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

OFFICE OF THE
GENERAL COUNSEL

July 31, 2000

G. Paul Bollwerk, III, Chairman
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington,DC 20555

Dr. Peter S.Lam
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. Jerry R. Kline
Administrative Judge
Atomic Safety and Licensing Board
Washington, DC 20555

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

Dear Administrative Judges:

The Staff of the Nuclear Regulatory Commission (Staff) is filing this day the Staff's Proposed Findings of Fact and Conclusions of Law Concerning Contention Utah E/Confederated Tribes F (Financial Qualifications). The Staff is submitting its proposed findings with respect to Utah Contention E in accordance with the Licensing Board's directive regarding the treatment of proprietary information. Therefore, the Staff's proposed findings are only being served on lead counsel for the Applicant and the State of Utah, the individual members of the Licensing Board, and the Assistant for Rulemakings and Adjudications in the Office of the Secretary, U. S. Nuclear Regulatory Commission.

Sincerely,

Catherine L. Marco

Catherine L. Marco
Counsel for NRC Staff

cc: Service List

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW CONCERNING CONTENTIONS UTAH R (EMERGENCY PLANNING) AND UTAH S (DECOMMISSIONING FUNDING)

Sherwin E. Turk
Catherine L. Marco

Counsel for NRC Staff

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I. BACKGROUND AND INTRODUCTION

1.1. These findings and rulings address all outstanding issues with respect to Contention Utah R (Emergency Plan/Onsite Fire Fighting); and Contention Utah S (Decommissioning Funding), concerning the application filed on June 20, 1997, by Private Fuel Storage, L.L.C. ("PFS" or "Applicant"), for a license under 10 C.F.R. Part 72 to possess spent fuel and other radioactive materials associated with spent fuel storage in an independent spent fuel storage installation ("ISFSI"), which PFS proposes to construct and operate on the Skull Valley Goshute Indian Reservation in Skull Valley, Utah.[1]

1.2. Notice of the Nuclear Regulatory Commission ("NRC")'s receipt and consideration of the PFS ISFSI license application was published in the Federal Register on July 31, 1997. 62 Fed. Reg. 41,099 (1997). If granted, the license would authorize PFS to store up to 40,000 metric tons uranium (MTUs) of spent nuclear fuel in dry cask storage systems at its proposed ISFSI. The Notice advised the Applicant and any person whose interest may be affected by the proceeding of their right to request a hearing by filing such

[1] Simultaneously herewith, the NRC Staff is filing separate proposed findings and conclusions of law concerning Contention Utah E/ Confederated Tribes F (Financial Assurance), which was the subject of *in camera* hearings, due to the proprietary nature of the evidence concerning that contention.

a request (and a petition for leave to intervene) by September 15, 1997. In response to the Notice, five petitions for leave to intervene were timely filed by various persons and entities, including the State of Utah.[2]

1.3 On September 15, 1997 (as reconstituted on October 1, 1997), this Atomic Safety and Licensing Board was established to rule on petitions for hearing and for leave to intervene and to preside over any adjudicatory proceeding that might be held in connection with the ISFSI application. 62 Fed. Reg. 49,263 (1997). On or about November 24, 1997, the petitioners timely filed a total of approximately 100 contentions which they sought to litigate in this proceeding.

1.4. The Licensing Board conducted an initial prehearing conference in Salt Lake City, Utah from January 27 to January 29, 1998 to provide the participants with an opportunity to make oral presentations on the issues of the petitioners' standing to intervene and the admissibility of their contentions.

1.5. On April 22, 1998, the Licensing Board issued its "Memorandum and Order (Rulings on Standing, Contentions, Rule Waiver Petition, and Procedural/Administrative Matters)," in which the Board determined, among other things, that the State of Utah and four other petitioners had demonstrated their standing to intervene in this matter,[3] and that many of their contentions, in whole or in part, satisfied the Commission's requirements for

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[2] The five initial petitions were filed by: (1) the State of Utah ("State"); (2) Ohngo Gaudadeh Devia ("OGD"); (3) Castle Rock Land and Livestock, L.C., Skull Valley Company, Ltd. (collectively, "Castle Rock"), and Ensign Ranches of Utah, L.C.; (4) the Confederated Tribes of the Goshute Reservation ("Confederated Tribes") and David Pete; and (5) the Skull Valley Band of Goshute Indians ("Skull Valley Band").

[3] The Licensing Board granted the petitions of the State of Utah, Castle Rock, OGD, the Confederated Tribes, and the Skull Valley Band; the petitions of David Pete, Ensign Ranches of Utah, L.C., and Scientists for Secure Waste Storage ("SSWS"), were denied. *See* LBP-98-7, 47 NRC at 157. Castle Rock later withdrew from the proceeding. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-6, 49 NRC 114 (1999).

admission as contested issues in this proceeding. The Licensing Board combined the intervenors' admitted contentions, many of which raised similar issues, into 26 consolidated contentions. *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 169-72, 183-238, 251-58 (1998).[4] The Board then issued a Notice of Hearing on the application. 63 Fed. Reg. 23476 (1998).[5]

1.6. Subsequent to its ruling on standing and the admissibility of contentions, the Licensing Board issued a series of procedural rulings in which it established a schedule for litigation in the proceeding.[6] Under this schedule, the admitted contentions were grouped into three categories, whereby Groups I and II contentions (involving various safety and safeguards issues) would be litigated first, while Group III contentions (involving mostly environmental issues) would be litigated later; this schedule generally tracked the NRC Staff's ("Staff") schedule for publication of its review of related issues, in its Safety Evaluation Report ("SER") for site-related issues, its final SER (for cask-related issues), its Draft Environmental Impact Statement ("DEIS"), and its Final EIS ("FEIS").

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[4] Two of the contentions addressed at this time had been consolidated with the contentions of the Castle Rock intervenors: Utah Contention E was consolidated with Contentions Castle Rock 7 and Confederated Tribes F, due to similarities in the issues raised (*PFS*, LBP-98-7, 47 NRC at 187); in addition, the admitted portions of Contention Utah S were consolidated with portions of Castle Rock 7 relating to decommissioning (*Id.*, at 196-97). When Castle Rock later withdrew from the proceeding, these two consolidated contentions were redesignated to delete the reference to Castle Rock's contentions, but they were otherwise left unchanged. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-6, 49 NRC 114, 119-20, 121 (1999).

[5] The Licensing Board later admitted three of the State's contentions challenging the adequacy of the Applicant's physical security plan. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-13, 47 NRC 360 (1998), *revised on reconsideration*, LBP-98-17, 48 NRC 69 (1998). In addition, the Board granted the late-filed petition to intervene submitted by the Southern Utah Wilderness Alliance ("SUWA"), and admitted one of that intervenor's contentions. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-3, 49 NRC 40 (1999).

[6] *See, e.g.,* "Order (General Schedule Revision and Other Matters)," dated February 2, 2000.

1.7. In accordance with the established schedule, commencing in May 1999, PFS filed a number of motions seeking summary disposition of various contentions, pursuant to 10 C.F.R. § 2.749. In a series of published decisions, the Licensing Board ruled upon those motions, in which it granted summary disposition of many contentions in whole or in part,[7] and denied certain other motions.[8] The Board also dismissed Contention Utah F/Utah P without opposition by the State; and it dismissed the remaining portion of Contention Security-C for lack of prosecution.[9]

1.8. Most recently, in an unpublished decision issued on March 10, 2000, the Licensing Board granted the Applicant's motion for partial summary disposition of a substantial portion of Contention Utah E/ Confederated Tribes F (financial assurance).[10] That ruling eliminated most of the issues in the contention, leaving only certain matters (the

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[7] *See* (1) *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-23, 49 NRC 485 (1999) (Utah C); (2) *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-31, 50 NRC 147 (1999) (Security-A, Security-B, and part of Security-C); (3) *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-32, 50 NRC 155 (1999) (Utah G); (4) *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-33, 50 NRC 161 (1999) (Utah M); (5) *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-34, 50 NRC 168 (1999) (Utah B); (6) *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-35, 50 NRC 180 (1999) (part of Utah K/Confederated Tribes B); and (7) *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-39, 50 NRC 232 (1999) (Utah N, and portions of Utah K/ Confederated Tribes B, Utah O, Utah R, and Utah S, relating to the proposed Rowley Junction intermodal transfer facility.

[8] *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-36, 50 NRC 202 (1999) (Utah R); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-42, 50 NRC 295 (1999) (Utah H).

[9] *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-26, 50 NRC 42 (1999) (Utah F/Utah P); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-00-5, 51 NRC 64 (2000) (Utah Security-C).

[10] *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-00-6 ("Memorandum and Order Granting in Part, Denying in Part, and Referring Ruling on Summary Disposition Regarding Contention Utah E/Confederated Tribes F") (slip op., March 10, 2000), *referral and petition for review pending.*

adequacy of the Applicant's construction and operating cost estimates, and onsite property insurance) for resolution through an evidentiary hearing.

1.9. As a result of these rulings, and the deferral of hearings on three other safety contentions,[11] four contentions remained for hearing in Groups I and II: Contention Utah E/ Confederated Tribes F (financial assurance); Contention Utah H (thermal design); Contention Utah R (emergency planning/onsite fire fighting); and Contention Utah S (decommissioning funding). On June 15, 2000, the State voluntarily withdrew Contention Utah H,[12] leaving three contentions to be considered in the initial set of evidentiary hearings (Contentions Utah R, Utah S, and Utah E/Confederated Tribes F).

1.10. Evidentiary hearings were held in Salt Lake City, UT, on June 19-22 and June 27, 2000, in accordance with a notice of hearing published in the Federal Register.[13] Numerous witnesses appeared on behalf of PFS, the State of Utah, and the Staff, as summarized below. In addition, limited appearance statements were received from many members of the public, in special sessions held in Salt Lake City on June 23-24, 2000.

1.11. These proposed findings of fact and conclusions of law present the Licensing Board's findings of fact with respect to the evidence presented at the June 2000 hearings concerning Contentions Utah R and Utah S, and the Board's conclusions of law with

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[11] Hearings on Contentions Utah K/Confederated Tribes B (Credible Offsite Hazards) and Utah L (Geotechnical) are currently scheduled to be held along with the hearings on environmental contentions, during the Summer of 2001. *See* Tr. 1387. Hearings on Contention GG (TranStor cask/pad stability) were deferred indefinitely, following the TranStor cask vendor's withdrawal of its application for cask certification.

[12] *See* "State of Utah's Notice of Withdrawal of Contention Utah H (Inadequate Thermal Design)" (June 15, 2000); Tr. 1384.

[13] *See* "Notice (Notice of Hearing and of Opportunity to Make Oral or Written Limited Appearance Statements)," 65 Fed. Reg. 24230 (April 25, 2000); "Notice (Revised Notice of Hearing and of Opportunity to Make Oral or Written Limited Appearance Statements)," 65 Fed. Reg. 37184 (June 13, 2000).

respect to these two contentions. Simultaneously herewith, separate findings of fact and conclusions of law are being filed concerning Contention Utah E/ Confederated Tribes F (Financial Assurance), due to the proprietary nature of the evidence submitted concerning that contention.

II. FINDINGS OF FACT

A. Contention Utah R

1. Background

2.1.1. As admitted by the Licensing Board, Contention Utah R asserted that the Applicant's Emergency Plan ("EP"), submitted by PFS with its license application, is inadequate to assure protection of the public health and safety in the event of an emergency at the PFS site or the Rowley Junction intermodal transfer point ("ITP"):

> 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:
>
> 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.

PFS, LBP-98-7, 47 NRC at 254; *see id.* at 195-96.

2.1.2. As set forth above, subparts 1 and 2 of Contention Utah R pertain to the Applicant's proposed use of an intermodal transfer facility at Rowley Junction, UT, where spent fuel transportation casks would be transferred from the main rail line to heavy haul

trucks for the final leg of transportation to the facility. These portions of the contention were resolved by summary disposition, in which the Licensing Board ruled that spent fuel transfer activities at the proposed ITP are part of the transportation function that falls within the scope of 10 C.F.R. Part 71 and applicable U.S. Department of Transportation (DOT) regulations, and are not litigable in this Part 72 license application proceeding. *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-34, 50 NRC 168, 176-77, 178 (1999) (Contention Utah B); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-39, 50 NRC 232, 236 (1999) (Contention Utah R, subparts 1 and 2).

2.1.3. With respect to subpart 3 of the contention, the State asserted that the PFS emergency plan fails to satisfy the requirements in 10 C.F.R. § 72.32(a)(5), and associated guidance provisions contained in (a) section 5.3 of Regulatory Guide ("Reg. Guide") 3.67, "Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities" (January 1992), and (b) Draft NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," Appendix C ("Emergency Planning") (October 1996).[14] According to the State, contrary to these provisions, the PFS Emergency Plan failed to describe the program for maintaining fire fighting equipment; and failed to show that the onsite water supply

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[14] The basis statement for Contention Utah E referred to Appendix C of Draft NUREG-1567, which contained detailed guidance pertaining to ISFSI emergency plans. Draft NUREG-1567, however, was superseded by publication of Final NUREG-1567 in March 2000; the final version of NUREG-1567 omitted former Appendix C, and stated that Reg. Guide 3.67 "contains the principal guidance" for preparation of an ISFSI emergency plan. *Id.*, § 10.4.5, at 10-13. On June 14, 2000, the Staff issued Interim Staff Guidance (ISG)-16, which revised § 10.4.5 of NUREG-1567. As revised, § 10.4.5 now omits reference to Reg. Guide 3.67 and incorporates much of former Appendix C in the text of NUREG-1567. *See* Letter from Sherwin E. Turk, Esq., to the Licensing Board, dated July 20, 2000 (attaching Memorandum from Earl P. Easton and Lawrence E. Kokajko to E. William Brach, dated June 14, 2000 ("Approval of Interim Staff Guidance Memorandum No. 16, Emergency Planning, Revision O"). The Licensing Board hereby takes official notice of ISG-16 and its explicit revision of NUREG-1567.

would be sufficient, particularly in light of the arid nature of the site and the demands which might be placed upon on-site water storage tanks and wells by the two fire trucks identified in the Applicant's emergency plan and fire trucks supplied by the Tooele County Fire Department.[15]

2.1.4. Pursuant to 10 C.F.R. § 72.24(k), an application for a Part 72 license must contain a safety analysis report ("SAR") describing the Applicant's plans for coping with emergencies, as required by 10 C.F.R. § 72.32. In accordance with 10 C.F.R. § 72.32(a), an application for an away-from-reactor ISFSI license must be accompanied by an emergency plan ("EP") that provides 16 specified categories of information. These include, without limitation, such matters as a description of the facility, types of radioactive materials accidents, the means for mitigating the consequences of such accidents, responsibilities of onsite personnel, commitments and means for notification and coordination with offsite authorities, emergency response training, and exercises. *See* 10 C.F.R. § 72.32(a)(1)-(16). Regulatory guidance concerning these requirements is set forth in § 10.4.5 of NUREG-1567 (March 2000), as revised by ISG-16 (June 2000); *see also* Draft NUREG-1567 (October 1996), Appendix C. *See* n.14, *supra.*

2.1.5. In June 1999, PFS filed a motion seeking summary disposition of subpart 3 of Contention Utah R, supported by affidavits and a statement of material facts.[16] Therein, PFS asserted that the adequacy of its water supply and fire-fighting capability were immaterial since its facility "is designed to withstand the effects of credible fires without firefighting by personnel or the operation of any automatic fire detection/ suppression

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[15] "State of Utah's Contentions on the Construction and Operating Licence Application by Private Fuel Storage, LLC for an Independent Spent Fuel Storage Facility," dated November 23, 1997, at 120, 121.

[16] "Applicant's Motion for Partial Summary Disposition of Utah Contention R - Emergency Plan," dated June 28, 1999 ("Motion- Utah R"). *See* discussion *supra*, at 4.

system" (Motion- Utah R, at 3). PFS' motion was supported by the Staff, albeit on different grounds: The Staff, supported by affidavits, stated its view that summary disposition should be granted because PFS' emergency plan established that its onsite firefighting capability and equipment, including fire brigade staffing and training, fire water tank capacity, and fire suppression systems, are adequate to respond to a fire. For its part, the State, supported by affidavit, disagreed with the positions of both PFS and the Staff.

2.1.6. In a ruling dated August 30, 1999, the Licensing Board denied PFS' motion for summary disposition of subpart 3 of this contention. *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-36, 50 NRC 202 (1999). The Board agreed with the Staff's observation that the PFS Emergency Plan includes certain fires within the emergency planning basis for the facility, warranting an emergency action level of Alert. *Id.*, at 207. The Board then found that a genuine dispute of material fact existed, as to whether the Applicant needs to consider fires involving a 6000 gallon diesel spill from the locomotives that are used to move rail cars into and out of the canister transfer building. *Id.*, at 207-08. As a consequence, subpart 3 of Contention Utah R was left to be resolved at an evidentiary hearing.

2. Applicable Legal Standards

2.1.7. As discussed above, the requirements for emergency planning at an away-from-reactor ISFSI are set forth in 10 C.F.R. § 72.32(a)(1)-(16). In particular, the emergency plan is required, *inter alia*, to describe the facility, each type of radioactive materials accident that may occur, means for mitigating the consequences of such accidents, responsibilities of onsite personnel, and emergency response training.

2.1.8. Pursuant to 10 C.F.R. § 72.32(a)(5), which is the focus of Contention Utah R, an ISFSI's emergency plan must provide the following:

> (5) *Mitigation of consequences.* A brief description of the means of mitigating the consequences of each type of accident, including those provided to protect workers onsite, and a description of the program for maintaining the equipment.

10 C.F.R. § 72.32(a)(5). The types of accidents to be addressed are discussed *infra* at 42.

2.1.9. Detailed guidance concerning the requirements of § 72.32(a)(5) is provided in § 10.4.5 of NUREG-1567, as revised by ISG-16. The guidance states, *inter alia*, that the plan should "describe the means and equipment provided for limiting the consequences of each type of accident identified in the plan"; "the actions and systems in place to reduce the magnitude and/or reduce the effect of a radioactive or hazardous material release that has occurred"; and "actions to be taken to limit and mitigate the consequences to public and workers." ISG-16, Enclosure at 7. The guidance further lists examples of the means for limiting releases, including sprinkler systems and other fire suppression systems, fire detection systems, firefighting capabilities, and use of fire-resistant building materials. *Id.* at 7-8. With respect to emergency response equipment and facilities, the guidance indicates that the emergency plan "should describe the onsite equipment and facilities designated for use during emergencies," *Id.* at 9, and that the plan should describe "the protective equipment and supplies available to emergency response personnel," such as individual respiratory equipment, protective clothing, and fire fighting equipment and gear. *Id.* at 10. In addition, the plan "should include criteria for issuing respiratory equipment, locations of emergency equipment and supplies, . . . means for distributing these items, . . . [and] inventory lists indicating the emergency equipment and supplies provided at specified locations." *Id.*

3. Testimony Presented

2.1.10. In accordance with the Licensing Board's scheduling Orders, prefiled written testimony concerning Contention Utah R was submitted by PFS, the State of Utah, and the

NRC Staff. The Applicant's witnesses appeared first, followed by the Staff's witnesses, with the State's witness testifying last.

2.1.11. The Applicant presented two witnesses in support of its application. These were: (1) Kenneth W. Dungan, a fire protection engineer and Principal in Risk Technologies, LLC, who evaluated the adequacy of fire protection measures at the PFS facility ("PFSF"), including PFS' firefighting capabilities to mitigate the consequences of a fire impinging or affecting spent fuel casks at the PFSF; and (2) Donald Wayne Lewis, an employee of Stone & Webster Engineering Corp. (S & W), who served as Lead Mechanical Engineer for the PFS project, and whose responsibilities included establishing the design basis and review of all design activities of the fire protection systems at the PFSF. "Testimony of Ken Dungan and Wayne Lewis on Fire Protection at the PFSF - Contention Utah R" (hereinafter referred to as "Dungan/Lewis"), Post Tr. 1456, at 1-3, and 3-4. In addition, following the presentation of other parties' testimony on this contention, PFS presented brief oral rebuttal testimony by Mr. Dungan. Tr. 1664-66.

2.1.12. Applicant witness Kenneth Dungan received a Bachelor of Science degree from the University of Maryland where he majored in Chemical Engineering and Fire Protection Engineering, and a Masters degree in Environmental Engineering from the University of Tennessee. Dungan/Lewis Post Tr. 1456, at 1; Dungan Qualifications, at 1. He is a registered professional engineer, a member of the American Institute of Chemical Engineers, and a Fellow and past President of the Society of Fire Protection Engineers. Dungan/Lewis Post Tr. 1456, at 1. Mr. Dungan has been involved in fire protection engineering for more than 30 years, with experience in hazards analysis, risk assessments, emergency planning, design, and research and testing. *Id.* at 2; Dungan Qualifications at 2-3. Mr. Dungan also has experience in firefighting as a volunteer and with industrial brigades, as well as in training of fire brigades and in pre-fire planning. He is familiar with

National Fire Protection Association (NFPA) standards,[17] and has served on several NFPA committees. Dungan/Lewis Post Tr. 1456, at 2. He has experience with fire protection at nuclear facilities, having worked as a fire protection engineer or consultant at various facilities, including oversight of an onsite fire department, developing firefighting strategies and establishing training and drilling requirements. *Id.* at 2-3. The Licensing Board finds Mr. Dungan to be well qualified as an expert witness on the subjects of fire protection and firefighting.

2.1.13. Applicant witness Wayne Lewis received a Bachelor of Science degree from Montana State University, where he majored in Civil/Structural Engineering, and is a registered professional engineer. Mr. Lewis has been employed by S & W for 17 years, with 19 years of experience in the nuclear power industry, including 10 years of experience with the design, licensing, construction, and operation of independent spent fuel storage installations (ISFSIs). With respect to the PFS facility, he has been responsible for preparation of the principal design criteria, design installation, and operating systems portions of the PFSF Safety Analysis Report, including fire protection systems. In his capacity as Lead Mechanical Engineer for the PFS project, he has overseen fire protection engineering activities for the facility. He has worked with and is knowledgeable of the NFPA standards related to nuclear facilities, including the design of suppression systems, flammable and combustible liquid piping systems, and combustion engines. Dungan/Lewis Post Tr. 1456, at 4; Lewis Qualifications at 2-3. The Licensing Board finds Mr. Lewis to be well qualified as an expert witness on the subject of fire protection.

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[17] The NFPA is a consensus standards development organization, which produces widely-accepted standards on fire safety. The NRC is represented on the NFPA committee that establishes standards for nuclear facilities. Dungan/Lewis Post Tr. 1456, at 2.

2.1.14. The Staff presented a panel of two witnesses concerning this contention. These were: (1) Paul W. Lain, a fire protection engineer in the NRC's Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, who reviewed the Applicant's Safety Analysis Report ("SAR") and Emergency Plan pertaining to fire protection and firefighting; and (2) Randolph L. Sullivan, an emergency preparedness specialist in the NRC's Division of Inspection Program Management, Office of Nuclear Reactor Regulation, who reviewed PFS' Emergency Plan and prepared Chapter 16 ("Emergency Plan") of the Staff's Safety Evaluation Report ("SER") concerning the PFSF. "NRC Staff Testimony of Paul W. Lain and Randolph L. Sullivan Concerning Contention Utah R (Onsite Fire Fighting Capability)" (hereinafter referred to as "Lain/Sullivan"), Post Tr. 1543, at 2.[18] *See* Staff Exhibit A, Ch. 16.

2.1.15. Staff witness Paul Lain is a board certified professional engineer with more than 16 years of experience in fire protection engineering. He received a Bachelor of Science degree in Fire Protection Engineering from the University of Maryland, and a Master of Science in Fire Protection Engineering from Worcester Polytechnic Institute. He has held technical and project management positions for the U.S. Navy, Department of Energy (DOE), and the NRC, in which he has performed a variety of duties including fire protection tests, inspections and design reviews. He has been employed as a fire protection engineer in the NRC Office of Nuclear Materials Safety and Safeguards since 1997, where he conducts fire safety reviews of fuel cycle facilities. Mr. Lain authored the Fire Protection Chapter of the Standard Review Plan for NRC fuel cycle facilities; and he currently conducts fire protection licensing reviews for fuel fabrication facilities licensed by

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[18] The SER referred to by Messrs. Lain and Sullivan is entitled "Safety Evaluation Report of the Site-Related Aspects of the Private Fuel Storage Facility Independent Spent Fuel Storage Installation," dated December 15, 1999, and revised and reissued January 4, 2000; the SER was admitted into evidence as Staff Exhibit A. *See* Tr. 1545.

the NRC. Mr. Lain is a member of the National Fire Protection Association, and has served on several NFPA standards committees. Lain/Sullivan Post Tr. 1543, at 1; Lain Qualifications at 1-2. The Licensing Board finds Mr. Lain to be well qualified as an expert witness on the subject of fire protection.

2.1.16. Staff witness Randolph Sullivan is a board certified health physicist with over 25 years of experience in emergency preparedness and radiological protection. He received a Bachelor of Engineering Science from the Illinois Institute of Technology, and has completed numerous U.S. Atomic Energy Commission training courses in health physics. Mr. Sullivan has served as a consultant to and has held senior positions in the commercial nuclear industry, and has managed the emergency preparedness program for a commercial nuclear power plant. He has also held responsible positions involving emergency preparedness, health physics and other matters for various DOE facilities. At the NRC, he has inspected health physics and emergency preparedness programs at various nuclear reactors and materials licensees. In his current position as an NRC Emergency Preparedness Specialist, he develops emergency preparedness inspection procedures and programs, and evaluates nuclear facility emergency plans to assure that they comply with regulatory requirements and can be implemented in a manner that protects public health and safety in the event of an emergency. Lain/Sullivan Post Tr. 1543, at 2; Sullivan Qualifications at 1-3. The Licensing Board finds Mr. Sullivan to be well qualified as an expert witness on the subject of emergency preparedness.

2.1.17. The State presented the testimony of Gary A. Wise, the State Fire Marshal for the State of Utah. Mr. Wise received an A.S. degree in fire science from Rancho Santiago College in Santa Ana, CA. He is certified as a Fire Officer II, and served as a firefighter for fifteen years as a member of the Anaheim, CA, Fire Department, and the Orem, UT, Department of Public Safety. He then served, over a period of about 13 years,

in progressively more responsible fire safety management positions in the Orem, UT Department of Public Safety, culminating in his service as Chief of that Department's Fire Division from 1990 to 1996. In December 1996, he was appointed by the Governor of Utah to his current position as Utah State Fire Marshal. Mr. Wise has been a member of various fire safety committees and organizations; he has served as President of the Greater Salt Lake Valley Chief Fire Officer's Association and the Utah State Fire Chief's Association, and he is a member of the National Association of State Fire Marshals. "Prefiled Testimony of Gary A. Wise on Behalf of the State of Utah Regarding Contention Utah R" (hereinafter referred to as "Wise"), Post Tr. 1588, at 1-2; Wise Qualifications at 1-2. The Licensing Board finds Mr. Wise to be well qualified as an expert witness on the subject of firefighting.

2.1.18. As more fully set forth below, having considered the testimony and other evidence presented by the parties, we find that the evidence supports a conclusion that the Applicant's emergency plan, and the fire hazard analysis contained in its SAR, provide reasonable assurance that the public health and safety will be adequately protected in the event of an emergency involving an on-site fire at the PFSF, and that PFS has adequately described the means and equipment for mitigation of such events. Our evaluation of this matter follows in the discussion below.

4. PFSF Fire Protection Design

2.1.19. Central to any determination as to the adequacy of the Applicant's emergency plan for response to a fire is an evaluation of the fire hazard which PFS must be prepared to address, as well as the facility's means of fire protection. In this regard, our analysis begins with consideration of the testimony considering the PFSF design as it pertains to fire safety, followed by consideration of the facility's proposed fire protection

systems and fire response.[19] We begin with a discussion of the evidence presented by the Applicant and Staff concerning the facility's design, fire hazards, and installed fire protection features (no evidence concerning these issues was presented by the State), followed by consideration of the evidence presented concerning PFS' fire brigade.

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[19] Minimum general design criteria (GDC) applicable to the design, fabrication, construction, testing, maintenance and performance of structures, systems, and components important to safety (SSCs) at an ISFSI are set forth in 10 C.F.R. § 72.120 *et seq.* With respect to fire hazards, the regulations provide:

> **§ 72.122 Overall requirements.**
>
> . . .
>
> (b) Protection against environmental conditions and natural phenomena. (1) Structures, systems, and components important to safety must be designed . . . to withstand postulated accidents.
>
> . . .
>
> (c) Protection against fires and explosions. Structures, systems, and components important to safety must be designed and located so that they can continue to perform their safety functions effectively under credible fire and explosion exposure conditions. Noncombustible and heat-resistant materials must be used wherever practical throughout the ISFSI or MRS, particularly in locations vital to the control of radioactive materials and to the maintenance of safety control functions. Explosion and fire detection, alarm, and suppression systems shall be designed and provided with sufficient capacity and capability to minimize the adverse effects of fires and explosions on structures, systems, and components important to safety. The design of the ISFSI or MRS must include provisions to protect against adverse effects that might result from either the operation or the failure of the fire suppression system.
>
> . . .
>
> (g) Emergency capability. Structures, systems, and components important to safety must be designed for emergencies. The design must provide for accessibility to the equipment of onsite and available offsite emergency facilities and services such as hospitals, fire and police departments, ambulance service, and other emergency agencies.

Guidance concerning these requirements is provided in NUREG-1567. *See* Lain/Sullivan, Post Tr. 1543, at 4-5.

2.1.20. In their testimony, the Applicant's witnesses generally described the layout of the PFS facility, the types of combustible materials that could require fire protection in order to avert the release of radioactive materials, as well as the available fire protection equipment, water supply, and personnel at the facility to respond to a fire event. They concluded that the fire protection measures at the PFSF, including PFSF firefighting capabilities, are adequate to mitigate the consequences of a fire impinging or affecting spent fuel casks at the PFSF. Dungan/Lewis Post Tr. 1456, at 3.

2.1.21. Staff witness Lain confirmed the adequacy of PFS' emergency planning and provisions for fire protection, with respect to fires that could involve a radiological release, based on his review of the SAR, the Emergency Plan, and PFS' responses to the Staff's Requests for Additional Information (RAIs) pertaining to fire protection equipment and firefighting capabilities. *See* Lain/Sullivan Post Tr. 1543, at 2; Tr. 1554, Tr. 1558-59. This included consideration of the facility's general layout; its building design; shipping, storage, and transfer cask designs; fire protection systems; water supply; credible fire scenarios; and fire fighting capability and equipment. Lain/Sullivan Post Tr. 1543, at 5. Based on his review, Mr. Lain concluded, *inter alia*, that the Applicant's description of its means and equipment to fight fires onsite is adequate to protect the health and safety of workers and the public. *Id.* at 5.

2.1.22. The layout of the PFSF site as it pertains to fire protection, is shown in three SAR diagrams (PFS Exhibits A, B and C). The Restricted Area will cover 99 acres and will also include the Canister Transfer Building ("CTB"), where spent fuel transportation casks will be delivered, either by rail or by heavy haul truck. In the CTB, the spent fuel canisters will be transferred from the transportation casks to storage casks, and then moved out to the concrete storage pads by cask transporter. As shown in PFS Exhibit A, the spent fuel storage casks will be located on concrete storage pads, with a crushed rock surface one

foot deep surrounding the storage pads and extending throughout the Restricted Area. Dungan/Lewis Post Tr. 1456, at 5, 6; PFS Exh. A.

2.1.23. The storage pads are relatively isolated in the northwest portion of the Restricted Area, in an area devoid of any significant combustibles. A minimum 200 ft fire break will be provided between any vegetation and the nearest storage pad. The proposed rail line will be 110 ft away from the storage pads, the CTB will be at a distance of 425 ft, the diesel fuel storage tank will be 700 ft away, and the nearest propane storage tank will be 1800 ft away. Lain/Sullivan Post Tr. 1543, at 5-6.

2.1.24. Significant sources of combustible material at the PFSF will be as follows: (1) diesel fuel in the fuel tank of the cask transporter vehicle (50 gallons); (2) diesel fuel in the fuel tanks of a heavy haul truck, if used (300 gallons); (3) the tires on a heavy haul truck; (4) the fuel and tires of other vehicles that could be present in the Restricted Area; (5) the fuel and tires of a diesel fuel delivery truck; (6) the fuel and tires of vehicles that do not enter the Restricted Area; (7) diesel fuel in the fuel tanks of the locomotives (6400 gallons), if used; (8) diesel fuel for the backup generator in the Security and Health Physics Building ("SHPB"); (9) diesel fuel in the tank for the diesel-driven water pump located outside the Restricted Area, near the SHPB; (10) the diesel fuel supply for the cask transporter, which will be located in an above-ground storage tank inside the Restricted Area approximately 200 ft northeast of the CTB and approximately 700 ft from the nearest storage casks; (11) the diesel fuel supply for the heavy-haul vehicles and on-site vehicles which will be stored in an above-ground storage tank located outside the Restricted Area, near the Operations & Maintenance Building ("OMB"); (12) propane in the tank(s) for heating the CTB and the SHPB, located south-southwest of the CTB, at least 1,800 ft from the CTB and the cask storage area; (13) propane in the tank(s) for heating the OMB and

Administration Building, located near those buildings; and (14) gasoline stored in gas cans in the OMB for use in various maintenance activities. Dungan/Lewis Post Tr. 1456, at 6-7; Lain/Sullivan Post Tr. 1543, at 7.

2.1.25. PFS intends to utilize fire protection measures at the PFSF that employ the "defense-in-depth" concept by minimizing the likelihood of fires; by providing detection systems and automatic and manual suppression systems for fires that may occur; and by providing compartmentalization and spill control to prevent the spread of fire, and structural fire resistance. PFS has committed to adhering to the standards of NFPA 801 in providing fire protection for the PFSF; NFPA 801 is a national consensus standard, developed with NRC participation, for providing fire protection for nuclear materials facilities. Dungan/Lewis Post Tr. 1456, at 7.

2.1.26. Regarding the structures, processes, and components at the PFSF, no combustibles are needed or used to move spent fuel, with the exception of diesel fuel for the vehicles (and the vehicles' tires). The structural materials, as well as the crushed rock surface within the Restricted Area, are noncombustible, and the building walls have fire resistance properties. Ignition sources are unnecessary as part of the facility's operation. Electrical equipment for lighting, ventilation, and cranes present a limited risk of small localized fires. *Id.* at 8.

2.1.27. The CTB (where spent fuel canisters will be transferred between the transportation and storage casks), is constructed of steel-reinforced concrete. As depicted in PFS Exhibit B, it is a large building, approximately 260 ft. long by 205 ft. wide. Spent fuel transportation casks are brought into the building in the cask load/unload bay at the south end of the building. The cask load/unload bay is 205 ft. long by 50 ft. wide with a 90 ft. ceiling over the center portion to accommodate the building's overhead crane and semi-gantry crane, and a 30 ft. ceiling over the east and west ends (but not over the transfer

cells); the bay will be protected by a foam-water sprinkler system that will be activated automatically. Transportation casks will be lifted by the overhead bridge crane and carried through the crane bay and into the transfer cells. Sumps and a spill retention threshold will keep any diesel fuel spilled from a truck in the cask load/unload bay out of the crane bay, away from a transportation cask, and away from the transfer cells. Dungan/Lewis Post Tr. 1456, at 8-9; Lain/Sullivan Post Tr. 1543, at 6.

2.1.28. The transfer cells are separated from each other and from the cask load/unload bay by a 30 ft. high concrete wall one foot thick. In the transfer cells, the spent fuel canisters will be transferred from the transportation casks to the storage casks. During a transfer operation the cask transporter vehicle will be excluded from the transfer cells by administrative procedure and the closed vehicle access doors. Thus, during the transfer, there will be no significant combustible materials in the transfer cells. As indicated in PFS Exhibit C, the building walls that separate the transfer cells from the cask load/unload bay, the crane bay, and the cask transporter bay are of fire resistant construction.[20] The crane bay and transfer cells will also be protected by smoke detectors, portable extinguishers, and hose stations for manual suppression. Dungan/Lewis Post Tr. 1456, at 8-9; Lain/Sullivan Post Tr. 1543, at 6.

2.1.29. The CTB will be protected from potential locomotive fuel spills and fires by excluding the locomotives from the interior of the CTB and by sloping the ground near the entrance to the CTB cask load/unload bay away from the building, to keep any spilled fuel out of the building. In addition to administrative controls, rail stops are clamped onto the rails in the CTB to provide assurance that a locomotive cannot enter the CTB. Storage

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[20] The cask transporter bay is separated from the transfer cells by a two hour fire barrier. Other "fire areas" in the CTB (office/equipment rooms, and the low level waste storage room) are separated from radiological areas by one-hour fire barriers. Lain/Sullivan Post Tr. 1543, at 6.

casks on the concrete storage pads are protected by virtue of being separated from the railroad tracks by a distance of approximately 110 ft. and by the slope of the ground near the tracks, away from the storage pads, that would isolate a spill of diesel fuel from a locomotive from the pads. The storage casks and the CTB are protected from other potential diesel fuel spills at the PFSF (e.g., from the backup diesel generator fuel tank, the diesel-driven water pump fuel tank, the diesel fuel storage tank located in the Restricted Area, or the diesel fuel storage tank located near the OMB) by virtue of the distance separating the casks from the sources of the diesel fuel. Dungan/Lewis Post Tr. 1456, at 9.

2.1.30. In his review of the application, Staff witness Lain confirmed that the Applicant's building design is adequate from a fire safety perspective. Under the ISFSI general design criteria in 10 C.F.R. § 72.122(c),[21] non-combustible and heat-resistant materials must be used wherever practical throughout the ISFSI. The CTB is constructed of concrete, which meets the non-combustible criteria and can withstand the effect of large fires for long periods of time. The size of the facility is also beneficial, in that the heat from a fire would dissipate in the high bay, allowing more time before the building becomes untenable for workers to egress and emergency response personnel to suppress the fire. The segregation of the transfer cells with concrete walls is beneficial because it shields the transfer operation from a fire in the load/unload bay; the cask transporter will also be segregated from the transfer cells during transfer operations with a two-hour fire rated barrier. Further, he found beneficial certain design features described in the SAR, whereby the fuel spills from transportation vehicles are controlled through such features as floor

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[21] The structures, systems and components (SSCs) important to safety at the facility have been identified by PFS as the spent fuel canisters, storage casks, storage pads, transfer casks, associated lifting devices, bridge crane, semi-gantry crane, canister transfer building, and seismic support struts. The cranes, lifting devices, support struts, and transfer casks will be located within the CTB; the storage pads are located within the northwest portion of the RA. Lain/Sullivan Post Tr. 1543, at 9.

drains and slopes to prohibit fuel from entering a transfer cell from a cask transporter spill; a one-inch threshold between the transport bay and the load/unload bay and sloping the load/unload bay floors, to divert a heavy haul vehicle fuel spill away from transfer cells and shipping casks into two large sumps; and sump capacity adequate to hold the fuel load from the heavy haul vehicle and a 30-minute flow from the foam water deluge system. Lain/Sullivan Post Tr. 1543, at 8-9.

2.1.31. The Applicant's witnesses evaluated the potential fire hazards at the facility, and concluded that none of the potential fire hazards presented by the building, equipment, or processes at the PFSF are severe enough to breach the fuel storage canisters -- which is a prerequisite to the release of a significant quantity of radioactive material to the environment. Further, they concluded that the fire protection proposed for the PFSF is more than adequate, and meets or exceeds all applicable NRC requirements. Dungan/Lewis Post Tr. 1456, at 9, 10.

2.1.32. Fire protection measures at the PFSF include both automatic and manual fire suppression capabilities intended to control any credible fire events. Automatic foam water sprinkler systems are planned for the cask load/unload bay in the CTB (but not in other areas of the CTB), where railcars or heavy haul trucks will bring in transportation casks; this means of fire suppression is very effective on fuel spill fires; in addition, portable extinguishers and hose stations will be available. In the canister transfer cells there will be no sprinklers, but portable extinguishers and hose stations will be available. Finally, as discussed above, provision has been made for the containment of spills and fires by barriers, curbs and drains, which minimize the potential for fire spread. *Id.* at 10; Tr. 1479.

2.1.33. The Applicant evaluated the possible fire scenarios which might affect the spent fuel casks at the PFSF. These fall into three major categories: (1) diesel fuel and gasoline spills and truck tires; (2) propane gas fires; and (3) in-situ process combustibles

(electrical cables, motor windings, etc.). The Applicant concluded that the breaching of a spent fuel canister confinement by any fire at the facility is not credible. The quantity and nature of the combustibles associated with the structures and processes are not capable of sustaining a fire of sufficient intensity and duration to significantly damage the storage or transfer casks. Dungan/Lewis Post Tr. 1456, at 10.[22]

2.1.34. With respect to fires involving diesel fuel or gasoline spills at the PFSF, the Applicant considered both interior and exterior spill fires. Interior fires include diesel spills from a heavy-haul truck in the cask load/unload bay and diesel spills from a cask transporter in a transfer cell or in the transporter bay. Exterior spills include spills from vehicles such as a diesel locomotive in the PFSF Restricted Area, from diesel fuel storage tanks, and the backup diesel generator tank. The Applicant's analysis showed that fires involving diesel or gasoline spills from any of the diesel fuel or gasoline sources on the PFSF site would not threaten the integrity of a spent fuel cask. *Id.* at 11-12.

2.1.35. The cask transporter at the PFSF would be used to transfer loaded concrete storage casks between the CTB and the concrete storage pads and to transport empty spent fuel storage cask overpacks to the CTB for loading. Its fuel tank will have a maximum capacity of 50 gallons of diesel fuel. The cask transporter will enter the fuel transfer cells but, through the use of physical and administrative means, it will be excluded from the transfer cell during canister transfer operations (*i.e.*, any time when a spent fuel

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[22] The Applicant's analysis of fire hazards focused on areas of the site where fires could result in a release of radioactive materials, rather than on areas like the Administration Building where a fire would not present this threat. This is consistent with the Staff's understanding of the appropriate scope of such analyses. *See, e.g.*, Lain/Sullivan Post Tr. 1543, at 5-7; Tr. 1476-77, Tr. 1554, Tr. 1558, Tr. 1574-75. Moreover, as set forth in our Conclusions of Law *infra*, we conclude that this approach satisfies the requirements of 10 C.F.R. § 72.32(a)(2) and (5).

canister is outside of its shipping or storage cask). *Id.* at 12, 13-14. In addition, the CTB is designed with sloped floors, so that any diesel fuel spilled outside of a transfer cell will not flow into a transfer cell. Thus, a cask transporter fire would not affect a transfer cask or an open transportation or storage cask. With respect to cask transporter fires involving a sealed transportation or storage cask, PFS presented an analysis showing that they can safely withstand fires involving 50 gallons of diesel fuel, without a loss of canister confinement integrity and a release of radioactive material. Further, the CTB will have hose stations and exterior fire hydrants that would provide sufficient water to extinguish a cask transporter fire. Accordingly, PFS concluded that a fire involving the cask transporter would not result in a release of radioactive material. *Id.* at 13, 14.

2.1.36. PFS also conducted an analysis of fires involving a heavy haul truck, which might be used to bring transportation casks to the PFSF from the ITP if a rail line to the facility is not built. Each truck will have fuel tanks with a total capacity of 300 gallons of diesel fuel. In the event of a fuel spill in the CTB cask load/unload bay, the fuel would be contained by a raised threshold between the bay and the transfer cells. Further, the bay floors will be sloped toward one of two sumps, and the sumps will slope away from the central area where a shipping cask and crane lifting cables will be located -- assuring that diesel fuel spilled from a heavy haul truck would be directed away from the transportation cask and important to safety equipment. In addition, the load/unload bay will have an automatic foam-water sprinkler system with three sprinkler zones, a design discharge density of at least 0.16 gal/min./sq. ft in accordance with NFPA 16, and a 10-minute foam capacity and 60-minute water capacity in accordance with NFPA 801. *Id.* at 14-15; PFS Exhibit B. The Applicant's analysis concluded that a diesel fire involving a heavy haul truck

at the PFSF would not threaten the integrity of a spent fuel cask such that a release of radioactive material or a radiological hazard to PFSF workers would result. *Id.* at 15-16.

2.1.37. The Applicant also considered a fire involving a heavy haul truck, in which the truck tires burn at the same time as the spilled diesel fuel. A heavy haul vehicle could have up to 122 tires, measuring approximately 10 inches wide by 36 inches in diameter. PFS' analysis showed that the size of the fire would be limited by the load/unload bay floor sumps; only one axle of tractor or trailer tires would be ignited; and the total heat release rate is not sufficient to damage the shipping cask or CTB. Calculations of the plume temperatures for this scenario verify that it is not severe enough to cause structural damage to the CTB or to any of the spent fuel containers located therein, even if no action is taken to suppress the fire. Further, any fire involving spilled diesel fuel would likely be extinguished by the sprinkler system before any of the truck tires were ignited. *Id.* at 16-17.

2.1.38. The effects of any fire that could result from a fuel spill involving vehicles other than the cask transporter or heavy haul vehicle are bounded by the effects of the vehicle fires discussed above (or, in the case of the diesel fuel supply truck, by PFS' analysis of locomotive fuel spills and fires, discussed *infra*). *Id.* at 17.

2.1.39. PFS also considered a fire involving diesel locomotives which may be used to take transportation casks to and from the PFSF on a proposed rail line.[23] PFS may use either a mainline locomotive, or a "shortline" or switching locomotive, to move spent fuel cars into the CTB. The locomotive(s) will bring railcars into the Restricted Area and will then be rearranged so that a single locomotive would push a loaded railcar into the CTB,

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[23] The locomotives would be used only under the Low rail line transportation alternative, and would not be used simultaneously with the heavy haul truck/ITP transportation alternative. Dungan/Lewis Post Tr. 1456, at 19.

with a 66-ft spacer car placed between the loaded railcar and the locomotive. *Id.* at 18; Lain/Sullivan Post Tr. 1543, at 12.

2.1.40. The locomotives will be prevented from entering the CTB, through the use of administrative procedures as well as by physical means. The dimensions of the cask and spacer railcars assure that when the cask is positioned in the center of the bay, in preparation for pickup by the overhead bridge crane, the locomotive will remain outside the building. Rail stops will be clamped to the railroad tracks to ensure that this commitment is not violated. Dungan/Lewis Post Tr. 1456, at 19; Tr. 1474.[24] With the transportation cask in this position, the locomotive would be about 16 ft. outside the CTB, with its fuel tanks about 36 ft. outside the CTB. *Id.* at 19. Also, the concrete apron in front of the CTB, where the rail line enters, will be sloped away from the building so that locomotive fuel spills and fires outside the CTB are physically prevented from flowing into the CTB. *Id.* at 19.[25]

2.1.41. Physical means will also prevent a fuel spill from a locomotive traveling near the concrete storage pads from adversely affecting the casks that are stored there. The natural land contour of the PFSF site has a downward slope from the rail lines to the cask storage area. The rail line will be located no closer than 110 ft. from the nearest storage pad. In order to prevent diesel fuel spilled from locomotives situated on the rail lines from approaching the cask storage area, PFS will alter the slope of the terrain by inserting a rise or uphill grade between the rail line and the cask storage area sufficient to prevent the

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[24] While a railcar could derail if it approached the rail stop too rapidly, it would not tip over. Tr. 1474, 1475. In the event of such a derailment, PFS would use the nearby CTB crane to move the shipping cask from the car to another location, and would then use the CTB crane or a mobile crane to move the car back onto the tracks. Tr. 1523-24.

[25] In addition, fire hydrants will be located near the CTB which would provide water to aid in extinguishing a locomotive diesel fuel fire outside the CTB. Dungan/Lewis Post Tr. 1456, at 20.

complete fuel inventory of two mainline locomotives (i.e., 6400 gallons) from overflowing this engineered rise. *Id.* at 19-20. Lain/Sullivan Post Tr. 1543, at 11.

2.1.42. The Applicant's analysis showed that these measures are sufficient to prevent a diesel fire involving the locomotives from threatening the integrity of a spent fuel cask and thus causing a release of radioactive material or a radiological hazard to workers at the PFSF. The analysis conservatively assumed no sloping of the tracks away from the storage casks, and that all four fuel tanks on two coupled 3000-horsepower locomotives were full and ruptured simultaneously, to yield a 6,400 gallon spill. Dungan/Lewis Post Tr. 1456, at 20-21; Tr. 1472-73, 1517-18.[26] The analysis showed that the radiative heat flux and (negligible) convective heat input to the distant storage casks would be significantly lower than the radiative heat flux and convective heat input involved in the cask transporter fire, which was assumed to encircle the cask. Therefore, the thermal effects of the cask transporter fire, discussed above, bound the thermal effects associated with the postulated locomotive diesel fuel fire. *Id.* at 20-21. Further, a locomotive fire would not threaten the integrity of a spent fuel transfer cask at the PFSF, in that the transfer cask would be shielded from the heat flux from the fire by the walls of the CTB. *Id.* at 21.

2.1.43. PFS also considered the effect of fire involving the diesel fuel storage tank, the backup diesel generator tank, and the diesel-driven water pump fuel tank at the PFSF. PFS concluded that these tanks do not present a threat to the spent fuel storage casks or the CTB, and the effects of a fire involving one of these tanks would be bounded by the locomotive spill fire. *Id.* at 22-23.

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[26] This analysis bounds the potential effects of a diesel fuel spill and fire involving the shortline or switching locomotive, which holds 1100 gallons of diesel fuel. Dungan/Lewis Post Tr. 1456 at 20; Lain/Sullivan Post Tr. 1543 at 8.

2.1.44. In addition, PFS evaluated fires involving propane, which is to be used at the PFSF for heating. Propane for heating the CTB and SHPB will be stored in an above-ground storage tank (or group of tanks) having a total volume of up to 20,000 gallons, to be designed in accordance with the requirements of NFPA 58. The tank(s) would be located no closer than 1,800 ft from the CTB and the nearest cask storage pads. The propane heaters at the CTB will be roof-mounted and configured such that the propane gas does not enter the building itself; rather, heated air will be blown into the building by fans and ducts. PFS provided details concerning features of the propane distribution system designed to minimize the potential for propane leakage or excess flow; PFS also committed to design the propane distribution system in accordance with NFPA 58, and to install the propane heating system in accordance with NFPA requirements. *Id.* at 22-23.

2.1.45. In its analysis, PFS determined that the likelihood of an unconfined vapor cloud explosion from the propane used for heating is extremely low. *Id.*; Tr. 1529-30. Propane tanks meeting ASME pressure vessel design requirements and NFPA 58, Liquefied Petroleum Gas Code piping and valving requirements, minimize the likelihood and size of gas releases. A release that is so large and rapid that it does not disperse is not possible without a tank failure; obstructions that would help a pressure wave to develop do not exist near the tank(s); and there is no nearby ignition source capable of igniting a large release. Dungan/Lewis Post Tr. 1456, at 24.[27] PFS also considered the potential for flash fires or boiling liquid expanding vapor explosions involving propane; these events were determined to be unlikely, but more credible than an unconfined vapor cloud explosion at

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[27] PFS had proposed to use a single 20,000 gallon propane tank; it plans to modify this proposal, however, so as to use four 5,000 gallon tanks instead of a single tank, to reduce the potential for a pressure wave exceeding 1 psi at the CTB in the event of a delayed vapor cloud ignition. Tr. 1530-33; Tr. 1535.

the PFSF. However, these events would not threaten the integrity of a spent fuel cask or canister at the PFSF. *Id.* at 24-25. Finally, PFS considered propane fires involving the propane heaters used to heat the CTB. The propane would not enter the CTB, but would be burned in a heater furnace outside the building. All propane components such as the heaters must comply with the requirements of NFPA 54, The National Gas Code, which ensures that gas burning devices are equipped with safety devices or control systems that would minimize fire propagation. *Id.* at 25.

2.1.46. Finally, PFS considered the potential effect of a fire involving in-situ combustibles. At the PFSF, such combustibles are limited in types and quantities. Fires involving such materials would be mostly small electrical fires, which would not pose a threat to any spent fuel storage configuration at the PFSF. Outside the electrical equipment room, all electrical cable will be encased in conduit (or duct bank), which will protect against potential electrical fires. Dungan/Lewis Post Tr. 1456, at 25; Tr. 1485. In addition, fire pumps are located outside the Restricted Area and have a separate electrical wiring circuit, so that a fire in the CTB would not impact or affect the fire pumps' operability. Tr. 1527.

2.1.47. In conclusion, PFS' witnesses expressed their view that the scenarios discussed above represent the bounding fire scenarios involving radioactive materials at the PFSF. Further, they concluded that none of the fire scenarios discussed above would cause a release of radioactive material since, in each case, the potential fire exposures are not capable of breaching the spent fuel confinement. *Id.* at 25-26.

2.1.48. Staff witness Lain confirmed the adequacy of the Applicant's analysis and its description of credible fire events. He found that the Applicant's SAR reviews the bounding credible fire scenarios, involving diesel fuel in the cask transporter (50 gallons),

the heavy haul vehicle (300 gallons), and the locomotives (6400 gallons). Lain/Sullivan Post Tr. 1543, at 10-11. With respect to the two scenarios evaluated for the cask transporter (one at the storage pad, and one in the transfer cell), the effects of each scenario were bounded by the cask vendor's (Holtec International) evaluation of a 15-minute fire involving 200 gallons of diesel fuel. *Id.* at 11.[28] With respect to the postulated heavy haul vehicle fire in the load/unload bay, the Applicant's computer analysis showed (a) that the facility's concrete structure can withstand this fire without collapse, and (b) the upper layer temperature in the transfer bay would not affect a loaded transfer cask, since the temperature is one-half less than would be needed to cause flashover of the facility's contents (flashover occurs when the upper layer temperature is high enough to cause most of the combustibles within the fire area to auto-ignite). Further, this analysis was conservative since it did not take into account the benefits of the smoke removal

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[28] Mr. Lain further found that PFS had adequately described the storage cask's construction, consistent with NUREG-1567, which provides that "[t]he reviewer should verify that the fire conditions of the worst case, credible site fire do not exceed the fire assumptions made in the fire analysis of the cask." Lain/Sullivan Post Tr.1543, at 9; *see* NUREG-1567, § 6.5.5.2. Mr. Lain was satisfied, based on the PFS and Holtec analyses, that the HI-STORM storage cask will be able to withstand the effects of fires at the PFSF. Holtec had evaluated the thermal effects on a loaded HI-STORM storage cask for a 15-minute 200-gallon diesel fuel fire, for 15 minutes, showing that only a few inches of the heavy concrete structure is affected and the canister is maintained within accepted thermal limits; this bounded the PFS bounding scenario of a cask transporter fire, involving 50 gallons of diesel fuel that is expected to burn for less than five minutes. *Id.* at 9-10. Similarly, the transfer cask is protected by lead shielding and a water jacket, which act like a heat sink, slowing the thermal insult on the canister during a fire. The bounding fire threat to a loaded transfer cask involves a fire in the load/unload bay. PFS analyzed the effects on a transfer cask during an unmitigated bounding fire, and concluded that the calculated maximum temperatures were below the short term temperature limits for the steel canister shell and transfer cask, and that these temperatures pose no threat to the structural integrity of steel canister and transfer cask. *Id.* at 10. Accordingly, the Staff concluded, based on its review of the cask construction, that the maximum credible (i.e., the bounding) fire scenario does not present a threat to the integrity or performance of the HI-STORM storage cask, transfer cask, or steel canister. *Id.*

system, the load/unload bay drainage, the foam-water deluge system, and manual efforts to mitigate the fire before these temperatures are reached. *Id.*

2.1.49. Mr. Lain similarly accepted the Applicant's evaluation of the effects of a 6400 gallon locomotive diesel spill, noting that PFS calculated the heat flux from three different size pool fires and determined that the resulting heat flux on the storage casks was bounded by the heat flux in the cask transporter fire, and therefore this scenario was bounded by the effects of the transporter fire.[29] He further found that the means proposed by PFS to prevent the locomotive from entering the CTB provide adequate assurance that the locomotive will not enter the CTB. *Id.* at 11-12.

2.1.50. In addition, Mr. Lain considered the planned storage of diesel fuel in the Restricted Area to be acceptable. The diesel storage tank will be on a concrete pad, will be double walled and will hold 1000 gallons of diesel fuel for refueling the cask transporter and the emergency generator (in contrast, the locomotive and heavy haul vehicle will be refueled outside the RA).[30] The location and fire protection design of the diesel fuel storage tank are adequate to protect against a fire which could affect the containment of radiological material. *Id.* at 7.

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[29] Messrs. Lain and Sullivan believed the locomotive fuel tanks were unlikely to explode during a fire. Tr. 1581-83. Applicant witness Dungan agreed, stating that an explosion of the tanks was very unlikely since tank failure could only occur in the event of over-pressurization (which is prevented by a design feature) or a puncture (which would result in a spill rather than an explosion). Tr. 1664-65.

[30] The diesel storage tank will be installed in accordance with NFPA 30, "Flammable and Combustible Liquids Code," UL-142, "Above Ground Tanks for Flammable and Combustible Liquids," and UL-2085, "Insulated Secondary Containment for Aboveground Storage Tanks, Protected"; UL-2085 requires the tank to meet a two hour liquid pool fire test, vehicle impact, and projectile resistance criteria. Lain/Sullivan Post Tr.1543, at 7.

2.1.51. The diesel generator day tank will hold 350 gallons and will be located in the SHPB. This tank will be a dual wall sub-based tank in accordance with NFPA 37, "Installation and Use of Stationary Combustion Engines and Gas Turbines." An automatic sprinkler system will be provided to protect against a fire in the diesel generator room, and one hour fire rated barriers will segregate the room from the rest of the building. A diesel generator day tank fire will not affect the containment of radiological material. *Id.* at 7-8.

2.1.52. With respect to the Applicant's fire protection systems, Mr. Lain concluded that PFS' description is adequate. Under the general design criteria in 10 C.F.R. § 72.122(c), fire detection, alarm, and suppression systems are to be designed and provided with sufficient capacity and capability to minimize the adverse effects of fires on structures, systems, and components (SSCs) important to safety. The Applicant's SAR discusses the use of a foam-water deluge system in the load/unload bay. The foam-water deluge provides superior suppression of Class B fires (applicable here), around the heavy haul vehicle. Fire hoses and portable extinguishers will be provided for quick deployment. Hydrants will be located near buildings to support manual fire suppression from the fire trucks. Two fire pumps, one electric and one diesel, and two water tanks are provided for redundancy. The SAR also describes the smoke detection, fire alarms, and a smoke removal system for the CTB. In accordance with NFPA 72, smoke detection will be provided for early warning to the building occupants. The fire alarm annunciates within the CTB and at a central alarm panel in the SHPB for continuous 24-hour a day monitoring.[31] Smoke removal is provided by the CTB's exhaust ventilation fans and should reduce the

[31] Mr. Lain described the SHPB as "the control point" for the Restricted Area. It houses the central monitoring alarm station, fire brigade equipment, and the emergency diesel generator; and it is the central point for dispatching the fire brigade. Lain/Sullivan Post Tr. 1543, at 7.

smoke level and upper layer temperature of the transfer bay during a fire. These systems provide adequate mitigation of the CTB fire risk to reduce the impact on SSCs important to safety. *Id.* at 12.[32]

5. Water Supply for Fighting Fires

2.1.53. As discussed above, the CTB cask load/unload bay is to be protected by a foam-water sprinkler system in accordance with NFPA 16. The PFSF will also have hose stations inside the buildings on-site, designed and located in accordance with NFPA 14, and fire hydrants outside the buildings, designed and located in accordance with NFPA 24. Dungan/Lewis Post Tr. 1456, at 28. NFPA requirements (including NFPA 24), to which PFS has committed, establish standards applicable to the design and required pressure of piping to the hydrants and sprinkler systems. Tr. 1504.

2.1.54. The water supply for fighting fires at the PFSF will be provided by two tanks of 100,000 gallons each and two fire pumps (an electric pump and a backup diesel pump). *Id.* at 28; Tr. 1480.[33] This water supply has been determined to be more than enough for firefighting at the PFSF. PFS considered the possible fire scenarios identified for the PFSF and the fire protection measures and systems that will be employed there, and determined that its proposed water supply is conservative. Water supplies are typically sized for the maximum fire flow demand. For the PFSF, the biggest demand would be presented by the

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[32] In response to an inquiry by Administrative Judge Lam, the Staff's witnesses further stated that they did not identify any credible scenario in their review, in which fuel canister radiation levels would interfere with or adversely affect the Applicant's firefighting capacity. Tr. 1580.

[33] PFS had previously indicated that it would have two 200,000-gallon water tanks, but reduced this commitment in light of the actual water requirement for the facility. Dungan/Lewis Post Tr. 1456, at 28.

sprinkler system in the cask load/unload bay; PFS calculated that the worst case water demand required by NFPA standards would be 63,000 gallons, which PFS states would bound any other water requirement at the PFSF. *Id.* At 28. PFS will provide a second full water tank, identical to the first, to meet the NFPA 801 requirement that a water supply tank should be capable of being refilled within 8 hours. *Id.* at 28-29. PFS' witnesses concluded that the water supply proposed for PFSF is more than adequate, and the excess capacity and redundant tanks and pumps make it extremely reliable. *Id.* at 29.[34]

2.1.55. The Staff concluded that the Applicant's description of the water supply is adequate. NFPA 13 requires that PFS specify the largest fixed fire suppression system demand and hose stream allowances. PFS has calculated this demand and has specified that two, 100,000 gallon water tanks will be provided for a primary and secondary water supply. The largest fixed fire suppression system is the foam-water deluge system installed to protect the CTB load/unload bay area; this system should be adequate to suppress the bounding fire scenario for the load/unload bay area, involving the heavy haul vehicle. Since NFPA 801 requires an eight hour refill time, PFS plans to provide an equal secondary supply. *Id.* at 13.

2.1.56. The Staff performed an independent calculation of the PFSF water requirements, and concluded that the worst case scenario would require approximately 93,000 to 94,000 gallons of water, rather than the 63,000 gallons calculated by PFS. The Staff, however, was satisfied that a 100,000 gallon tank is adequate to satisfy this demand. Tr. 1518, Tr. 1562-63, Tr. 1575, Tr. 1579-80. In sum, the Staff concluded that PFS will have an adequate water supply for firefighting. *Id.* at 13.

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[34] Water for the two tanks would be supplied by either onsite wells or offsite water supply systems, such as the Skull Valley Band Reservation. Tr. 1485-86.

2.1.57. The Applicant has stated that it will obtain water from one or more wells drilled on-site, from the reservation's existing supply, or from additional wells drilled on reservation property. While the State questioned whether PFS has obtained permits to dig the planned wells (*see, e.g.*, Tr. 1563), no reason has been shown why PFS could not obtain the necessary water from the Skull Valley Goshute Reservation (from whom it will lease the site), or from commercial sources, even if it is unable to obtain a well permit. Accordingly, in light of the evidence discussed above, the Board finds that the water supply proposed for PFSF is adequate.

6. The PFS Fire Brigade

2.1.58. PFS will establish a fire brigade for use in response to a fire emergency. The fire brigade will consist of a minimum of 5 personnel, who will be trained and equipped as a structural fire brigade in accordance with NFPA 600, "Standard on Industrial Fire Brigades" (Staff Exhibit B; State Exhibit 6). Dungan/Lewis Post Tr. 1456, at 26; Tr. 1499; PFS Exhibit G, EP at 4-3. However, at least 11 persons will be trained to serve on the fire brigade during normal hours of operation (*i.e.*, the "day shift"), which is when transfer operations are expected to occur. Tr. 1499, Tr. 1508-09, Tr. 1525; PFS Exhibit G, EP at 4-3; State Exhibit 1, Fig. 4-1.[35] Fire brigade personnel will be drawn from the PFSF operations staff, and will serve in positions relating to cask transfer when not serving on the fire brigade. Tr. 1507, Tr. 1511; PFS Exhibit G, EP Fig. 4.1.

2.1.59. In view of the identified fire scenarios and fire protection measures that will be employed at the PFSF, the fire brigade is expected to play a minimal role in mitigating

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[35] PFS is not restricted from conducting operations during off-hours. Tr. 1528. In the event that transfer operations extend beyond normal hours of operation, the fire brigade would continue to be available, since the brigade members would be at the PFSF to perform their assigned transfer operation duties. Tr. 1528-29.

the consequences of any fire involving radioactive materials. For example, the fire brigade would extinguish fires that are too small to actuate the automatic suppression systems, and would perform support functions to ensure that fire pumps are running, personnel evacuate properly, and utilities (power and fuel) are shut off as appropriate. For outside fires, the brigade's role in most cases will be to control the burning to limit fire exposures, and assist in suppressing a transporter or other vehicle fire. Dungan/Lewis Post Tr. 1456, at 26.

2.1.60. The PFS witnesses stated that the fire brigade members' other duties should not interfere with their ability to participate in the fire brigade. Tr. 1526. For example, not all persons who have operating duties would be engaged in transfer-related activities at the same time, and persons who are not actively engaged in transfer-related duties would be available to assume their fire brigade duties immediately without affecting the transfer operations. Tr. 1527. The Staff likewise concluded that fire brigade personnel should be able to respond rapidly in the event of a fire, notwithstanding the workers' operational responsibilities and the possibility that they may have to place their equipment in a safe condition before responding. Tr. 1566. Accordingly, this does not present an outstanding concern.

2.1.61. PFS determined that scenarios requiring a fire brigade response inside the structures are only credible during normal hours, since the heavy haul trucks, spent fuel cask transporters, and locomotives will not operate during "normal off-hours" (i.e., when no operations are underway). Dungan/Lewis Post Tr. 1456, at 26-27; Tr. 1512-13. During off-hours, an interior fire requiring a prompt fire brigade response is unlikely. For example, even if an electrical fire were to occur during off-hours, it would not require a prompt response since the absence of other combustibles would preclude an electrical fire from threatening the integrity of a spent fuel canister or the structural integrity of the CTB.

Dungan/Lewis Post Tr. 1456, at 26-27. The Staff agreed with PFS' determination that no credible fire would occur during off-hours that would cause a radiological release. Tr. 1576-77, Tr. 1578, Tr. 1583.

2.1.62. Because a prompt response will not be required during off-hours, in the event of a fire during off-hours PFSF security personnel would employ a call-in procedure to muster fire brigade members from off-site to respond to the fire. Security personnel, who will be trained in fire response, will not engage in firefighting; rather, their only role would be to assess the fire and promptly notify the fire brigade, as PFS will make clear in the SAR and Emergency Plan. Dungan/Lewis Post Tr. 1456, at 27; PFS Exhibit G; Tr. 1462-63, 1466, 1512; *see* Tr. 1570. PFS has estimated that about 90 minutes may be required for the fire brigade members to arrive at the site during off-hours, based on the probable location of their residences (which is not known, as yet). Tr. 1515, Tr. 1571-72; State Exhibit 2, at 2.

2.1.63. The PFS SAR and Emergency Plan indicate that offsite assistance may be requested from the Tooele County Fire Department. PFS Exhibit G, SAR at 9.5-2, EP at 3-5. However, because the Tooele County fire department is a volunteer force and its members hold other full time positions, they might not be readily available to respond to a call from PFS; also, because the City of Tooele is located over 50 miles from the PFSF, it would likely take up to 90 minutes for the fire department to arrive at the PFSF. Wise Post Tr. 1588, at 3; State Exhibit 2, at 1-2.

2.1.64. The evidence showed that the PFS site's distance from the nearest fire department is not significant. Both PFS and the Staff agree that PFS must be self-sufficient in satisfying its firefighting needs. Tr. 1471-72, Tr. 1547, Tr. 1550. As a result, the PFSF does not rely on an offsite response to avert a release of radioactive materials, even in the

bounding fire scenario. Tr. 1470. Similarly, during off-hours, the fire brigade's presence is not required to protect against fires that could cause a radiological release. Tr. 1578-79. Accordingly, the distance and travel time for PFS fire brigade members (during off-hours) and the Tooele County Fire Department to arrive at the PFS site is not significant. Tr. 1578-79.

2.1.65. PFS will have use of two fire trucks, one on site and one backup truck stationed at the Skull Valley Band of Goshute village. Dungan/Lewis Post Tr. 1456, at 26; Tr. 1492, Tr. 1505, Tr. 1534. The fire trucks are not needed to prevent damage to a spent fuel cask or canister, due to the presence of the CTB foam-water sprinkler system and onsite hose systems, but generally would be utilized to bring in additional hose line or other equipment. Dungan/Lewis Post Tr. 1456, at 27; Tr. 1534, Tr. 1563. In addition, although water pressure would normally be provided by the onsite water pumps, the trucks could be used, if necessary, to provide backup pressure for the sprinkler system or onsite pumps. Tr. 1501, Tr. 1505-06, Tr. 1534. In sum, the fire trucks are not needed to meet any NRC regulatory requirements. Tr. 1534.

2.1.66. All persons who operate vehicles at the site (e.g., cranes, heavy haul vehicles, locomotives, cask transporter), will be required to have fire brigade training and a license to drive a fire truck. Tr. 1493, 1498. Accordingly, at least three members of the fire brigade would be able to drive the fire trucks, and other persons may be able to do so as well. Tr. 1496-97, Tr. 1499-1500, Tr. 1525-26; PFS Exhibit G, EP at 4-3. In addition, all members of the fire brigade will be trained to operate the equipment on the fire truck. Tr. 1525.

2.1.67. A description of training for members of the fire brigade is contained in the Emergency Plan. PFS Exhibit G, EP at 4-3, 6-2. PFS has committed to meet NFPA 600

in all respects, including training. The requirements of NFPA 600, to which brigade members will be trained and equipped, represent industry best practice. Dungan/Lewis Post Tr. 1456, at 26, 27; Tr. 1520, Tr. 1529. In accordance with NFPA 600, this would include quarterly training, annual live fire exercises, and other drills semiannually. Tr. 1511; *see* Staff Exhibit B (NFPA 600, 2000 Edition), §§ 2-3, 4-2, 5-2, and A-2. PFS witness Dungan was satisfied that the PFSF fire brigade will be adequate both in numbers and training to perform its role. Dungan/Lewis Post Tr. 1456, at 27.

2.1.68. In addition to the automatic fire detection and suppression equipment and fire trucks discussed above, the Emergency Plan indicates that emergency response equipment at the PFSF will include personnel protective clothing, including respirators and anti-contamination clothing; firefighting equipment and gear, including self-contained breathing apparatus; decontamination supplies, communications equipment, including intercoms, hand-held radios and cellular phones; first aid supplies and basic medical equipment; and portable radiation monitoring equipment. State Exhibit 5, EP at 5-9.

2.1.69. With respect to equipment maintenance, PFS has committed to maintain all fire protection equipment at the PFSF, including the CTB foam-water system, yard hydrants, fire pumps, water storage tank, service mains, and all associated components, in accordance with NFPA 25. Further, the PFSF fire detection system will be installed and maintained in accordance with NFPA 72. Dungan/Lewis Post Tr. 1456, at 29.

2.1.70. Staff witness Paul Lain provided an evaluation of the Applicant's firefighting capabilities and equipment from the perspective of a Fire Protection Engineer. Based on his review of the Applicant's SAR, Emergency Plan, and RAI responses, Mr. Lain concluded that the Applicant has adequate support capability to fight fires onsite. Lain/Sullivan Post Tr.1543, at 5.

2.1.71. With respect to PFS' description of its firefighting equipment, 10 C.F.R. § 72.122(g) provides that SSCs important to safety must be designed for emergencies. Accordingly, the design must provide accessibility to onsite and offsite emergency equipment and services such as fire departments. In this regard, standpipes and hose systems will be provided throughout the CTB, in accordance with NFPA 14, "Standard for the Installation of Standpipes and Hose Systems"; in addition, portable extinguishers will be located throughout the facility per industry standards (NFPA 10). The NRC has accepted these industry standards as adequate for facility fire safety. Further, the Emergency Plan describes the location of emergency response equipment, which is to be located in the SHPB, away from the CTB; one fire truck will be located on-site and one will be located at the Goshute village 3.5 miles away; and other fire fighting assets will be available from Tooele County (although some time will be required for them to arrive at the site, as discussed *supra* at 37). This dispersion of assets provides adequate accessability of fire fighting equipment and gear for use by response personnel in the event of an emergency at the facility. *Id.* at 13-14. In sum, the Staff found the Emergency Plan's description of firefighting gear and its location to be adequate. Tr. 1563-64, Tr. 1576.

2.1.72. With respect to equipment maintenance, the Staff concluded that the PFS Emergency Plan contains an adequate description of the equipment maintenance program. The Applicant committed in its Emergency Plan to have firefighting equipment and gear stocked, inventoried, and maintained in accordance with NFPA 600, which requires it to be maintained pursuant to the manufacturers' instructions. The Applicant also committed to conduct inventories of emergency response equipment and supplies quarterly and after each use. The Staff concluded that these commitments are acceptable, and will provide adequate maintenance of PFS' firefighting equipment. Lain/Sullivan Post Tr.1543, at 14-15.

2.1.73. Further, the Staff reviewed the Applicant's commitment to train and equip the fire brigade in accordance with industry standards (NFPA 600), to provide additional training for fire truck operations, and to provide annual familiarization training to offsite responders. The Staff concluded that this description of the PFS fire protection training program is adequate. *Id.* at 14.

2.1.74. In sum, Mr. Lain concluded that the Applicant's description of its means and equipment to fight fires onsite provides a defense-in-depth approach and is adequate to assure the health and safety of its workers, the public and the environment. *Id.* at 15.

2.1.75. Staff witness Sullivan provided an evaluation of the Applicant's Emergency Plan (which he reviewed in the Staff's SER (Staff Exhibit A)), from his perspective as an Emergency Preparedness Specialist. Lain/Sullivan Post Tr. 1543, at 2. Mr. Sullivan compared the Plan with the requirements in 10 C.F.R. § 72.32(a) pertaining to the contents of an ISFSI emergency plan, and the detailed guidance criteria contained in Draft NUREG-1567, Appendix C. *Id.* at 15-16.[36]

2.1.76. As discussed *supra* at 9-10, the Emergency Plan for an ISFSI must contain certain information pursuant to 10 C.F.R. § 72.32(a), including a description of the facility, types of accidents and the detection and classification of those accidents; mitigation of potential consequences of the identified accidents; the responsibilities of licensee personnel to implement the emergency plan; commitments for notifying and coordinating with offsite response organization; commitments for training of emergency response personnel;

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[36] As set forth *supra,* at 7 n.14, these provisions are incorporated in NUREG-1567 by ISG-16. ISG-16 states: "Appendix C of the *draft* version of NUREG-1567 provided acceptable guidance applicable specifically to an ISFSI under 10 CFR Part 72. Therefore, neither the publication of NUREG-1567, nor this revision to Section 10.4.5 affects the evaluation findings of any review carried out utilizing the *draft* NUREG-1567." ISG-16, at 1.

arrangements for requesting and effectively using offsite assistance; and a commitment to allow offsite response organizations to comment on the initial Emergency Plan.

2.1.77. While the Commission's emergency planning regulations do not explicitly address fire fighting capabilities, Mr. Sullivan pointed out that such capabilities may need to be specified if the facility's identified emergency events include a fire. In such cases, as is the case for the PFS facility, NUREG-1567 indicates that an Emergency Plan must identify the types of potential accidents, including fires; describe how a fire would be detected; describe firefighting capabilities; describe fire fighting equipment and gear; specify emergency response organization interfaces with firefighting efforts; describe training for fire fighting personnel; describe arrangements for offsite firefighting support; and describe maintenance of fire fighting equipment. *Id.* at 16-17.

2.1.78. Based on his review of the Applicant's Emergency Plan, and its provisions relating to an emergency response to a fire event, Mr. Sullivan concluded that the Emergency Plan (including its provisions relating to firefighting capabilities) complies with applicable regulatory requirements and guidance with respect to fire events requiring an emergency response, thus providing reasonable assurance that the public health and safety will be protected in the event of a fire at the PFS facility. The Staff therefore concluded that the Emergency Plan, as it pertains to firefighting, is adequate. *Id.* at 17.

2.1.79. The Emergency Plan indicates that "fires involving a loaded storage or transfer cask that last longer than 15 minutes" would warrant an emergency action level (EAL) of an Alert (EP at 2-12). In Chapter 3, the Emergency Plan describes PFS' plans for accident detection, mitigation, and assessment of radiological releases. Chapters 4 and 5 of the Emergency Plan describe PFS' normal and emergency response organizations, and personnel responsibilities for emergency response -- including duties during normal and

off-shift hours; the use of emergency communications equipment; equipment and means for protection of onsite personnel; and emergency response equipment and facilities. The emergency response equipment for fires includes, *inter alia*, automatic fire detection and suppression equipment located in the CTB; the PFSF onsite fire truck; personnel protective equipment, including respirators and anti-contamination clothing; and other firefighting equipment and gear, including self-contained breathing apparatus, stocked, inventoried, and maintained in accordance with NFPA 600. Chapter 6 of the Emergency Plan describes the specialized training that will be provided to the emergency response organization, and states PFS' commitment to provide training to members of the fire brigade "as prescribed in NFPA 600." *Id.* at 17-19; *see* State Exhibit 5, at 5-8.

2.1.80. Mr. Sullivan compared the Applicant's Emergency Plan with the specific guidance criteria pertaining to firefighting capabilities in Draft NUREG-1567, Appendix C (now incorporated in Final NUREG-1567 by ISG-16), and concluded that the Plan complies with those criteria. His comparison showed as follows:

> *Identify the types of potential accidents, including fires.* The Emergency Plan contains a discussion of the areas in which a fire could take place, the potential size and duration of a fire, and the potential impact [of] such a fire.
>
> *Describe how a fire would be detected.* The Emergency Plan states that fires would be detected by visual observation by site personnel. Additionally, . . . automatic fire detection and suppression equipment is located in some buildings, including the Canister Transfer Building.
>
> *Describe firefighting capabilities.* . . . [T]he Emergency Plan states that fire fighting capabilities are available onsite and consist of a fire truck, fire fighting equipment and trained personnel. The Fire Brigade will be available onsite during normal work hours, which is appropriate, since that is when spent fuel transfer operations are conducted and the risk of a fire resulting in a radiological release may exist.

> *Describe fire fighting equipment and gear.* The Emergency Plan states that fire fighting gear and equipment will be available on site, including a fire truck. The fire fighting equipment and gear includes personnel protective equipment, including respirators and anti-contamination clothing. The gear, equipment and truck will be in accordance with NFPA 600, "Standard on Industrial Fire Brigades," 1996, National Fire Protection Association.
>
> *Specify emergency response organization interfaces with fire fighting efforts.* The Emergency Plan states that the fire brigade will interface with the Maintenance/Radiation Protection coordinator, who reports to the Emergency Response Leader.
>
> *Describe training for fire fighting personnel.* The Emergency Plan states that fire brigade personnel will receive training as prescribed by NFPA 600.
>
> *Describe arrangements for offsite firefighting support.* The Emergency Plan states that arrangements for support from the Tooele County Fire Department will be made.
>
> *Describe maintenance of fire fighting equipment.* The Emergency Plan states that fire fighting equipment and gear will be stocked, inventoried and maintained in accordance with NFPA 600.

Id. at 19-21.

2.1.81. In sum, based on a review of the Applicant's Emergency Plan as it relates to firefighting, the Staff concluded that the Emergency Plan satisfies the requirements of 10 C.F.R. § 72.32, and the guidance criteria in Draft NUREG-1567. *Id.* at 21.

2.1.82. A different opinion was expressed by the State's witness. Utah State Fire Marshal Gary Wise, who presented his view that the PFS fire brigade will not have a sufficient number of personnel or adequately trained personnel to fight fires on site at the PFS facility. Wise Post Tr. 1588, at 3. Mr. Wise approached the issue from his perspective

as an expert in firefighting; he expressed no view, however, as to the adequacy of the PFS emergency plan under NRC regulations; and he was unfamiliar with NRC regulatory requirements and guidance pertaining to fires. Tr. 1625-26.[37] Similarly, Mr. Wise generally expressed no opinion concerning the adequacy of the PFSF layout or design, its installed fire protection features, or its fire hazard analysis (all discussed above), and he agreed that he did not have the technical expertise to state whether any of the fire scenarios evaluated by PFS could result in a radiological release. Tr. 1626.[38]

2.1.83. First, Mr. Wise observed that the Emergency Plan indicates that PFS intends to call on the Tooele County Fire Department to augment PFSF fire fighting capabilities and to fight large fires beyond the capability of the PFSF fire brigade. *Id.* at 3. As discussed *supra* at 37, it could take 90 minutes for the Fire Department to arrive at the PFS site. *Id.* at 3; State Exhibit 2, at 1-2. Mr. Wise believes that any offsite fire fighting assistance after a delay of 90 minutes would be ineffective in controlling and containing onsite fires. Consequently, he believed that PFS must be totally self-reliant in its ability to fight fires onsite. *Id.* at 3.

2.1.84. Mr. Wise's concern about the offsite response time would be valid, if an offsite response was required. However, as discussed above, PFS agrees that it must be

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[37] Mr. Wise stated that he had never before evaluated the adequacy of a nuclear facility's fire protection plans; had never reviewed NRC requirements or regulatory guidance relating to fire protection for a nuclear facility; and had never evaluated the fire hazards for any nuclear facility, apart from his limited review of the PFSF. Tr. 1625-26.

[38] During the hearing, Mr. Wise expressed a concern that the CTB automatic foam-water sprinkler heads would be located at a height of 90 ft, which he believed would result in delayed activation of the sprinklers until heat levels rose sufficiently to activate them; in the same vein, he expressed concern that smoke removal by PFS would also result in heat removal, again resulting in delayed activation of the automatic sprinkler system. Tr. 1635-36. These concerns were addressed by PFS witness Dungan, who explained that PFS will install features (such as ground level flame detectors) to avert delayed activation of the sprinklers. Tr. 1665-66.

self-sufficient with respect to fire protection, and has presented an analysis showing that its layout, design, fire protection systems, and fire brigade will accomplish this objective. Further, while NUREG-1567 indicates that an ISFSI emergency plan should describe the arrangements made for requesting and effectively using offsite assistance, there is no requirement that an applicant must "effectively use" offsite assistance if it is self-sufficient (*i.e.*, if offsite assistance is not required to prevent a release of radioactive materials). *See* Tr. 1548, Tr. 1550. Accordingly, we do not find the offsite response time to be significant for the PFSF.

2.1.85. Mr. Wise further presented his view that the onsite fire brigade is inadequately staffed to perform its firefighting function. In this regard, he indicated his belief that the fire brigade will be comprised of only five persons, who will be required to perform too many tasks -- i.e., incident commander, fire truck operator, manning the hoses, and backup to relieve or rescue persons manning the fire hoses (one of whom might also be able to serve as incident commander). In addition, he believed that one of these five persons would need to be dispatched to retrieve the backup fire truck from the Goshute village. *See, e.g.*, Wise Post Tr. 1588, at 4, 5, 7-8. He agreed, however, that an adequate number of persons had been identified to drive the fire trucks. Tr. 1598.

2.1.86. Mr. Wise expressed particular concern that with only five persons, the fire brigade could not operate both the onsite and offsite fire trucks, or operate more than one hose on the PFS pumper truck. He stated that during an "interior structural fire" in which two firefighters are engaged in firefighting, two other firefighters must be located a safe distance away so they may perform rescue operations if necessary ("two in, two out"). Further, in order to fight an interior structural fire in the CTB (or any other structural fire), the entire five-person fire brigade would be needed to operate a single fire truck and a

single hose (two persons to operate one hose, two persons to standby, and a fifth person to operate the pumper truck). As a result, he believed that no fire brigade member would be available to operate a second hose on the PFS pumper truck, or the back-up fire truck and its hoses. He therefore concluded that if PFS wants to use more than one hose on its pumper truck or rely on the second fire truck and safely provide fire protection for the facility, it must add additional members to its fire brigade. Wise Post Tr. 1588, at 7-8.

2.1.87. Mr. Wise's stated belief that the fire brigade will consist of only five persons is not correct. While PFS stated that the fire brigade will consist of a minimum of five members, in fact, 11 trained fire brigade members will be present during cask transfer operations. Therefore, in the event of a fire that requires a response by more than five persons, additional trained members of the fire brigade will be available, beyond the five person minimum staffing level. During the hearing, Mr. Wise learned that the fire brigade would have eleven members, but he was unable to state an opinion whether an 11-person fire brigade would be sufficient. Tr. 1595-96. In contrast, the Staff found the number of persons identified for the fire brigade to be sufficient. Tr. 1567. Moreover, Mr. Wise appears to have assumed that operation of the fire trucks is a necessary component for fire protection at the PFSF; only during the hearings did he learn that PFS does not rely on the fire trucks to meet NRC requirements. Tr. 1600.

2.1.88. Further, with respect to the number of persons needed to operate hose lines, NFPA 600 recognizes that not all fires -- interior or exterior -- rise to a level above the "incipient" stage. *See, e.g.*, Staff Exhibit B, at 600-5, § 1-5.22.[39] The number of persons

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[39] NFPA 600 establishes different standards for industrial fire brigades, depending upon whether they perform "incipient stage fire fighting," "advanced exterior fire fighting," "interior structural fire fighting," or some combination of these. *See, e.g.*, Staff Exhibit B, at 600-3, 600-4. The following definition is provided in the 2000 edition of NFPA 600:

(continued...)

required to operate a hose line or to standby outside the hot zone will vary according to the size and category of a particular fire. During an "incipient stage fire" involving SCBA operations, only one firefighter must be stationed outside the hot zone. Staff Exhibit B at 600-11, § 4-3.4. In contrast, for an "interior structural fire" where operations involve the use of self-contained breathing apparatus (SCBA), at least two firefighters must be stationed outside the "hot zone." *Id.*, at 600-11, § 5-3.5.[40] PFS will satisfy this NFPA 600 requirement. Tr. 1666; *see* Tr. 1501-02, Tr. 1505, Tr. 1506-07.

2.1.89. Indeed, the required size of a firefighting response, and whether such a response is required at all, will vary according to the fire scenario that develops. As Mr. Wise agreed, some fires, small or large -- even fires involving a large propane tank -- could be allowed to burn out without any firefighting response whatsoever, if the fire poses no threat to life or property. Tr. 1626-28. Significantly, Mr. Wise did not conduct an evaluation of possible fires at the PFSF to determine which fires would require a manual response, Tr. 1628; he did not know if normal sources of fire ignition such as candles,

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[39](...continued)

> **Incipient Stage.** Refers to the severity of a fire where the progression is in the early stage and thus has not developed beyond that which can be extinguished using portable fire extinguishers or handlines flowing up to 125 gpm (473 L/min). A fire is considered to be beyond the incipient stage when the use of thermal protective clothing or self-contained breathing apparatus is required or an industrial fire brigade member is required to crawl on the ground or floor to stay below smoke and heat.

Id., at 600-5, § 1-5.22 (this definition replaces the 1996 edition's definitions of "advanced exterior" and "interior structural" fire fighting. *See* State Exhibit 6, at 600-6; Wise Post Tr. 1588, at 6).

[40] The 2000 edition of NFPA 600 revised the 1996 edition's requirement that only one person is to be stationed outside the hot zone during interior structural fires involving the use of SCBA. *See* State Exhibit 6, at 600-12, § 5-3.5; Tr. 1645-46.

wiring or space heaters would be in the Restricted Area of the PFSF, Tr. 1594; and he did not evaluate the potential for a radiological release from a fire at the facility, Tr. 1594. Accordingly, his testimony fails to establish that the fire brigade is too small to prevent a release of radiological materials in the event of a fire at the PFSF.[41]

2.1.90. Mr. Wise also expressed concern regarding PFS' description of its plan for training fire brigade members, finding that PFS has provided only "sketchy details" on the type, amount and frequency of training to be provided to fire brigade members. Wise Post Tr. 1588, at 5. He further cited a PFS response to the Staff's RAIs, wherein PFS described its training plans, and indicated that these statements do not conform to NFPA 600 requirements. Wise Post Tr. 1588, at 6. In addition, he expressed concern that workers at the PFSF other than fire brigade members may have some firefighting response duties, but PFS had failed to describe the level of fire training to be provided to those persons, as required by NFPA 600. Wise Post Tr. 1588, at 4, 7.

2.1.91. Mr. Wise's observation that the Emergency Plan contains "sketchy details" with respect to training is not surprising. At the time of the hearings, PFS had not yet developed the specifics of its fire brigade training program. Tr. 1520. Mr. Wise was not aware that PFS intends to supplement the Emergency Plan's description of training with detailed procedures, to be submitted later. Tr. 1599-1600. As Mr. Wise notes, however (*Id.* at 4), PFS has committed to provide the training prescribed by NFPA 600. *See, e.g.*,

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[41] Mr. Wise found that the Applicant's fire hazard analysis always focused on fires that could result in a radiological release, and believed that attention should have been given to fires that do not result in such a release, like a fire in the Administration Building. Tr. 1597. He did not evaluate those fires, however. Tr. 1597-98. Further, he was not familiar with NRC regulations and guidance (which describe the types of fires that need to be evaluated by an applicant for an NRC license), Tr. 1625-26, and did not know what the NRC requires for fire protection systems or fire brigades. Tr. 1662.

PFS Exhibit G, EP at 6-2.[42] Indeed, it was on this basis that PFS' description of its proposed training was approved by the Staff. *See* Lain/Sullivan Post Tr. 1543, at 20.[43] Accordingly, we find that these concerns have been satisfied.

2.1.92. Similarly, Mr. Wise found that PFS' description of its fire brigade fails to provide a proper organizational statement, as required in NFPA 600. Wise Post Tr. 1588, at 5, 6-7. He was unaware, however, that PFS would later submit procedures containing a more detailed description of the organization. Tr. 1599-1600.[44] This concern is satisfied, however, by PFS' commitment to comply with NFPA 600 in all respects. Tr. 1529, Tr. 1666.

2.1.93. Finally, Mr. Wise expressed the view that PFS "could" follow another standard for organizing, training, and equipping its fire brigade -- citing NFPA 1500, "Standard on Fire Department Occupational Safety and Health Program" (State Exhibit 8). Wise Post Tr. 1588, at 8. Mr. Wise based this view on the facts that (a) the PFSF site is

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[42] Mr. Wise indicated his belief that PFS plans to have a "backup fire brigade," which he believed should be trained in accordance with NFPA 600. Wise Post Tr. 1588, at 6, citing State Exhibit 3. The cited PFS statement, however, referred to the "backup fire truck brigade," and described how regular fire brigade members would operate that truck. It did not state that a "backup fire brigade" would be created, separate from the PFS fire brigade. *See* State Exhibit 3.

[43] At the time of the hearings, PFS had not yet developed its emergency plan implementing procedures or the procedures for the fire brigade, but will develop those procedures prior to commencing operation. Tr. 1521. The Staff will review the operability of the Applicant's fire protection systems (including fire truck, fire pumps, and sprinkler systems), the adequacy of fire brigade training, and the results of fire drills, during the Staff's post-licensing operational inspections of the facility. *Id.* at 21; Staff Exhibit A, at 16-2 (§§ 16.1.4 and 16.1.5), 16-4 (§ 16.1.10), and 16-5 (§ 16.1.12). The Staff's planned review of implementing procedures, training, and other implementation details in its post-licensing inspections is consistent with established NRC practice and caselaw. *See, e.g., Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1103-04, 1106-08 (1983).

[44] Mr. Wise also expressed concern that a potential delay could ensue if fire brigade members need to obtain protective gear or breathing apparatus (to be stored in the SHPB) upon detecting a fire in the CTB. Tr. 1648. He agreed, however, that this is a matter that could be clarified in the facility's training program. Tr. 1649.

located 50 miles from the Tooele County Fire Department (which he believed was the closest municipal fire department), and (b) the fire brigade will be organized, trained, equipped, and expected to fight interior structural fires. In his view, the fire brigade constitutes an "industrial fire department," and its distance from the nearest municipal fire department rendered NFPA 1500 applicable. Wise Post Tr. 1588, at 9-10, *citing* NFPA 1500, §§ 1-5 and A-1-5.[45]

2.1.94. Both the Applicant's and Staff's witnesses disagreed with Mr. Wise's suggestion that NFPA 1500 is the proper standard to apply at the PFSF, and stated their view that NFPA 600 is the correct standard for industrial fire brigades such as will be established by PFS. Lain/Sullivan Post Tr. 1543, at 14-15, 20; Tr. 1520-21.[46]

2.1.95. Mr. Wise's reading of NFPA 1500, § A-1-5, is incorrect. Even if the PFS fire brigade is considered to be an "industrial fire department," it would not become subject to NFPA 1500 based on its distance from the nearest municipal department. Rather, section A-1-5 states, in pertinent part, as follows:

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[45] NFPA 1500 sets minimum requirements for an occupational safety and health program. State Exhibit 8, at 1500-4, § 1-1.1. It applies to "public, governmental, military, private, and industrial fire department organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, and other emergency services." *Id.*, §1-1.2. In contrast, NFPA 600 states that its purpose is "to provide minimum requirements for organization, operation, training, and occupational safety and health for industrial fire brigades." Staff Exhibit B, at 600-4, § 1-2; *cf.* § 1-1.1. It further states that NFPA 600 "shall apply to any organized, private, industrial group of employees having fire fighting response duties, such as emergency brigades, emergency response teams, fire teams, and plant emergency organizations." *Id.*, § 1-1.2.

[46] Mr. Wise's preference for NFPA 1500 is quite understandable. He has spent 32 years in public fire service and has considerable experience with municipal fire departments. At the same time, however, he has never served in a private or industrial fire brigade, and he has never evaluated the adequacy of a private or industrial fire brigade. Tr. 1623-25; Wise Qualifications at 1-2.

> The vast majority of industrial fire brigades are not industrial fire departments. Industrial fire departments are those few brigades that resemble and function as municipal fire departments. These are generally found only at large industrial facilities and at industrial facilities that also perform municipal fire fighting, usually where the plant is located far from municipalities with organized fire departments. Industrial fire departments are organized and equipped for interior structural fire fighting similar to municipal fire departments. Their apparatus is similar to that used by municipal fire departments. . . .

State Exhibit 8, at 1500-24; emphasis added. As this language makes clear, a fire brigade is not transformed into an "industrial fire department" merely because of its distance from the nearest municipality with an organized fire department; rather, distance is mentioned only with respect to a "large industrial facility," or a facility whose fire brigade performs "municipal firefighting." Since neither of these conditions applies to PFS, NFPA 1500 § A-1-5 does not establish that the PFS fire brigade should be considered to be an "industrial fire department." Further, the fact that the PFSF is equipped for interior structural fires does not transform it into an industrial fire department; rather, as NFPA 600 makes clear, a fire brigade may need to be equipped and trained for interior structural fires. *See, e.g.,* Staff Exhibit B at 600-11 (Ch. 5, "Industrial Fire Brigades That Perform Interior Structural Fire Fighting Only"). Moreover, NFPA 1500 explicitly states that it "does not apply to industrial fire brigades or industrial fire departments meeting the requirements of NFPA 600. " *Id.*, § 1-1.3; emphasis added. Accordingly, even if the PFS fire brigade is an "industrial fire department," PFS' commitment to satisfy NFPA 600 renders NFPA 1500 inapplicable.

2.1.96. In addition, NFPA 600 distinguishes between industrial and municipal fire departments based on whether they are expected to fight fires outside their facilities, in areas where unknown hazards may exist. Mr. Wise agreed that the PFS fire brigade is

expected to fight fires onsite, rather than offsite, Tr. 1604; that it will be trained and equipped to cope with fires at the PFSF -- a known facility with known materials and known spaces to the fire brigade, Tr. 1612; and that it would not respond to emergencies outside the facility's boundaries in circumstances when the offsite fire involves "unfamiliar hazards or enclosed structures with layout and contents that are unknown to the fire brigade." Tr. 1607.[47] These facts support application of NFPA 600 to the PFSF.

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[47] NFPA 600 states:

> The primary difference between industrial fire brigades and municipal fire departments is that industrial fire brigades must deal with conditions and hazards that are limited to those that exist within a given facility that is generally privately owned and operated. Although these site-specific hazards can and do represent the same degree of hazard to both industrial fire brigade members and municipal fire fighters, industrial fire brigade members are not usually concerned with, nor are they expected to deal with, hazards and emergencies beyond the boundaries of the facility that the brigade serves.
>
> . . . Further, industrial fire brigades constituted in accordance with this standard will, of necessity, have a much more through knowledge of the buildings and facilities where they respond than do municipal fire fighters who must respond to a significantly greater variety of buildings and facilities, many of which have unidentified and undisclosed hazards.
>
> . . . [These] potential unknown factors . . . can hinder the effectiveness of any municipal fire department and place a greater safety risk on the fire fighters.
>
> This distinct advantage of familiarity achieves a higher level of *industrial* fire brigade safety and allows for the fundamental difference between a municipal fire department and an industrial fire brigade.

Staff Exhibit B, § A-1-1, at 600-12; *cf.* State Exhibit 6, at 600-4. NFPA 600 further states that it does not apply to industrial fire brigades that respond to fires outside the facility's site boundaries "when the off-site fire involves unfamiliar hazards or enclosed structures with layout and contents that are unknown to the fire brigade." Staff Exhibit B, § 1-1.3, at 600-4; State Exhibit 6, § 1-1.3, at 600-4.

2.1.97. Accordingly, we are satisfied that the PFS fire brigade is properly classified as an industrial fire brigade. We further find that NFPA 600 is the appropriate standard for use in training, equipping and organizing the PFS fire brigade; and, based on PFS' commitment, we find that the fire brigade will conform to NFPA 600.

B. Contention Utah S

1. Background

2.2.1. As admitted by the Licensing Board, Utah Contention S states as follows:

> 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. § 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. § 72.22(e).

PFS, LBP-98-7, 47 NRC at 255.

2.2.2. Five basis statements were admitted in support of Contention Utah S -- Bases 1, 4, 5, 10, and 11. *Id.* at 196-97. One of these statements (Basis 11, pertaining to the Rowley Junction ITP) was resolved by summary disposition. *PFS,* LBP-99-39, 50 NRC at 236. The remaining four basis statements proceeded to hearing, and are addressed separately in the discussion below. In general, these bases asserted that the Applicant's letter of credit for site decommissioning should include the cost of cask decommissioning (Basis 1); that the decommissioning estimates failed to specify the year's dollars used, and failed to assure that sufficient funds would be available for decommissioning (Basis 4); that the decommissioning cost estimate failed to include the cost of decommissioning in the event of a large accident (Basis 5); and that the estimated cost for a site survey failed to

state the year's dollars used, and was not properly escalated to future dollar values (Basis 10).

2.2.3. On April 7, 2000, the Applicant and the State filed a joint motion to approve a stipulation for the hearing of Contention Utah S, in which they requested that the scope of Contention Utah S, Basis 1, be limited to certain specified matters.[48] On May 1, 2000, the Licensing Board granted the parties' Joint Motion.[49] The Licensing Board noted that the focus of Contention S will be the sufficiency of the funding for decommissioning costs, taking into account: (1) the year's dollars used to establish the costs; (2) the escalation factors to arrive at the future value of the costs; (3) the maximum quantities of spent fuel to be stored at the site during the term of the license; (4) the potential for large accidents; and (5) the means by which PFS will provide sufficient funds if the cost estimate indicates that a deficit exists in decommissioning funds. Joint Motion Ruling at 2.

2. Applicable Legal Standards

2.2.4. The applicable regulatory requirements that pertain to decommissioning funding plans for a Part 72 ISFSI applicant are contained in 10 C.F.R. § 72.30(b) and (c), and 10 C.F.R. § 72.22(e). Regulatory guidance is provided in Regulatory Guide 3.66, "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70 and 72," and in NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities" (March 2000).

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[48] "Joint Motion by the State of Utah and the Applicant to Approve Stipulation for the Hearing of Utah Contention S" (Joint Motion), dated April 7, 2000.

[49] "Memorandum and Order (Granting Joint Motion to Approve Stipulation on Contention Utah S and Outlining Administrative Matters)" ("Joint Motion Ruling"), dated May 1, 2000.

2.2.5. The regulations concerning the decommissioning funding plan (DFP) for a Part 72 ISFSI require that applicants submit a cost estimate for decommissioning, a description of the method of assuring funds for decommissioning, and information on how reasonable assurance will be provided that adequate funding will be available to cover the estimated decommissioning cost, including means of adjusting cost estimates and associated funding levels periodically over the life of the ISFSI. 10 C.F.R. § 72.30(b).

2.2.6. Financial assurance for decommissioning must be provided by one or more of the following methods: (1) prepayment before the start of operation into an account segregated from licensee assets such that the amount of funds would be sufficient to cover decommissioning costs; (2) a surety method, insurance, or other method that guarantees that decommissioning costs will be paid; and/or (3) an external sinking fund in which deposits are made at least annually, coupled with a surety method or insurance, the value of which may decrease by the amount being accumulated in the sinking fund. 10 C.F.R. § 72.30(c).

2.2.7. In addition, as pertinent here, the Staff's witnesses indicated that an ISFSI applicant's DFP should compare the decommissioning cost estimate with present funds, and if there is a deficit in present funding, the DFP should indicate the means for providing sufficient funds for completion of decommissioning. Further, the year's dollars used in the DFP should be stated and should not be earlier than the year of preparation of the cost estimate. Wood/McKeigney (Contention S) Post Tr. 2479, at 6.

2.2.8. With these requirements in mind, we now turn to the Applicant's proposal for the funding of its decommissioning activities and the four bases to Contention Utah S.

3. Testimony Presented

2.2.9. The Applicant presented the testimony of John D. Parkyn, Chairman of the PFS Board of Managers, and Vice president of Genoa Fuel Tech, a subsidiary of Dairyland Power Cooperative. In addition, Mr. Parkyn is Chairman and CEO of the Great Salt Lake and Southern Railroad and is a Director of River Bank in La Crosse, WI. Among other positions he has held, he has been Chairman of the Board of the Bank of Stoddard, WI, and the Bank of Ferryville, WI. "Testimony of John D. Parkyn on Decommissioning the PFSF -- Contention Utah S" (hereinafter referred to as "Parkyn Decommissioning"), Post Tr. 2424, at 1.

2.2.10. The Staff presented the testimony of Dr. Alex F. McKeigney and Robert S. Wood. Dr. McKeigney is a Financial Analyst in the NRC Office of Nuclear Reactor Regulation, with over 20 years of experience in strategic and financial planning and financial analysis. He holds a Ph.D. in Sociology, and received an MBA from the Harvard Business School. Mr. Wood is a Senior Level Licensee Financial Policy Advisor in the NRC Office of Nuclear Reactor Regulation. He holds a B.A. degree in Economics, an M.P.A. degree, and has completed doctoral level courses and qualifying exams for a Ph.D. in economics from Ohio State University. Mr. Wood has worked at the NRC or its predecessor (the U.S. Atomic Energy Commission) since 1971, and has held a variety of responsible positions relating to the financial qualifications and decommissioning funding of NRC license applicants and licensees. "NRC Staff Testimony of Alex F. McKeigney and Robert S. Wood on Utah Contention S -- Decommissioning Funding" (hereinafter referred to as "McKeigney/Wood (Contention S)"), Post Tr. 2479, at 1, and attached Professional Qualifications.

2.2.11. The State of Utah presented the testimony of its consultant, Dr. Michael F. Sheehan. Dr. Sheehan is a partner in the firm of Osterberg & Sheehan, Public Utility Economists, of Scappoose, OR, and Mount Vernon, IA. He received B.S., M.A. and Ph.D. degrees in economics from the University of California at Riverside, and has 20 years experience in the areas of planning and project budget and finance analysis. "Prefiled Testimony of Michael F. Sheehan, Ph.D. on Behalf of the State of Utah Regarding Contention Utah S" (hereinafter referred to as "Sheehan (Contention S)"), Post Tr. 2491, at 1; "Prefiled Testimony of Michael F. Sheehan, Ph.D. on Behalf of the State of Utah Regarding Contention Utah E, Post Tr. 2190, at 1-2, and State Exhibit 9 ("Professional Qualifications").

4. PFS' Proposed Plan for Funding Decommissioning Activities

2.2.12. The Applicant proposed to fund two basic decommissioning activities: (a) decommissioning of the PFSF site, and (b) decommissioning of the spent fuel storage casks that will be used at the PFSF. Parkyn Decommissioning, Post Tr. 2424, at 4.

2.2.13. With respect to decommissioning of the facility site, the Applicant will use a letter of credit coupled with an external sinking fund into which decommissioning fund payments will be deposited upon collection of funds from PFS customers, under PFS' customer "Service Agreements." Prior to beginning operation, PFS will have obtained a letter of credit equal to 100% of the estimated site decommissioning costs. PFS will collect site decommissioning payments from its customers periodically over the life of the PFSF such that the total amount for decommissioning the site will have been deposited in the external sinking fund by the time all the spent fuel is removed from the PFSF. As the site decommissioning funds are paid into the external sinking fund, the letter of credit may be reduced by an equivalent amount. Parkyn Decommissioning, Post Tr. 2424, at 4.

2.2.14. With respect to decommissioning of the spent fuel storage casks, the Applicant will prepay the cost of decommissioning each cask into an escrow account prior to the shipment to the PFSF of the spent fuel to be stored in that cask. To cover storage cask decommissioning costs, the Service Agreements will require payment of cask decommissioning costs prior to the shipment to PFSF of the canister to be stored in that cask. These cask decommissioning payments will be deposited by PFS in an external escrow account. The full amount of potential decommissioning costs for each cask will thus be collected in a segregated account prior to the receipt at the facility of the spent fuel canister that will be stored in the cask. Parkyn Decommissioning, Post Tr. 2424, at 4.

5. Evidence Concerning the Bases for Contention Utah S

2.2.15. Basis 1 of Contention Utah S states as follows:

> Basis 1. The Applicant has failed to provide reasonable assurance, as required by 10 CFR § 72.30(b), that funds will be available to decommission the ISFSI in that the letter of credit PFS intends to obtain "in the amount of $1,631,000 to cover the estimated facility and site decommissioning costs, exclusive of the storage casks," LA, App. B, p. 5-2, does not include funds for the decommissioning of the storage casks.

2.2.16. In its June 2000 ruling on the parties' Joint Motion, the Licensing Board acknowledged that the Applicant wished to reserve its argument that the scope of Basis 1 excludes the issue of the lack of funds for storage cask decommissioning. Joint Motion Ruling at 3. In this regard, the State asserted that Dr. Sheehan's pre-filed testimony refers to the letter of credit in only one area pertaining to whether the bank issuing the letter of credit will increase the amount of the letter of credit "if and when decommissioning cost

estimates increase."[50] After receiving briefs from the parties, the Board decided to withhold ruling on this matter, noting that the issue was not ripe because the State did not refer to the cost of storage cask decommissioning in the prefiled testimony of its witness, Dr. Sheehan.[51] We further note that the State did not raise this matter during the evidentiary hearings. Thus, we will exclude this issue from our consideration of Basis 1.

2.2.17. River Bank of La Crosse, WI, has committed to issue a $1.7 million letter of credit. State Exhibit 11. Dr. Sheehan testified that an area of uncertainty involves "any required increase in the letter of credit." Sheehan (Contention S) Post Tr. 2491, at 12. He further testified that if and when decommissioning cost estimates increase, there is a high degree of uncertainty whether PFS will be able to secure additional funds under a letter of credit. *Id.* He explained that the possibility exists that as funds are being paid into escrow, the costs of decommissioning might increase, and he could imagine a scenario in which, due to the increase in cost, the letter of credit may need to be reestablished at a high level. Tr. 2545, Tr. 2547.

2.2.18. Mr. Parkyn testified that based on the annual review of decommissioning costs, the Letter of Credit will be adjusted to account for any changes in overall site decommissioning costs. Parkyn Decommissioning, Post Tr. 2424, at 6. Thus, if PFS needs a letter of credit of greater value to cover site costs, "it will obtain one." *Id.* Mr. Parkyn does not contemplate that it will be difficult at all for a nuclear entity to secure an increase in a letter of credit which covers decommissioning cost estimates should those estimates increase. Tr. 2426. As a Director of River Bank (the bank issuing the letter of credit), and

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[50] "State of Utah's Response to Applicant's Brief on the Scope of Utah Contention S, Basis One," dated June 7, 2000, at 2-3.

[51] "Memorandum and Order (Ruling on In Limine Motions and Providing Administrative Directives)," June 12, 2000, at 8 n.2.

as former Chairman of the Board of two other banks (the Bank of Stoddard, WI, and the Bank of Ferryville, WI), we give substantial weight to Mr. Parkyn's assertion that obtaining an increase in a letter of credit should not prove difficult.

2.2.19. We also note that PFS' proposed letter of credit conforms to the Commission's regulations and the Staff's guidance for letters of credit, and that an applicant that relies on a letter of credit for decommissioning funding is not required to demonstrate an ability to secure additional funds for future events. Tr. 2549-50.

2.2.20. Further, we are convinced that funds will be available to cover the cost of decommissioning in that under the Service Agreements with its customers, PFS will require the customers to make up their proportionate shares of any increase in the site decommissioning costs, on the basis of the pro rata portion of the PFSF capacity that each customer has reserved for spent fuel storage. Parkyn Decommissioning, Post Tr. 2424, at 6. Also, PFS will realize a rate of return on the money in its decommissioning account over the life of the PFSF. *Id.* Mr. Parkyn testified that he is confident that PFS could accomplish a 2% real rate of return based on the actual decommissioning fund success for the Dairyland La Crosse plant. Tr. 2473. This provides further assurance that sufficient funding will be available.

2.2.21. Basis 4 of Contention Utah S states:

> Basis 4. The Applicant has failed to justify the basis for its decommissioning cost estimates of $17,000 to decommission a storage cask and of $1,631,000 to decommission the remainder of the ISFSI in that (i) the decommissioning cost estimates do not state the year's dollars used (e.g., 1997 dollars) as provided in NUREG-1567, Draft Standard Review Plan for Spent Fuel Dry Storage Facilities, LA Appendix B, Chapter 4, and (ii) the estimates are not properly escalated to convert past dollars values into future dollars values (i.e. the future value of costs when the costs are expected to be incurred).

> An applicant for a part 72 ISFSI license must submit a Decommissioning Funding Plan "at the time of the license application." Regulatory Guide 3.66, Standard Format and Content of Financial Assurance Mechanisms required for decommissioning under 10 CFR Parts 30, 40, 70 and 72 . . . ., at 1-3, 1-6. The Decommissioning Plan "must compare the cost estimate with present funds, and if there is a deficit in present funding the plan must indicate the means for providing sufficient funds for completion of decommissioning." NUREG-1567, at 16-4. This information is missing from the application.
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> Furthermore, to ensure that sufficient decommissioning funds are available, the Applicant should take a conservative approach in estimating the maximum quantity of spent fuel casks to be stored at the site during the license term.

2.2.22. In this regard, Mr. Parkyn testified that the estimated cost of decommissioning the site is stated in 1997 dollars; the estimated cost of decommissioning each cask is also stated in 1997 dollars. Parkyn Decommissioning, Post Tr. 2424, at 5. *See also* Tr. 2425. In addition, the vintage of the data used in the PFS decommissioning cost estimates is 1997. Tr. 2425. Dr. Sheehan acknowledged that to the extent that Mr. Parkyn is correct about the vintage of the data and year's dollars, Dr. Sheehan's concerns have been addressed. Tr. 2494, Tr. 2495-96. No evidence was presented to suggest that Mr. Parkyn's statements are not correct. Therefore, we, too, consider that this matter has been resolved.

2.2.23. Regarding escalation and adjustment, the decommissioning cost estimates for the site and the storage casks will be adjusted annually to account for the effects of inflation using the Consumer Price Index ("CPI") published by the U.S. Bureau of Labor Statistics, and reviewed and adjusted to account for any real changes in the cost of decommissioning the PFSF. Parkyn Decommissioning, Post Tr. 2424, at 5. Thus, when

considering cost escalation, PFS does not intend to restrict adjustment to that within the range of inflation. Tr. 2425. Rather, the annual review will account for any changes in the tasks, scope, cost or schedule for decommissioning, including changes in technology and regulatory requirements. Parkyn Decommissioning, Post Tr. 2424 at 5; Tr. 2426.

2.2.24. If PFS observes a shortfall, customers who have made their decommissioning payments to PFS will be billed for the amount required to make up the shortfall. For customers who have not yet made their decommissioning payments to PFS, PFS will raise the amounts of the payments to be made so that all costs will be covered. Thus, PFS will ensure that it has sufficient funds to decommission the PFSF site and the spent fuel storage casks. Parkyn Decommissioning, Post Tr. 2424, at 7.

2.2.25. The Service Agreements will provide that the cask decommissioning cost estimate will be reviewed and adjusted annually to account for inflation and any changes in the estimated cost of decommissioning. Parkyn Decommissioning, Post Tr. 2424, at 5. The Applicant will require customers to pay their proportionate share of increases in site decommissioning costs, and such a requirement will be part of the terms and conditions of the Service Agreements. Tr. 2449, Tr. 2450. Also, under the Service Agreements, if any contamination at the PFSF is caused by a customer or anyone acting on the customer's behalf, PFS will clean up the contamination, and the customer will be required to immediately pay the cost of cleanup. Tr. 2450.

2.2.26. The PFS Service Agreements for all utility customers will remain in effect with respect to their decommissioning responsibilities, until the license terminates -- even if a utility's fuel has previously been shipped off-site. Tr. 2464, Tr. 2472. Further, the regulatory responsibility of those persons (*i.e.*, NRC licensees) who have stored fuel on-site at PFS will continue until the NRC terminates the PFS license. Tr. 2482-83.

> very large number of casks that are to be handled at the ISFSI and the large number of operations and movements that will be required argue strongly for anticipating this potential and making arrangements for a multimillion dollar increase in decommissioning to "provide reasonable assurance that the planned decommissioning of the ISFSI will be carried out" as required by 10 CFR § 72.30.

2.2.31. As Dr. Sheehan observes, PFS does not address any decommissioning impacts resulting from potential large accidents. Sheehan (Contention S) Post Tr. 2491, at 6. In Dr. Sheehan's view, an appropriately conservative cost estimate must assume that there are significant risks of a radionuclide release at the facility that must be addressed through insurance and/or through decommissioning costs, to reflect the risk that an accident causing a serious release of radioactivity could result in additional expense for radiological decontamination at the time of decommissioning. *Id.* at 7. For example, he was concerned that an accident involving an earthquake or military training mishap could pose significant risks for large accidents, which he felt should be addressed in PFS' decommissioning funding. *Id.*

2.2.32. Like the Staff, we can find no requirement in 10 C.F.R. § 72.30 that an ISFSI applicant must take large accidents into consideration in providing a decommissioning cost estimate. *See* Wood/McKeigney (Contention S) Post Tr. 2479, at 11. In addition, there is no regulatory guidance which would suggest that large accidents should be considered in the formulation of an applicant's decommissioning cost estimate; nor is there guidance regarding what methods might be used to estimate the amount of funding that may be necessary to address the potential for large accidents at an ISFSI. *Id.* Further, Dr. Sheehan could not identify an NRC regulation that defines decommissioning in a way to include a large accident. Tr. 2496.

2.2.33. The Commission has stated, in the context of nuclear reactors (for which on-site property insurance is required), that potential accident recovery costs are not the subject of decommissioning funding, in that "[a]ssurance of funds for post-accident cleanup is more properly covered by the use of insurance." *See* Proposed Rule, "Decommissioning Criteria for Nuclear Facilities," 50 Fed. Reg. 5600, 5606 (1985); Parkyn Decommissioning, Post Tr. 2424, at 7-8. Like the reactor decommissioning funding regulations, the regulations in Part 72 do not require decommissioning to address potential large accidents. Additionally, we note that while Dr. Sheehan believed that the decommissioning plan should address the cost of cleanup from a large accident, he also appeared to recognize that such contamination would have to be addressed upon decommissioning only if the contamination had not been cleaned up previously. *See* Tr. 2541-42. Further, we are aware of no reason which would indicate that PFS would not clean up any such radiological contamination prior to decommissioning, such as through its Service Agreements, property insurance or recourse against any responsible parties.

2.2.34. Therefore, we conclude that PFS does not need to include the cost of accident recovery in its decommissioning cost estimate.

2.2.35. We recognize that costs related to contamination as a result of potentially large accidents might be significant, as indicated in three studies referenced in Dr. Sheehan's testimony. *See* Sheehan (Contention S) Post Tr. 2491, at 8. Dr. Sheehan, however, was unable to explain key factors in the studies he had cited -- which he acknowledged would make a difference in the calculation of the consequences. Tr. 2512-14. Likewise, he did not know whether the casks discussed in those reports were similar to the casks that would be used at the PFS facility. Tr. 2513. Moreover, Dr. Sheehan acknowledged that those studies did not show the costs that may be incurred

in cleanup of a large accident involving spent fuel casks at the PFSF. Tr. 2531-34. Accordingly, the referenced studies do not establish the cost that may be involved in cleanup of any potentially large accident at the PFSF; nor have such costs been established by any other evidence in the record.

2.2.36. Recognizing the low probative value of the references studies with respect to cleanup costs involving a cask accident at the PFS site, Dr. Sheehan suggested that the studies be accepted to show what "some orders of magnitude might be, given some work that has been done elsewhere." Tr. 2531. Dr. Sheehan agreed, however, that the "order of magnitude" of the cost of cleanup at the PFS site may be different from that shown in these studies. *Id.* Thus, the studies are of no probative value in this proceeding. Further, apart from referencing these studies, Dr. Sheehan did not estimate accident probabilities, did not estimate accident consequences or cleanup costs, and he acknowledged that he is not a cost estimator. Tr. 2492, Tr. 2508. Accordingly, the referenced studies, and Dr. Sheehan's views concerning the potential magnitude of cleanup costs at the PFSF, are entitled to little weight in this proceeding.[52]

2.2.37. Basis 10 of Contention Utah S states:

> Basis 10. The Applicant specifies that decommissioning costs include $260,000 for a survey of the ISFSI site. LA, App B., p.4-6. The Applicant has failed to justify the basis for this estimate in that it does not state the year's dollars used (e.g., 1997 dollars) as provided in NUREG-1567, Draft Standard Review Plan for Spent Fuel Dry Storage Facilities, LA Appendix B, Chapter 4, and (ii) is not properly escalated to convert past dollars into future dollars values (i.e. the future value of costs when the costs are expected to be incurred).

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[52] Finally, as indicated above, the potential need to cover the cost of accident recovery at the PFSF is addressed by the nuclear property damage insurance which PFS has committed to obtain. Parkyn Decommissioning Post Tr. 2424, at 8.

2.2.38. With respect to Basis 10, Mr. Parkyn testified that the site survey cost estimate is in 1997 dollars. Parkyn Decommissioning, Post Tr. 2424, at 8. Mr. Parkyn testified that PFS will account for potential future increases in the cost of the site survey due to inflation by adjusting the decommissioning cost estimate annually to account for the effects of inflation using the annually-published CPI. *Id.* The annual review will account for any real changes in the cost of the site survey for the facility, such as changes other than those attributable to the cost of the dollar by accounting for these costs as part of the annual decommissioning cost estimate review. *Id.*

2.2.39. We have previously addressed the issue of the year's dollars in Basis 4, above. As with the issues of year's dollars and escalation presented in Basis 4, we consider these matters to be resolved.

III. CONCLUSIONS OF LAW

3.1. The Licensing Board has considered all of the evidence presented by the parties on Contentions Utah R (emergency planning) and Utah S (decommissioning funding). Based upon a review of the entire record in this proceeding and the proposed findings of fact and conclusions of law submitted by the parties, and based upon the findings of fact set forth herein, which are supported by reliable, probative, and substantial evidence in the record, the Board has decided all matters in controversy concerning these two contentions and reaches the following conclusions.

3.2. Pursuant to 10 C.F.R. § 72.32(a)(2), in support of its application, PFS is required to include in its emergency plan information identifying "each type of radioactive materials accident." Further, in accordance with 10 C.F.R. § 72.32(a)(5), the emergency plan is required to provide "a brief description of the means of mitigating the consequences of each type of accident . . . ." These regulatory provisions establish requirements for the

protection of public health and safety in the event of an emergency that may involve radioactive materials; they do not establish requirements for other types of events, such as fires that do not involve radioactive materials.

3.3. We conclude that PFS has provided reasonable assurance that public health and safety will be protected in the event of an emergency involving a fire at the PFSF, consistent with 10 C.F.R. § 72.32, in that it has adequately described each type of accident that may involve a fire, and the means and equipment to be used in mitigation of accidents involving a fire. Further, we conclude that PFS has adequate support capability (including water supply and firefighting personnel) for use in fighting fires onsite.

3.4. Within the scope of the issues raised in Contention Utah R, we conclude that PFS has provided an adequate description of its plans for coping with emergencies involving fires, as required by 10 C.F.R. § 72.24(k), and that its Emergency Plan complies with 10 C.F.R. § 72.32(a)(5), in accordance with 10 C.F.R. § 72.40(a)(11).

3.5. Pursuant to 10 C.F.R. § 72.30(b) and (c), in support of its application PFS is required to provide a decommissioning funding plan that includes information on how reasonable assurance will be provided that adequate funding will be available to decommission the facility, a cost estimate for decommissioning, and a description of the method of assuring funds for decommissioning, including means of adjusting cost estimates and associated funding levels periodically over the life of the ISFSI. Further, in accordance with 10 C.F.R. § 72.30(c), financial assurance for decommissioning must be provided by one or more of the following methods: (1) prepayment before the start of operation into an account segregated from licensee assets such that the amount of funds would be sufficient to cover decommissioning costs; (2) a surety method, insurance, or other method that guarantees that decommissioning costs will be paid; and/or (3) an external sinking fund in

which deposits are made at least annually, coupled with a surety method or insurance, the value of which may decrease by the amount being accumulated in the sinking fund.

3.6. Further, pursuant to 10 C.F.R. § 72.22(e)(3), in support of its application PFS is required to submit information sufficient to show its financial qualifications to carry out the activities for which the license is sought. The information must show that PFS either possesses the necessary funds, has reasonable assurance of obtaining the necessary funds, or by a combination of these two, will have the necessary funds available to cover, *inter alia*, estimated decommissioning costs, and the necessary financial arrangements to provide reasonable assurance prior to licensing that decommissioning will be carried out after the spent fuel is removed from storage.

3.7. Within the scope of the issues raised in Contention Utah S, we conclude that PFS has provided a decommissioning funding plan that includes the information required by 10 C.F.R. § 72.30(b) and (c), and that PFS has provided reasonable assurance that adequate funding will be available to decommission the facility.

3.8. Further, within the scope of the issues raised in Contention Utah S, we conclude that PFS has shown, in accordance with 10 C.F.R. § 72.22(e)(3), its financial qualifications to carry out the activities for which the license is sought. PFS has provided reasonable assurance of obtaining the necessary funds available to cover estimated decommissioning costs, and the necessary financial arrangements to provide reasonable assurance that decommissioning will be carried out after the spent fuel is removed from storage.

3.9. Accordingly, within the scope of the issues raised in Contention Utah S, we conclude that PFS has provided the information required by 10 C.F.R. §§ 72.22(e)(3),

72.30(b) and (c), and 72.40(a)(10), and that its decommissioning funding plan satisfies the requirements set forth therein.

Respectfully submitted,

Sherwin E. Turk
Counsel for NRC Staff

Catherine L. Marco
Counsel for NRC Staff

Dated at Rockville, Maryland
this 31st day of July, 2000

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the "NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW CONCERNING CONTENTIONS UTAH R (EMERGENCY PLANNING) AND UTAH S (DECOMMISSIONING FUNDING)" in the above captioned proceeding have been served on the following through deposit in the Nuclear Regulatory Commission's internal mail system, or by deposit in the Nuclear Regulatory Commission's internal mail system, with copies by electronic mail, as indicated by an asterisk, or by deposit in the United States mail, first class, as indicated by double asterisk, with copies by electronic mail as indicated, this 31st day of July, 2000.

G. Paul Bollwerk, III, Chairman*
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555
(E-mail copy to GPB@NRC.GOV)

Dr. Jerry R. Kline*
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555
(E-mail copy to kjerry@erols.com)

Dr. Peter S. Lam*
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555
(E-mail copy to PSL@NRC.GOV)

Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Office of the Secretary*
ATTN: Rulemakings and Adjudications Staff
U.S. Nuclear Regulatory Commission
Washington, DC 20555
(E-mail copy to HEARINGDOCKET@NRC.GOV)

Office of the Commission Appellate Adjudication
Mail Stop: 16-C-1 OWFN
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

James M. Cutchin, V*
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555
(E-mail to JMC3@NRC.GOV)

Jay E. Silberg, Esq.**
Ernest Blake, Esq.
Paul A. Gaukler, Esq.
SHAW, PITTMAN, POTTS &
TROWBRIDGE
2300 N Street, N.W.
Washington, DC 20037-8007
(E-mail copies to jay_silberg,
paul_gaukler, and ernest_blake
@shawpittman.com)

Denise Chancellor, Esq.**
Fred G. Nelson, Esq.
Laura Lockhart, Esq.
Ms. Jean Braxton
Utah Attorney General's Office
160 East 300 South, 5th Floor
P.O. Box 140873
Salt Lake City, UT 84114-0873
(E-mail copy to dchancel@State.UT.US),
and jbraxton@email.usertrust.com

Connie Nakahara, Esq.**
Utah Dept. of Environmental Quality
168 North 1950 West
P.O. Box 144810
Salt Lake City, UT 84114-4810
(E-mail copy to cnakahar@state.UT.US)

Diane Curran, Esq.**
Harmon, Curran, Spielberg & Eisenberg
1726 M Street, N.W., Suite 600
Washington, D.C. 20036
(E-mail copy to
dcurran@harmoncurran.com

Danny Quintana, Esq.**
Danny Quintana & Associates, P.C.
68 South Main Street, Suite 600
Salt Lake City, UT 84101
(E-mail copy to quintana
@Xmission.com)

Joro Walker, Esq.**
Land and Water Fund of the Rockies
2056 East 3300 South, Suite 1
Salt Lake City, UT 84109
(E-mail copy to
joro61@inconnect.com)

John Paul Kennedy, Sr., Esq.**
1385 Yale Ave.
Salt Lake City, UT 84105
(E-mail copy to john@kennedys.org)

Land and Water Fund of the Rockies**
2260 Baseline Road, Suite 200
Boulder, CO 80302

William D. (Bill) Peterson**
Pigeon Spur Fuel Storage Facility
2127 Lincoln Lane
Holladay, UT 84124
(E-mail copy to
BillPeterson@OlympicHost.com

Catherine L. Marco
Catherine L. Marco
Counsel for NRC Staff