RAS 1729 **DOCKETED 05/16/00**

May 15, 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 Kline
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
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:

In accordance with the Atomic Safety and Licensing Board's May 1, 2000, Memorandum and Order, the Staff is providing the following list of direct case witnesses and exhibits.

A. Direct Case Witnesses

Randolph L. Sullivan	(R)
Paul W. Lain	(R)
Jack Guttmann	(H)
Alex F. McKeigney	(E & S)
Robert S. Wood	(E & S)

B. Exhibits

Staff Exhibit A
Safety Evaluation Report of the Site-Related Aspects of the Private Fuel Storage Facility Independent Spent Fuel Storage Installation, dated December 15, 1999 (revised in its entirety January 4, 2000). Staff Exhibit A was provided to the Licensing Board and parties in January 2000. An electronic version will be forwarded by e-mail tomorrow.

Staff Exhibit B
Certificate of Compliance for the Holtec International HI-STORM 100 Cask System, dated May 4, 2000 with Appendix B, "Approved Contents and Design Features For the HI-STORM 100 Cask System," p. 3-8 and Holtec International HI-STORM 100 Cask System Safety Evaluation Report, Chapter 4, "Thermal Evaluation." Staff Exhibit B is attached hereto, with an electronic copy to be forwarded tomorrow.

In addition, as directed in the May 8, 2000, telephone conference, the Staff is providing a list of individuals expected to attend closed sessions during the June hearing.

They are:

1. Sherwin E. Turk
2. Catherine L. Marco
3. Mark S. Delligatti
4. Jack Guttmann
5. Alex McKeigney
6. Robert S. Wood
7. E. William Brach
8. Susan F. Shankman
9. Marissa Bailey
10. Scott Flanders
11. Thomas Michener
12. Donald Trent

The following individuals may also be in attendance:

13. Amitava Ghosh
14. Budhi Sagar
15. Asad Chowdury
16. Robert M. Weisman

Finally, the Staff is herewith providing to all parties and the Licensing Board a copy of the Staff's testimony related to Utah Contention R. The Staff's testimony related to Utah Contentions E, S, and H is being provided to the Licensing Board and counsel for the Applicant and the State only in that it may contain proprietary information.

Sincerely,

/RA/

Catherine L. Marco
Counsel for NRC Staff

cc w/enclo.: Service List

May 15, 2000

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF TESTIMONY OF PAUL W. LAIN
AND RANDOLPH L. SULLIVAN
CONCERNING CONTENTION UTAH R
(ONSITE FIRE FIGHTING CAPABILITY)

Q1. Please state your names, occupations, and by whom you are employed.

A1(a). My name is Paul W. Lain (PWL). I am employed as a Fire Protection Engineer in the Licensing & International Safeguards Branch, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission (NRC), in Washington, D.C. A statement of my professional qualifications is attached hereto.

A1(b). My name is Randolph L. Sullivan (RLS). I am employed as an Emergency Preparedness Specialist in the Operator Licensing, Human Performance, and Plant Support Branch, Division of Inspection Program Management, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission (NRC), in Washington, D.C. A statement of my professional qualifications is attached hereto.

Q2. Please describe your current responsibilities.

A2(a). (PWL) I currently conduct fire safety reviews for fuel cycle facilities licensed by the NRC, and also perform various project management duties for the NRC in connection with its regulation and oversight of nuclear fuel cycle facilities.

A2(b). (RLS) I develop, review and revise emergency preparedness inspection procedures and programs. I review and evaluate nuclear facility Emergency Plans and revisions to those plans to ensure regulatory compliance, and to ensure that the Emergency Plans can be implemented in a manner that protects the public health and safety in the event of an emergency.

Q3. Please explain what your duties have been in connection with the NRC Staff's review of Private Fuel Storage, L.L.C.'s (PFS or the Applicant) application to construct and operate an Independent Spent Fuel Storage Installation (ISFSI) on the reservation of the Skull Valley Band of Goshute Indians.

A3(a). (PWL) As part of my official responsibilities, I reviewed the Applicant's Safety Analysis Report (SAR) and Emergency Plan (EP), pertaining to the Applicant's fire protection equipment and firefighting capabilities, as well as its responses to the NRC Staff's Requests for Additional Information (RAIs). In addition, I was principally responsible for preparing the NRC Staff's Statement of Position on Contention Utah R, dated December 15, 1999; and I participated in preparing the NRC Staff's response to the Applicant's motion for partial summary disposition of Contention Utah R, filed on July 28, 1999.

A3(b). (RLS) As part of my official responsibilities, I reviewed the Applicant's Emergency Plan and prepared Chapter 16 ("Emergency Plan") of the NRC Staff's Safety Evaluation Report (SER) for the PFS facility, which was issued on December 15, 1999 (revised and reissued on January 4, 2000). In addition, I assisted in preparing the NRC Staff's response to the Applicant's motion for partial summary disposition of Contention Utah R, which the Staff filed on July 28, 1999.

Q4. What is the purpose of this testimony?

A4. The purpose of this testimony is to provide the NRC Staff's views concerning Utah Contention R, involving (a) the Applicant's systems and ability to fight fires onsite, and (b) the adequacy of the Applicant's planning for fighting fires, as set forth in its Emergency Plan. Accordingly, this testimony provides an evaluation of fire protection safety at the PFS facility, and an evaluation of the Applicant's emergency planning with respect to fires.

Q5. Are you familiar with Utah Contention R?

A5. Yes. Utah Contention R states as follows:

> 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][1] in that: . . . 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.

The State, in the contention's basis section, further asserted that PFS had not described the means and equipment needed for mitigating the consequences of fires, contrary to 10 C.F.R. § 72.32(a)(5) and Regulatory Guide (Reg. Guide) 3.67, § 5.3. In particular, the State asserted that (a) the EP "does not state whether sufficient water is available to fight a fire of any consequence"; (b) the EP does not describe the program for maintaining any equipment"; and (c) while the SAR indicates that PFS will obtain water for fighting fires from surface storage tanks, the tanks' water capacity requires evaluation.

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[1] The "transfer facility" is not addressed in this testimony, inasmuch as the Licensing Board has dismissed all portions of the contention that relate to the Rowley Junction Intermodal Transfer Point. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-39, 50 NRC 232, 233, 236 (1999).

Fire Safety

Q6. Please identify the Commission's requirements related to fire safety at an away-from-reactor ISFSI.

A6. (PWL) The Commission has established 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, as set forth in 10 C.F.R. § 72.120 *et seq.* In particular, with respect to fire hazards the regulations provide as follows:

> **§ 72.122 Overall requirements.**
>
> . . .
>
> (b) Protection against environmental conditions and natural phenomena. (1) Structures, systems, and components important to safety must be designed to accommodate the effects of, and to be compatible with, site characteristics and environmental conditions associated with normal operation, maintenance, and testing of the ISFSI . . . and to withstand postulated accidents.
>
> . . .
>
> (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.

Regulatory guidance concerning these requirements has been provided in the Standard Review Plan for Spent Fuel Dry Storage Facilities, NUREG-1567.

Q7. With respect to fire safety, do you agree with the State of Utah's contention that the Applicant has not adequately described the means and equipment for mitigation of accidents because it does not have adequate support capability to fight fires onsite?

A7. (PWL) No.

Q8. Please explain the basis for your conclusion in this regard.

A8. (PWL) I have reviewed the Applicant's description 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, as set forth in the Applicant's Safety Analysis Report (SAR), Emergency Plan (EP), and responses to Staff Requests for Additional Information (RAIs). On the basis of my review, I have determined 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.

Q9. From a fire safety standpoint, please describe the general layout of the proposed PFS facility.

A9. (PWL) The PFS facility has three main areas within the Restricted Area (RA): (1) the storage pads, (2) the Canister Transfer Building (CTB), and (3) the Safety and Health Physics Building (S&HPB). The storage pads are where the loaded storage casks will be placed for long term storage and are relatively isolated in the northwest portion of the RA. The RA will be covered with compacted gravel and the area will be void of any significant combustibles. A minimum 200 ft fire break will be provided between any vegetation and the nearest storage pad. The rail line is reported to be 110 ft away from the

storage pads, the CTB a distance of 425 ft, the diesel fuel tank is 700 ft, and the nearest propane tank will be 1800 ft away.

The CTB has three “fire areas”: The office/equipment rooms, the low level waste storage room, and the operations area. The office/equipment rooms are separated from the radiological areas by a one hour fire barrier. In the low level waste storage room, contaminated combustibles are stored in metal barrels and the room is segregated from the other areas by a one hour fire barrier. The operations area contains three main bays: the cask transporter bay, the transfer cell/crane bay, and the cask load/unload bay. The cask transporter bay is where the cask transporter moves storage casks in and out of the canister transfer cells and is separated from the transfer cells by a two hour fire barrier. The crane bay is 90 ft high and contains three canister transfer cells. The cells are separated from each other and the load/unload bay by 30 ft high concrete walls. The cells have no ceiling, thereby allowing the gantry crane to preform canister transfer operations. The crane bay has a bridge crane for moving the shipping casks to and from the load/unload bay to the transfer cells.

The cask load/unload bay is used to load/unload shipping casks from rail cars or the heavy haul vehicle and has three sections: the crane bay and two low bays. The crane bay is an extension of the transfer cell/crane bay and is separated by a 1 inch threshold to help prevent diesel fuel spills from spreading into the transfer cell bays. The low bays are attached to opposites sides of the crane bay with 22 ft high doorways and 30 ft high ceilings. These low bays provide shelter for the heavy haul vehicle and rail car during load/unload operations.

The S&HPB is the control point for the RA. It houses the central monitoring alarm station, fire brigade equipment, and the emergency diesel generator. The S&HPB is the central point for dispatching the fire brigade.

Q10. Please identify any significant combustible sources that will be located at the facility, and discuss the adequacy of the containers in which those materials will be stored.

A10. (PWL) Diesel fuel is the significant combustible fuel source within the RA. Significant quantities of diesel fuel within the RA will be located in: (1) a storage tank, (2) the generator day tank, (3) the cask transporter vehicle, (4) the heavy haul vehicle, and (5) two locomotives. The storage tank is located inside the RA, 200 ft from the CTB and 700 ft from the storage pads. 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). 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. 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.

The diesel generator day tank will hold 350 gallons and will be located in the S&HPB. The fuel supply is sized to provide continuous 24 hour generator operation. The fuel 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. The location, fire protection, and design of the diesel generator day tank provide adequate assurance that the fire hazard posed by this tank will not affect the containment of radiological material.

The cask transporter holds 50 gallons of fuel and moves the storage casks between the CTB and the storage pads. The heavy haul vehicle holds 300 gallons of fuel in two saddle tanks and moves the shipping casks between the intermodal transfer point and the CTB. The locomotive that moves the shipping casks between the main rail line and the CTB holds 6400 gallons of fuel, and the switching locomotive that moves rail cars within the RA holds 1100 gallons of diesel fuel.

Q11. Please provide the basis for your view that the Applicant's building design is adequate from a fire safety perspective.

A11. (PWL) Under the ISFSI general design criteria in 10 C.F.R. § 72.122(c), non-combustible and heat-resistant materials must be used wherever practical throughout the ISFSI. The Applicant's SAR describes the CTB design. The material of construction is 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.

In addition, the facility is designed to control the spilling of fuel from transportation vehicles. The SAR discusses the drainage design of the CTB in detail. The floor in the cask transport bay will be sloped to prohibit fuel from entering the transfer cell from a cask transporter spill. A one inch threshold is provided between the transport bay and the load/unload bay and the load/unload bay floors will be sloped to divert a heavy haul vehicle fuel spill away from transfer cells and shipping casks into two large sumps, one in each low

bay. Each sump's capacity will hold the fuel load from the heavy haul vehicle (300 gallons) and 30 minutes of flow from the foam water deluge system.

Q12 What are the structures, systems and components important to safety (SSCs) at the PFS facility, and where will the SSCs be located?

A12. (PWL) PFS has designated the spent fuel canister, storage cask, storage pads, transfer cask, associated lifting devices, bridge crane, semi-gantry crane, canister transfer building, and seismic support struts as SSCs. 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.

Q13. Please explain how the Applicant's description of cask construction provides a basis for your conclusion that the Applicant's description of its means and equipment to fight fires onsite is adequate?

A13. (PWL) Regarding the storage cask, NUREG-1567 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." In other words, the storage casks, at a minimum, should be able to withstand the thermal exposure from the available fuel present. The PFS facility SAR and cask TSAR demonstrate that the HI-STORM storage cask exceeds this guidance standard.

The HI-STORM storage cask was evaluated under a thermal threat of a 200 gallon diesel fuel fire for 15 minutes. The evaluation showed that only a few inches of the heavy concrete structure is affected and the canister is maintained within accepted thermal limits. The bounding threat to the HI-STORM storage cask is the cask transporter fire, which is 50 gallons of diesel fuel that is expected to burn less than five minutes.

The canister transfer cask is protected by lead shielding and a water jacket. The lead and water act like a heat sink, slowing the thermal insult on the canister during a fire.

The bounding fire threat to a loaded transfer cask is a fire in the load/unload bay. The PFS SAR discussed an analysis of the transfer cask during an unmitigated bounding fire and concluded the calculated maximum temperatures around a loaded transfer cask poses no threat to the structural integrity of the steel canister or transfer cask. The short term temperature limits for the transfer cask and canister shell is 700^{o}F and 775^{o}F, respectfully. The calculated temperatures from the unmitigated bounding fire were below these short term limits.

Based on its review of these matters, the Staff has concluded 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.

Q14. Please explain how the Applicant's description of credible fire scenarios provides a basis for your acceptability finding?

A14. (PWL) The Applicant's SAR reviews the bounding credible fire scenarios, which involve the cask transport vehicle, the heavy haul vehicle, and the locomotive. The cask transporter moves the storage casks in and out of the transfer cells and out to the storage pad. The fuel loading on the cask transporter is 50 gallons of diesel fuel. Two fire scenarios were evaluated: one at the storage pad, and another in the transfer cell. In both cases, the fire insult was bounded by the Holtec TSAR thermal evaluation of a 15 minute fire involving 200 gallons of diesel fuel.

The Applicant's SAR postulates a heavy haul vehicle fire (300 gallons of diesel fuel) in the load/unload bay. The SAR evaluates this scenario with additional fuel loading (tires from the heavy haul vehicle) and utilizes computer analysis to calculate the fire plume temperature in the lower bay and the average upper layer temperature in the transfer bay. The plume temperature analysis showed that the facility's concrete structure can withstand this fire without collapse and the upper layer temperature in the transfer bay would not

affect a loaded transfer cask. Upper layer temperatures were half of those 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). This analysis was conservative since it did not take into effect the benefits of the smoke removal system, load/unload bay drainage, foam-water deluge, and manual efforts to mitigate the fire before these temperatures are reached.

The Applicant's SAR also evaluates a 6400 gallon locomotive diesel spill and its effects on storage casks located on the storage pads. The storage pads are located no closer than 110 feet from the rail line. PFS calculated the heat flux from three different size pool fires and the effects on the storage casks. PFS determined that the fire would produce less heat flux on the storage casks then the cask transporter fire and therefore, this scenario was bounded.

PFS has committed to prohibit the locomotive from entering the CTB, and the SAR discusses the strategy. The locomotive will push a loaded rail car into the CTB, and will pull the empty car out of the CTB after it is unloaded. PFS will place a 66 ft spacer car between the locomotive and the rail car in moving the rail car into and out of the CTB. In addition, physical stops will be mounted on the rails to assure the locomotive does not enter the building. These measures provide adequate assurance that the locomotive will not enter the CTB.

Q15. Please explain the basis for your conclusion as it relates to the Applicant's description of its fire protection systems?

A15. (PWL) Under the ISFSI general design criteria in 10 C.F.R. § 72.122(c), fire detection, alarm, and suppression systems will 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 Applicant's 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 building and at a central alarm panel in the Security and Health Physics Building for continuous 24 hour a day monitoring. Smoke removal is provided by the building's exhaust ventilation fans and should reduce the 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.

Q16. Please explain the basis for your conclusion as it relates to the Applicant's description of the water supply.

A16. (PWL) PFS plans to construct a water system to provide water for the fixed fire suppression systems, hose lines, and hydrants. The capacity of the primary tank meets NFPA requirement to specify the largest fixed fire suppression system demand and hose stream allowances, per NFPA 13. PFS has calculated this demand and has specified that two, 200,000 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. The primary capacity is also within the norms for an industrial facility. Factory Mutual's Loss Prevention Data Sheet 3-2 ("Water Tanks for Fire Protection") notes that "tanks of 100,000

to 300,000 gal (379 to 1136m^3) capacity are usually selected for storage purposes." Since NFPA 801 requires an eight hour refill time, PFS plans to provide an equal secondary supply. The Applicant has also 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. The Staff is satisfied with this design and concludes that PFS will have an adequate water supply for fire fighting.

Q17. Please explain the basis for your conclusion as it relates to the Applicant's description of its firefighting capability and equipment?

A17. (PWL) Under the ISFSI general design criteria in 10 C.F.R. § 72.122(g), structures, systems and components important to safety must be designed for emergencies. 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. The Applicant's EP indicates that emergency response equipment will be located in the Security and Health Physics Building away from the CTB. One fire truck will be located on-site, one will be located at the Goshute village 3.5 miles away, and additional fire fighting assets will also be available from the Tooele County. 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.

The Applicant's Emergency Plan (EP) indicates that a five-member fire brigade will be available during the normal 40 hour work week and on-call after hours; in addition, the security staff will be trained to handle an initial response during minimal staffing periods.

The brigade will receive training and equipment in accordance with industry standards (NFPA 600) and additional training will be provided for fire truck operations. Training to familiarize offsite responders will be offered annually. The Staff considers this description of the Applicant's fire protection training program to be adequate.

Q18. The State has also asserted that the EP does not describe the program for maintaining equipment. Do you agree with this assertion?

A18. (PWL) No. In the EP, the Applicant has committed to have fire fighting equipment and gear stocked, inventoried, and maintained in accordance with NFPA 600. This standard requires equipment to be maintained in accordance with manufacturers' instructions. The Applicant also committed to conduct inventories of emergency response equipment and supplies quarterly and after each use. The Staff concludes that PFS' commitment to maintain fire fighting equipment in accordance with industry standards is acceptable and will provide adequate maintenance of its fire fighting equipment.

Q19. Please provide your conclusions regarding the adequacy of the Applicant's support capability to fight fires onsite?

A19. (PWL) It is my conclusion 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.

Emergency Planning

Q20. Please describe the NRC's requirements and the generic standards which apply to Emergency Plans for away-from-reactor ISFSIs.

A20. (RLS) Pursuant to 10 C.F.R. § 72.24(k), an application for a Part 72 license must contain a Safety Analysis Report describing the Applicant's plans for coping with emergencies, as required by 10 C.F.R. § 72.32. Pursuant to 10 C.F.R. § 72.32(a), each application for an ISFSI be accompanied by an Emergency Plan that includes specific

information, as set forth in 10 C.F.R. § 72.32(a)(1) through (16). These requirements specify the content of Emergency Plans, including:

- Facility description
- Types of accidents and the detection and classification of those accidents
- Mitigation of potential consequences of the identified accidents and the means of restoring the facility to a safe condition
- Assessment of any potential releases associated with the identified accidents
- Responsibilities of licensee personnel to ensure the implementation of the Emergency Plan
- Commitments for the notification of and coordination with offsite response organization and a description of the information to be communicated to those offsite response organizations
- Commitments for the training of emergency response personnel, including the conduct of drills to develop and maintain proficiency
- Arrangements for requesting and effectively using offsite assistance
- Arrangements for providing information to the public
- Commitment to allow offsite response organizations to comment on the initial submittal of the Emergency Plan.

Additionally, NUREG-1567, "Standard Review Plan for Spent Fuel Storage Facilities" (Draft Report, October 1996) provides detailed guidance criteria for use by the Commission in reviewing an ISFSI emergency plan and evaluating the adequacy of an applicant's emergency preparedness program elements.

Q21. Do the Commission's emergency planning regulations contain specific requirements that apply to an applicant's fire fighting capability?

A.21. (RLS) The Commission's emergency planning regulations do not explicitly address fire fighting capabilities. Specification of such capabilities may be necessary, however, if the identified emergency events for a facility involve fire. In such cases, as is the case for the PFS facility, NUREG-1567 indicates that an Emergency Plan must provide the following with regard to fire fighting:

- 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 fire fighting efforts,
- describe training for fire fighting personnel,
- describe arrangements for offsite firefighting support, and
- describe maintenance of fire fighting equipment.

Q22. Please state your view as to whether the information provided in the PFS Emergency Plan is adequate and complies with NRC regulatory requirements and guidance with respect to fire events requiring an emergency response, including the Applicant's fire fighting capability.

A22. (RLS) Based on my review of the Applicant's Emergency Plan, and its provisions relating to an emergency response to a fire event, I am satisfied that the Applicant's Emergency Plan complies with applicable regulatory requirements and guidance, providing reasonable assurance that the public health and safety will be protected in the event of a fire at the PFS facility. The PFS Emergency Plan complies with applicable regulations and guidance with respect to fire fighting capability, in accordance with 10 C.F.R. § 72.32(a) and the detailed criteria set forth in Draft NUREG-1567. The

Staff has concluded that the Applicant's Emergency Plan with respect to fire fighting is, therefore, adequate.

With respect to fires, the PFS 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 of its Emergency Plan, PFS describes its plans for accident detection, mitigation, and assessment of radiological releases. With respect to the mitigation of accident consequences involving a fire, the Plan states as follows (*Id.* at 3-5 - 3-6):

> Fire fighting capability is available onsite, consisting of a fire truck, fire fighting equipment and trained personnel assigned to the fire brigade. Personnel will be evacuated from the affected area and the fire brigade will be mobilized to mitigate the consequences of a fire. A second fire truck, stationed near the PFSF site at the Skull Valley Indian Reservation village, is also available and can rapidly respond to the site to supplement the fire fighting capability at the PFSF. The Tooele County Fire Department will be called to assist in extinguishing fires beyond the capability of the fire brigade.
>
> The Canister Transfer Building is constructed of fire retardant and non-flammable building materials. Administrative controls will restrict combustibles within the building to those necessary for canister transfer operations. However, the diesel fuel in tanks of the heavy-haul transport vehicles will enter the Canister Transfer Building when shipping casks are trucked into and out of the building. Automatic fire detection and suppression capability will be provided in the Canister Transfer Building, in accordance with National Fire Protection Association (NFPA) requirements, to mitigate the effects of a worst case fire and assure a diesel fuel fire is extinguished in a timely manner.

In Chapters 4 and 5 of its Emergency Plan, PFS describes its 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. With respect to fires, the emergency response equipment includes, *inter alia*, the following:

> Automatic fire detection and suppression equipment located in the Canister Transfer Building;
>
> The PFSF onsite fire truck
>
> Personnel protective equipment, including respirators and anti-contamination clothing;
>
> Fire fighting equipment and gear, including self-contained breathing apparatus stocked, inventoried, and maintained in accordance with NFPA 600 . . . .

Id. at 5-8. The Emergency Plan further indicates that specialized training will be provided to the emergency response organization, including the following: "Facility Fire Brigade members will receive training as prescribed by NFPA 600. . . . The training will include methods of controlling fires under accident conditions in accordance with Fire Protection Procedures, search and rescue, first aid, and procedures for handling and treating contaminated and injured personnel. Additional training will be provided on operation of the fire trucks." *Id.* at 6-2. In addition, the Emergency Plan indicates that fire drills will be conducted in accordance with Fire Protection Procedures, at least annually. *Id.* at 8-2.

In sum, the Staff has concluded that the Applicant's Emergency Plan satisfies the Commission's emergency planning regulations, and that sufficient information has been provided concerning the Applicant's plans for detecting, assessing, and mitigating the consequences of fires at the facility, based on the sufficiency of the Applicant's plans for responding to a fire event.

Q23. Please describe the manner in which the PFS Emergency Plan complies with the NUREG-1567 guidance with respect to fire fighting capabilities?

A23. (RLS) The following discussion compares the Applicant's Emergency Plan, as it applies to fire fighting capabilities, with the specific Draft NUREG-1567 guidance

criteria, and explains the Staff's views as to the manner in which the PFS Emergency Plan complies therewith.

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 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, as discussed above, automatic fire detection and suppression equipment is located in some buildings, including the Canister Transfer Building.

Describe firefighting capabilities. As discussed above, the 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.

Based on a review of the Applicant's Emergency Plan, as it relates to fire fighting, the Staff has concluded that the PFS Emergency Plan satisfies the requirements of 10 C.F.R. § 72.32, and the guidance criteria in Draft NUREG-1567. The operability of the Applicant's fire protection systems (including fire truck, fire pumps, and sprinkler systems), the adequacy of training to be received by its fire brigade, and the results of fire drills that are performed by PFS, will be evaluated by the Staff during its post-licensing operational inspections of the facility.

Q24. Does this conclude your testimony?

A24. Yes.

Paul W. Lain, P.E.
Statement of Professional Qualifications

Mr. Lain is a board certified professional engineer with more than 16 years of experience in fire protection engineering. He has held technical and project management positions for the U.S. Navy, Department of Energy (DOE), and the Nuclear Regulatory Commission (NRC). He has conducted inspections on aircraft carriers, battleships, plutonium and uranium manufacturing facilities, and a nuclear waste storage facility. He has conducted over 100 shipboard fire tests to verify the effectiveness of smoke control systems onboard naval vessels. He was the fire protection expert on multiple Operational Readiness Reviews for DOE nuclear facilities. Mr. Lain authored the Fire Protection Chapter of the Standard Review Plan for NRC fuel cycle facilities, and conducted the fire protection review for the re-licensing of the Nuclear Fuel Services facility in Tennessee. Currently, Mr. Lain conducts the fire protection licensing reviews for fuel fabrication facilities licensed by the NRC.

EDUCATION

Bachelor of Science in Fire Protection Engineering from the University of Maryland, 1983
Master of Science in Fire Protection Engineering from Worcester Polytechnic Institute, 1996

PROFESSIONAL EXPERIENCE

From 1983 to 1991, Mr. Lain was a fire protection engineer for the Fire Protection Systems Branch of the Naval Sea Systems Command. He was the project manager for many research projects pertaining to fire protection onboard U.S. naval ships and submarines. He conducted over 100 large scale fire tests onboard the navy's test vessel USSX Shadwell, to determine the feasibility of active smoke control utilizing the existing shipboard ventilation system. He performed fire protection inspections and design reviews on a variety of U.S. naval vessels.

From 1991 to 1997, Mr. Lain was a fire protection engineer for the Division of Nuclear Material and Facility Stabilization at DOE. Mr. Lain was the fire protection subject matter expert for reviews of Safety Analysis Reports (SARs) at Rocky Flats Environmental Technology Site and Idaho National Engineering Laboratory, for Operational Readiness Reviews of F-Canyon, FB-Line, and the Inter Tank Processing facilities at the Savanna River Site, and the Fire Protection Vulnerability Review of Y12 and K25 facilities at Oak Ridge.

Since May of 1997, Mr. Lain has been a fire protection engineer for the NRC Office of Nuclear Materials Safety and Safeguards, in the Licensing and International Safeguards Branch. He conducts fire safety reviews of fuel cycle facilities licensed by the NRC and was the NRC project manager for the Siemens Power Corporation facility in Richland, Washington. Additional duties include the development of the Fire Safety Chapter of the Standard Review Plan for fuel cycle facilities, inspections of the Oak Ridge National Laboratory's Research and Engineering Development Center, the Gaseous Diffusion Plant at Paducah, KY., and the Nuclear Fuels Services Facility in Erwin, TN.

MEMBERSHIPS

Mr. Lain is a member of the National Fire Protection Association (NFPA) and has served on several standards committees of the NFPA. He is a licensed professional engineer in the State of Maryland.

Randolph L. Sullivan
Statement of Professional Qualifications

Mr. Sullivan is a board certified health physicist with more than 25 years of experience in emergency preparedness and radiological protection. He has held senior technical and managerial positions within the commercial nuclear industry and the Federal Government. His expertise includes health physics, technical hazards assessment, engineering and emergency preparedness. He has provided consulting assistance to more than 12 commercial nuclear utilities and several private firms. He has performed on projects for Department of Energy prime contractors. His experience in private industry has included responsible management and technical staff positions. He managed a full-scope nuclear power plant emergency preparedness program and was the Project Manager on the startup of an emergency preparedness program. As a Radiation Specialist at the Nuclear Regulatory Commission, he inspected commercial nuclear power plants, large byproduct-material licensees, a waste disposal site, and a fuel fabrication facility. Mr. Sullivan currently is an Emergency Preparedness Specialist with the Nuclear Regulatory Commission.

EDUCATION

B.S. Engineering Science, Illinois Institute of Technology
U.S. Atomic Energy Commission, Reactor Health Physics Training Courses

BACKGROUND

At U. S. Nuclear Regulatory Commission, he is an Emergency Preparedness Specialist, performing licensing activities for nuclear licensees.

At Advanced Technologies and Laboratories, Inc. he was a consultant to DOE, supporting the Office of Environmental Management in the assessment of LLW disposal site radiological capacity, the Office of Environment, Safety and Health (ES&H) in the development of professional level Radiation Protection training programs and the Office of Emergency Management in the assessment of demonstration exercises and the development of performance measurements. He assisted the Waste Isolation Pilot Plant site in the conduct of emergency management exercises during their Operational Readiness Review and in the mentoring of Emergency Preparedness staff

At Program Management Inc., Mr. Sullivan provided technical support to DOE's Office of Environment, Safety and Health in radiation protection standards and policy development. He supported the development of an Environmental Assessment for amendments to 10 C.F.R. Part 835, "Occupational Radiation Protection" and finalization of Revision 2 to the DOE Radiological Control Manual.

At Natural and Technical Hazards Management Inc.(NTHMC), Mr. Sullivan developed emergency action levels for the Power Burst Facility and the Test Area North at Idaho National Engineering Laboratory. This included detailed efforts to assess radiological and toxic chemical hazards.

At mbs Consulting Partners, Mr. Sullivan was the Chief Partner of this consulting group, which provided custom dose projection software to seven nuclear power plant sites. The software implemented the new 10 C.F.R. Part 20 and EPA 400 regulations. mbs was also the American distributer for the Safe Training System, a chemical and radiological contamination simulation system.

At GPU Nuclear, Mr. Sullivan was the Oyster Creek Nuclear Generating Station Emergency Preparedness Manager, responsible for a full scope Emergency Preparedness (EP) program and a staff of senior technical personnel. He implemented numerous improvement projects leading to the only NRC rating of SALP-1 at this site for several reporting periods. He established a "state of the art" Technical Support Center including automated data projection systems and an online dose projection system. He upgraded and standardized training programs to minimize student time while maximizing training impact by the use of case studies and hands on testing. He developed numerous drill/ exercise scenarios, conducted the associated critiques and assigned corrective actions. Mr. Sullivan critiqued over 20 actual emergency events, assigning corrective actions where appropriate and presenting findings to Management and NRC. He was responsible for extensive interface with State and local officials in the implementation of supportive emergency plans as well as conducting media briefings and responding to media inquiries. He was responsible for all NRC interface for emergency preparedness. He participated in Institute for Nuclear Power Operations EP assessments at nuclear plant sites and was requested to critique several exercises at neighboring power plants. Mr. Sullivan was selected as Secretary of the Site Management Team, a senior level committee created to foster a culture of excellence. He managed engineering, technical and craft personnel during the 15R outage as the Turbine Building Manager.

At Hydro Nuclear Services, Mr. Sullivan provided health physics audit and consulting services to Nuclear Pharmacy Inc., a large byproduct-material licensee. He supported several emergency preparedness and health physics projects for nuclear power plants.

At Impell Corporation, Mr. Sullivan was Project Manager for an emergency preparedness startup and licensing effort at a nuclear power plant. He managed a group responsible for the development of a unique simulator-based training and drill program. He trained and coached executive and senior management personnel through a successful first exercise.

At Allen Nuclear Associates, Mr. Sullivan was part of a technical staff performing the start-up of a full scope nuclear plant health physics program. He assisted in the development of the emergency preparedness program and the ALARA program. He performed management analysis for the selection of appropriate staff for senior emergency plan positions.

At Quadrex Corporation, Mr. Sullivan was Manager of Health Physics Services, responsible for multiple projects including preparation of emergency plans and procedures, nuclear plant decommissioning, accident analysis, diffusion modeling, environmental monitoring, and the Systematic Evaluation Program for two power plants. He participated in the assessment of the General Atomic Fusion Reactor and supported the Hanford Tank Farm remediation project. He performed a hazards assessment in support of the startup of the Loss of Flow Test Facility at INEL.

While with the NRC (in the 1970s), Mr. Sullivan was responsible for the regulation and inspection of Health Physics and Emergency Preparedness programs at nuclear plants, research reactors, a fuel fabrication facility, hospitals, universities, and large industrial byproduct-material licensees.

As a Health Physics Technician at the University of Illinois, Mr. Sullivan routinely inspected over 100 medical research labs, developed procedures, shipped rad-waste, implemented a TLD system, and supported radiation therapy dosimetry.