the probability portion of the equation, except in such general terms as to be nearly meaningless.

**8 Utah has presented no evidence of a system or technique for assessing accurately the probability of a terrorist attack in general or a September 11- type attack specifically. It argues, however, that qualitative factors could show that a terrorist threat is "reasonably foreseeable." It gives as an example a situation where a terrorist group, with the apparent wherewithal to mount such an attack, makes a specific threat against a facility or class of facilities. Although the probability of such attacks would still not be measurable, the threats would make attacks reasonably foreseeable and thus subject to NEPA, according to Utah. We note that there has been no such threat, however, against the proposed PFS facility.

*351 If we were to speculate on the probability of the scenario in Utah's contention -- a hijacked jumbo jet hitting the PFS facility and causing catastrophic effects -- our guess is that the probability is actually minuscule. For one thing, Congress and the Federal Aviation Administration (FAA) have put in place enhanced anti-hijacking measures at airports and on commercial airplanes (e.g., enhanced passenger and baggage screening, strengthening of cockpit doors, the Air Marshall program). Moreover, the United States intelligence community and various law enforcement agencies have increased their efforts to identify potential terrorists and prevent potential attacks before they occur. For instance, the FAA and Department of Defense have acted more than once to protect the airspace above nuclear power plants from what were thought at the time to be credible threats. [FN39]

In addition, terrorists seeking to cause havoc and destruction would find many targets far more inviting than the proposed PFS facility. That facility would be located in a remote, desert location far from population centers. And it would use NRC-approved strong storage casks, which are designed to minimize the effects of off-normal events and accidents. [FN40] Given this setting, a terrorist attack seemingly would be quite unlikely to result in a high- consequence release of radioactivity.

Because we have seen no evidence to the contrary, in this proceeding or elsewhere, we conclude that the risk of a terrorist attack on the proposed PFS facility (and other nuclear facilities) is beyond this agency's ability to determine meaningfully. Utah has not proposed other means to evaluate terrorism, besides suggesting that the NRC simply assume, on the basis of the September 11 terrorist attacks, that the PFS facility is at risk. This we decline to do, as it would transform NEPA analysis into a form of guesswork and distort NEPA's cost-benefit calculus. As in Limerick Ecology Action, Inc. v. NRC,

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

therefore, the contention here fails to provide "some method or theory by which the NRC could ... enter[] into a meaningful analysis of the risk of sabotage despite its asserted inability to quantify the risks." [FN41]

D. NEPA Does Not Require a "Worst-Case" Analysis

**9 Utah's proposed approach -- that the NRC assume the likelihood of a suicidal air crash into the PFS facility and calculate the consequences -- amounts to a form of "worst-case" analysis. While that approach at one time found favor in *352 NEPA case law, today it stands discredited. Both the Supreme Court and CEQ have concluded that NEPA does not call for a "worst-case" inquiry, which, it is now recognized, simply creates a distorted picture of a project's impacts and wastes agency resources. [FN42]

In theory, as the NRC Staff brief acknowledges, the NRC could attempt to perform a "worst-case" analysis on the basis of much conjecture and numerous assumptions. But is it useful or legally necessary to do so? For instance, with no meaningful way to determine the probability that terrorists will attack the PFS facility, the most that can be said is that a repeat of the September 11 scenario, this time directed at PFS rather than an office building, is a theoretical possibility. A theoretical possibility, though, is not the same as a "reasonably foreseeable" impact, the usual trigger-point for NEPA reviews. Substituting theoretical possibility for probability analysis amounts to a worst-case approach. It exaggerates a project's risks and might unduly alarm the public.

In Robertson v. Methow Valley Citizens Council, the Supreme Court held that NEPA's "twin functions -- requiring agencies to take a 'hard look' at the consequences of the proposed action and providing important information to other groups and individuals" -- do not call for an inquiry into worst-case possibilities. [FN43] The Court pointed with approval to CEQ's 1986 abandonment of a regulation that had required EISs to include worst-case analyses. [FN44] The Court stated that CEQ's original rule had led agencies to devote substantial effort to "limitless" analyses -- "that is, one can always conjure up a worse 'worst case' by adding an additional variable to a hypothetical scenario." [FN45] CEQ's new focus on "reasonably foreseeable impacts," the Court said, "will generate information of greatest concern to the public and of greatest relevance to the agency's decision, rather than distorting the decisionmaking process by overemphasizing highly speculative harms." [FN46]

Under Robertson, an analysis of a hypothetical terrorist attack has no place in the EIS for the PFS facility. NEPA's mandate to federal agencies, as we see it, is to consider a broad range of environmental effects that are reasonably likely to ensue as a result of a major agency action, not to engage in speculation about what might happen as a result of criminal terrorist activities. The PFS EIS discusses a range of likely impacts, including radiological impacts on workers and the public, air quality impacts, impacts on plant life, visual impacts, impacts on wildlife, and socioeconomic and cultural impacts on the local community. While not all these effects can be "measured" or "determined" in a concrete fashion -- for *353 example, the facility's impact on scenic values -- the Staff can say with some degree of certainty that the impacts studied will take place.

**10 This is in striking contrast to the impacts of an airborne terrorist attack at the PFS site using a commercial aircraft, an event that could possibly happen but is hardly a natural or expected consequence of licensing the facility. Utah says that we should take guidance from Sierra Club v. Marsh, a First Circuit decision concluding that "reasonable foreseeability" under NEPA means that "the impact is

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision." [FN47] Distinguishing "reasonably foreseeable" effects from those that are "highly speculative," the court asked: "With what confidence can one say that the impacts are likely to occur?" [FN48] Utah, in turn, asks its own question under the Sierra Club v. Marsh formulation, "What person of ordinary prudence would not want to know, before deciding to license a facility that might some day house the nation's entire current inventory of spent nuclear fuel, what the reasonably foreseeable environmental impacts would be of an airborne assault on the facility?" [FN49]

Utah asks the wrong question. The "reasonably foreseeable" effects of a successful attack with a jumbo jet against the PFS facility are not the same as the "reasonably foreseeable" impacts of simply licensing the facility. Utah's attempt to conflate the probability of the initiating event (terrorism) with its consequences simply skips over the question whether the impacts are "likely to occur," a key element of Sierra Club v. Marsh's "ordinary prudence" test.

With Utah having provided no reason to believe that an airborne terrorist attack on the PFS facility is "likely to occur" -- indeed, Utah asks us simply to assume that it will -- we cannot conclude that such an attack is a "reasonably foreseeable" impact of building the proposed ISFSI. To hold otherwise would mean that we would have to consider such attacks foreseeable at any facility under our jurisdiction. And Utah's view of foreseeability does not seem confined to airborne terrorist attacks. On Utah's approach, presumably all other kinds of terrorism, if conceivable, would require NEPA review as well, both in EISs and at NRC hearings. Such an open-ended approach to NEPA is unworkable because ***354** it has no stopping point. [FN50] As the Supreme Court noted in Robertson, it is always possible to "conjure up" progressively more disastrous scenarios. [FN51]

The Court's rejection of worst-case NEPA reviews in Robertson relieves agencies of the arduous and unproductive task of analyzing conceivable, but very speculative, catastrophes. It also enables agencies to use their limited resources more effectively. [FN52]

E. NEPA's Public Process Is Not a Forum for Sensitive Security Issues

Although we conclude in the previous discussion that there is no basis on which to provide a reasonable measure of the risk of terrorism and that the risk of terrorism is far afield from issues involving the natural environment of the facility, the Commission is presently engaged in analyzing how to keep such risk at a minimum. Part of this effort is to protect sensitive information from falling into the hands of those with malevolent intentions. The public aspect of NEPA processes conflicts with the need to protect certain sensitive information. NEPA requires agencies to include the public in NEPA reviews. [FN53] Indeed, public information and public participation form a large part of NEPA's raison d'etre. [FN54] At the NRC, public input includes not just an opportunity to comment on draft EISs, but also an opportunity to contest environmental findings at agency hearings on the licensing action in question.

****11** In our view, the public interest would not be served by inquiries at NRC hearings and public meetings into where and how nuclear facilities are vulnerable, how they are protected and secured, and what consequences would ensue if ***355** security measures failed at a particular facility. Such NEPA reviews may well have the perverse effect of assisting terrorists seeking effective means to cause a release of radioactivity with potential health and safety consequences.

Years ago, before NEPA's enactment, the Atomic Energy Commission (AEC) considered the question

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

whether it should use its hearing process to assess the risk of "enemy attack or sabotage" against a particular facility (the Turkey Point reactor in Florida). [FN55] The AEC rejected the idea, holding that "examination into the above matters, apart from their extremely speculative nature, would involve information singularly sensitive from the standpoint of ... our national defense." [FN56] Such matters, according to the AEC, are "clearly not amenable to board consideration and determination." [FN57] The AEC commented that it "would not propose to make them cognizable issues in the absence of a clear Congressional direction to that end." [FN58] Congress has enacted no such directive.

NEPA does not override the AEC's (and our) concern for making sure that sensitive security-related information ends up in as few hands as practicable. NEPA itself includes limiting provisions. Section 101(b) of NEPA requires agencies to implement the statute's policies using "all practicable means, consistent with other essential considerations of national policy." [FN59] Another passage in the same section provides that the federal government's efforts to "attain the widest range of beneficial uses of the environment" are subject to restraints based on "risk to health and safety, or other undesirable and unintended consequences." [FN60] These provisions caution against using the NEPA process for a terrorism review. A full-scale NEPA process inevitably would require examination not only of how terrorists could cause maximum damage but also of how they might best be thwarted. But keeping those kinds of information secret is vital. To use NEPA's own terms, confidentiality in this area is an "essential consideration of national policy," protects against "risks to health and safety," and avoids "undesirable and unintended consequences."

For the NRC, protecting safeguards information is not simply a policy choice. It is required by law. Section 147 of the AEA provides that the NRC "shall" prohibit unauthorized disclosures of key security-related information. Consequently, the NRC cannot make publicly available the kind of information necessary for a ***356** more than superficial NEPA review. [FN61] This limitation on information availability supports our decision not to use NEPA, in part a public information statute, as our vehicle to analyze terrorism. [FN62]

****12** We recognize that in Weinberger v. Catholic Action of Hawaii, 454 U.S. 139 (1981) (which did not involve issues of terrorism), the Court indicated that the Navy should perform a NEPA review in the given circumstances, and factor it into its decisionmaking, even if the NEPA results could not be publicized or adjudicated. [FN63] Such a review would be useful to an agency that otherwise might not consider an issue relevant to licensing. But here, a formal NEPA review, secret or otherwise, would not add meaningfully to our understanding of the terrorism issue, in light of our ongoing studies and existing requirements and directives. And widespread NEPA-terrorism reviews, even if we attempted to keep EISs and hearings confidential, increase the risk of dangerous security breaches.

As we explained above in detail, [FN64] our refusal to assess terrorism's risks under the ritualized NEPA process -- EISs, public comment, adjudicatory hearings -- hardly means that the NRC is ignoring those risks, either at individual facilities or in general. Working closely with the Office of Homeland Security and with other agencies, the NRC after September 11 has shifted substantial resources and personnel to a study of the terrorism threat. We already have upgraded security requirements, with more improvements in the pipeline. Our agency is engaged in intensive research on facility vulnerabilities; it is considering additional or alternate means of protection; and it is looking in particular at the effects of suicidal crashes of large commercial airplanes, [FN65] the focus of Utah's contention here.

Given our existing efforts, it is not obvious what additional information or insights a formal NEPA review might bring into play. [FN66] We already are reviewing ***357** terrorism from nearly every conceivable angle. We have in place substantial security requirements for our facilities and are studying

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

whether additional action is necessary. Thus, even if terrorism were a matter cognizable under NEPA -- and for the reasons given above we believe it is not -- it would elevate form over substance to insist that we supplement our ongoing comprehensive review with a duplicative or formalistic NEPA study. [FN67]

III. CONCLUSION

For the foregoing reasons, we decline to require a NEPA review of the impact of terrorism at the proposed PFS facility. We therefore affirm the Licensing Board decision rejecting Utah's late-filed terrorism contention (Late-Filed Contention Utah RR).

IT IS SO ORDERED.

For the Commission [FN68]

ANNETTE L. VIETTI-COOK

Secretary of the Commission

FN1. LBP-01-37, 54 NRC 476 (2001).

FN2. CLI-02-3, 55 NRC 155 (2002). The Commission accepted review of the question whether either the Atomic Energy Act (AEA) or the National Environmental Policy Act (NEPA) requires the NRC to consider the risk of terrorism in a licensing proceeding. The Commission declined to review the Board's ruling that Utah's proffered contention met our late-filing criteria. Utah subsequently dropped its AEA claim, leaving only its NEPA claim for our review.

FN3. Duke Cogema Stone & Webster (Savannah River Mixed Oxide Fuel Fabrication Facility), CLI-02-4, 55 NRC 158 (2002) (granting petition for review); Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-6, 55 NRC 164 (2002) (accepting certified question); Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Unit 3), CLI-02-5, 55 NRC 161 (2002) (accepting referred ruling).

FN4. We reach the same conclusion in the other three companion cases. See Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-26, 56 NRC 358 (2002); Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Unit 3), CLI-02-27, 56 NRC 367 (2002); and Duke Cogema Stone & Webster (Savannah River Mixed Oxide Fuel Fabrication Facility), CLI-02-24, 56 NRC 335 (2002).

FN5. See, e.g., AEA §§ 103(b) & (d), 104(d), 161(b), 182a, 189a(1)(B)(ii) & (iii), 42 U.S.C. §§ 2133(b) & (d), 2134(d), 2201(b), 2232(a), 2239(a)(1)(B)(ii) & (iii). See also Florida Power & Light Co. (Turkey

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

Point Nuclear Generating Plant, Units 3 and 4), 4 AEC 9, 12 (Commission 1967) (these two statutory phrases "are fundamental to a delineation of the Commission's licensing authority and responsibility for [nuclear power plant] facilities"), aff'd sub nom. Siegel v. AEC, 400 F.2d 778 (D.C. Cir. 1968).

FN6. The standoff distance between a barrier and the nuclear plant is the distance between vital plant equipment and the closest exterior point of the vehicle barrier system.

FN7. See LBP-98-13, 47 NRC 360, 372 (1998); LBP-98-10, 47 NRC 288, 296 (1998); LBP-98-7, 47 NRC 142, 186, 199, 216, 226, 233-34, aff'd on other grounds, CLI- 98-13, 48 NRC 26 (1998).

FN8. See 10 C.F.R. § 72.94.

FN9. LBP-01-37, 54 NRC at 485-86. See Final Rule, "Physical Protection for Spent Nuclear Fuel and High-Level Radioactive Waste," 63 Fed. Reg. 26,955-56 (May 15, 1998).

FN10. The Final Environmental Impact Statement, dated December 2001, was not yet available at the time Utah submitted its contention and the Board made its ruling.

FN11. Long Island Lighting Co. (Shoreham Nuclear Power Station), ALAB-156, 6 AEC 831, 851 (1973).

FN12. LBP-01-37, 54 NRC at 487. See 10 C.F.R. § 50.13, "Attacks and destructive acts by enemies of the United States; and defense activities." This provision relieves reactor license applicants from providing for design features that protect against "enemies of the United States." By its terms, section 50.13 applies to production and utilization facilities only. It therefore does not apply directly to ISFSIs such as the one at issue in this proceeding.

FN13. 869 F.2d 719, 743-44 (3d Cir. 1989).

FN14. LBP-01-37, 54 NRC at 487.

FN15. See id. at 487-88.

FN16. CLI-02-3, 55 NRC at 162.

FN17. See State of Utah's Brief in Response to CLI-02-03 and in Support of Utah's Request for Admission of Late-Filed Contention Utah RR (Suicide Mission Terrorism and Sabotage), dated Feb. 27,

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

2002, at 3 n.2.

FN18. The Commission evaluates the impacts of accidents precipitated by natural events such as earthquakes, hurricanes, and other severe storms. Unlike acts of terrorism, such events are closely linked to the natural environment of the area within which a facility will be located, and are reasonably predictable by examining weather patterns and geological data for that region. We do not know of similar principles that would permit reasonable prediction of an act of terrorism against a particular facility. Terrorism is a global issue, involving stochastic criminal behavior, independent of the planned facility.

FN19. See 42 U.S.C. § 4331(b).

FN20. See Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 295 n.41 (2002).

FN21. See 42 U.S.C. § 4332(2)(C)(i).

FN22. 40 C.F.R. § 1502.16. Although the Commission is not bound by CEQ regulations that it has not expressly adopted (see Limerick Ecology Action, 869 F.2d at 743), the Commission gives those regulations "substantial deference." See Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), CLI-91- 2, 33 NRC 61, 72 n.2 (1991).

FN23. 40 C.F.R. § 1508.8(a).

FN24. 40 C.F.R. § 1508.8(b) (emphasis added).

FN25. Environmental impact statements should be "analytic rather than encyclopedic," and "shall be kept concise and shall be no longer than absolutely necessary to comply with NEPA and these regulations." 40 C.F.R. § 1502.2(a), (b).

FN26. See Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989); Baltimore Gas and Electric Co. v. National Resources Defense Council, Inc., 462 U.S. 87, 97 (1983); Dubois v. U.S. Department of Agriculture, 102 F.3d 1273, 1291 (1st Cir. 1996).

FN27. See, e.g., Wyoming Outdoor Council, Inc. v. U.S. Forest Service, 165 F.3d 43, 49 (D.C. Cir. 1999); Dubois v. U.S. Dept. of Agric., 102 F.3d at 1286; Sierra Club v. Marsh, 976 F.2d 763, 767 (1st Cir. 1992).

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

FN28. See Davis v. Latschar, 202 F.3d 359, 368 (D.C. Cir. 2000); San Luis Obispo Mothers for Peace v. NRC, 751 F.2d 1287, 1300-01 (D.C. Cir. 1984), vacated on other grounds, 760 F.2d 1320 (D.C. Cir. 1985).

FN29. See Limerick Ecology Action, 869 F.2d at 745; National Resources Defense Council, Inc. v. Morton, 458 F.2d 827, 837 (D.C. Cir. 1972).

FN30. See Limerick Ecology Action, 869 F.2d at 739; Trout Unlimited v. Morton, 509 F.2d 1276, 1283 (9th Cir. 1974).

FN31. See Robertson v. Methow Valley Citizens Council, 490 U.S. at 354; Edwardsen v. U.S. Department of the Interior, 268 F.3d 781, 785 (9th Cir. 2001).

FN32. San Luis Obispo Mothers for Peace v. NRC, 751 F.2d at 1300-01 (NRC's exclusion from EIS of consequences of Class 9 accidents upheld in light of agency's finding that there was an extremely low probability of occurrence).

FN33. See Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 760, 772-75 (1983). See also Presidio Golf Club v. National Park Service, 155 F.3d 1153, 1163 (9th Cir. 1998); No GWEN Alliance of Lane County v. Aldridge, 855 F.2d 380, 1385-86 (9th Cir. 1988). "At bottom the notion of proximate cause reflects ideas of what justice demands, or of what is administratively possible and convenient." Holmes v. SIPC, 503 U.S. 258, 268 (1992) (internal quotations omitted). The concept confines NEPA to "manageable" inquiries. Metropolitan Edison, 460 U.S. at 776.

FN34. Louisiana Energy Services, L.P. (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 102-03 (1998). See also Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-02-20, 56 NRC 147, 155-56 (2002).

FN35. 869 F.2d at 744.

FN36. 715 F.2d 732, 750 (2d Cir. 1982), appeal dismissed and cert. denied, 465 U.S. 1055 (1984).

FN37. See also No GWEN Alliance of Lane County v. Aldridge, 855 F.2d at 1385- 86 (speculation that a foreign nation might target military radio towers in a nuclear war does not trigger a NEPA duty to study the effects of such an attack).

FN38. Private Fuel Storage, LLC. (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 262 (2001).

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

FN39. See PSEG Nuclear LLC (Salem Nuclear Generating Station, Units 1 and 2; Hope Creek Generating Station), DD-02-3, 56 NRC 243, 255-57 (2002).

FN40. See generally NUREG-1714, "Final Environmental Impact Statement for the PFS Facility," Vol. 1, at 4-49 through 4-53 (December 2001).

FN41. 869 F.2d at 744.

FN42. Robertson v. Methow Valley Citizens Council, 490 U.S. at 354-55.

FN43. Id. at 356.

FN44. Id. at 354-56; see 40 C.F.R. § 1502.22 (1985) (requiring worst-case analysis).

FN45. 490 U.S. at 356 n.17, quoting CEQ Proposed Rule, "National Environmental Policy Act Regulations," 50 Fed. Reg. 32,234, 32,236 (Aug. 9, 1985).

FN46. See 490 U.S. at 356.

FN47. 976 F.2d at 767. See also Dubois v. U.S. Dept. of Agric., 102 F.3d at 1286.

FN48. 976 F.2d at 768, quoting Sierra Club v. Marsh, 769 F.2d 868, 878 (1st Cir. 1985).

FN49. See Utah's Brief at 8.

FN50. To put the burden of considering threats of terrorism into perspective, it is useful to consider the cumulative burden on the federal government as a whole that would result from such free-ranging inquiries. Because there are no limits or natural boundaries to the possibility of a terrorist strike, if one were to conclude that NEPA requires an agency to consider such threats, then the environmental reviews for thousands of federal actions throughout the nation would be required to consider terrorism, including those for individual highways, dams, bridges, etc.

FNThis is not to suggest that an environmental review should never consider the threat of terrorism. We address today only whether NEPA requires such a study. In fact, the NRC has briefly considered, as a matter of discretion, the issue of terrorism in generic environmental reviews for certain broad categories of activities. See, e.g., NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," Vol. 1, § 5.3.3.1, at p. 5-18 (May 1996); NUREG-1437, "Generic Environmental

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

Impact Statement for License Renewal of Nuclear Plants," Vol, 1, Addendum 1, Appendix 1 at p. A1-17 (August 1999).

FN51. See 490 U.S. at 356 n.17.

FN52. See Kansas Gas and Electric Co. (Wolf Creek Generating Station, Unit 1), CLI-99-19, 49 NRC 441,463 (1999); General Public Utilities Nuclear Corp. (Three Mile Island Nuclear Station, Units 1 and 2; Oyster Creek Nuclear Generating Station), CLI-85-4, 21 NRC 561, 563-64 (1985), quoting Rockford League of Women Voters v. NRC, 679 F.2d 1218, 1222 (7th Cir. 1982); Westinghouse Electric Corp. (Exports to the Philippines), CLI-80-14, 11 NRC 631, 649 (1980). See generally Natural Resources Defense Council, Inc. v. Morton, 458 F.2d 827, 837 (D.C. Cir. 1972) (NEPA "must be construed in the light of reason if it is not to demand what is, fairly speaking, not meaningfully possible, given ... that the resources of energy and research -- and time -- available to meet the Nation's needs are not infinite").

FN53. See 42 U.S.C. § 4332.

FN54. See Robertson v. Methow Valley Citizens Council, 490 U.S. at 356.

FN55. Turkey Point, 4 AEC at 13-14, aff'd sub nom. Siegel v. AEC, 400 F.2d 778 (D.C. Cir. 1968).

FN56. Id. at 14.

FN57. Id.

FN58. Id.

FN59. 42 U.S.C. § 4331(b) (emphases added). See also NEPA § 101(a), 42 U.S.C. § 4331(a) ("it is the continuing policy of the Federal Government ... to use all practicable means and measures.... [t]o create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (emphasis added)).

FN60. 42 U.S.C. § 4331(b)(3).

FN61. See Warm Springs Dam Task Force v. Gribble, 621 F.2d 1017, 1027 (9th Cir. 1988) ("[e]veryone recognizes the catastrophic results of the failure of the dam; to detail these results would serve no useful purpose").

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works

FN62. Cf. Public Citizen v. Federal Aviation Administration, 988 F.2d 186 (D.C. Cir. 1993) (FAA's statutory mandate to protect airport security overrides Administrative Procedure Act's notice-and-comment and publication requirements for rulemakings).

FN63. 454 U.S. 139, 143 (1981).

FN64. See Section I.A, supra, entitled "Overview."

FN65. See PSEG Nuclear LLC (Salem Nuclear Generating Station, Units 1 and 2; Hope Creek Generating Station), DD-02-3, 56 NRC 243, 262 (2002), review declined, unpublished letter of NRC Secretary (Dec. 6, 2002):

[T]he NRC, in conjunction with DOE laboratories, is continuing a major research and engineering effort to evaluate the vulnerabilities and potential effects of a large commercial aircraft impacting a nuclear power plant. This effort also includes consideration of possible additional preventive or mitigative measures to further protect public health and safety in the event of a deliberate aircraft crash into a nuclear power plant or spent fuel storage facility. The final results from that analysis are not yet available. If the ongoing research and security review recommends any other security enhancements, the NRC will take the appropriate action.

FN66. Although the Commission concludes that NEPA does not call for a formalistic NEPA study on the impacts of terrorism, the FEIS for the PFS project will include the Commission's comprehensive discussion here of the terrorism issue. See Claiborne, CLI-98-3, 47 NRC at 89 ("The adjudicatory record and the Board decision (and, of course, any Commission appellate decisions) become, in effect, part of the FEIS. See, e.g., Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 NRC 681,705-07 [1985].").

FN67. See Friends of the River v. Federal Energy Regulatory Comission, 720 F.2d 93, 106-08 (D.C. Cir. 1983).

FN68. Commissioner Dicus was not present for the affirmation of this Order. If she had been present, she would have approved it.

END OF DOCUMENT

Copr. © West 2003 No Claim to Orig. U.S. Govt. Works