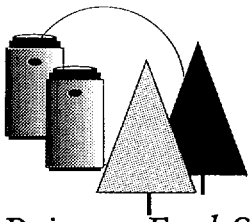

Private Fuel Storage, L.L.C.

P.O. Box C4010, La Crosse, WI 54602-4010
Phone 303-741-7009 Fax: 303-741-7806
John L. Donnell, P.E., Project Director

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

April 28, 2000

EIS COMMITMENT RESOLUTION LETTER #9
DOCKET NO. 72-22 / TAC NO. L22462
PRIVATE FUEL STORAGE FACILITY
PRIVATE FUEL STORAGE L.L.C.

References: 1. PFS Letter, Parkyn to U.S. NRC, Suspension of Licensing Activity for the TranStor Storage System, dated April 7, 2000
2. April 27, 2000 telephone call between the NRC and S&W

During the above referenced telephone call, between Scott Flanders of the NRC and Stone and Webster (S&W) personnel, the NRC requested additional information regarding PFSF radiation dose estimates. The NRC request is documented below along with the PFS response.

NRC Requests/Questions

The NRC requested additional information regarding doses at the PFSF associated with storage pad construction and personnel doses associated with canister transfer operations. Section 4.1.9 of the PFSF Environmental Report (ER), "Radiation Doses to Storage Pad Construction Workers", provides information on estimated doses to workers assuming that one-half of the storage casks in the cask storage area are HI-STORM storage casks and one-half are TranStor storage casks. Since licensing activity has been suspended for the TranStor storage system, the NRC is interested in estimated doses to PFSF construction workers (constructing storage pads in phase 2 and 3 of construction) if it is assumed that all of the casks loaded on pads in the vicinity of the construction workers are assumed to be HI-STORM storage casks. Likewise, Section 7.4 of the PFSF Safety Analysis Report (SAR) provides information regarding annual doses to PFSF workers involved in canister transfer and maintenance operations, and dose estimates are averages that those workers would receive while working on HI-STORM and TranStor cask

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systems. The NRC is interested in annual doses assuming all the casks involved in these operations are HI-STORM casks.

PFS Response

Attachment 1 is the proposed draft of Revision 8 to the PFSF ER Section 4.1.9, which includes an estimate of doses to pad construction workers based on the assumption that all the casks in the cask storage area are HI-STORM storage casks.

Attachment 2 is the proposed draft of Revision 12 to PFSF SAR Section 7.4, which includes an estimate of annual doses to personnel involved with canister transfer and maintenance operations assuming that all the operations involve HI-STORM cask systems.

The PFSF SAR and ER will be updated to include the attached information in the next amendment scheduled for issue in May 2000.

If you have any questions regarding this response, please contact me at 303-741-7009.

Sincerely

John L. Donnell
Project Director
Private Fuel Storage L.L.C.

Attachments

Copy to (with enclosure):
Mark Delligatti
Scott Flanders (8 copies)
John Parkyn
Jay Silberg
Sherwin Turk
Greg Zimmerman
Scott Northard
Denise Chancellor
Richard E. Condit
John Paul Kennedy
Joro Walker
Eileen Supko

ATTACHMENT 1

PROPOSED UPDATE TO PFSF ENVIRONMENTAL REPORT

SECTION 4.1.9

4.1.9 Radiation Doses to Storage Pad Construction Workers

As discussed in Sections 3.2 and 4.1.7 of the PFSF Environmental Report, construction of the PFSF will be performed in three phases to meet the anticipated long-term schedule for receipt of spent fuel. This approach will allow the PFSF to begin operations in a timely manner and to levelize construction activities and costs over time. It will also provide long term employment for people living in the area from the construction of concrete storage pads and casks.

Phase 2 pad construction (SW quadrant) will be performed while the Phase 1 (SE quadrant) pads are being loaded with casks, and will be completed before all of the Phase 1 casks are in-place. Phase 2 earthwork, soil stabilization, and pad construction will utilize the same technique and sequence as was used for the Phase 1 pads; i.e., row-by-row (running north-south), working from east to west across the SW quadrant. During Phase 2 construction, storage casks will beloaded on the SE quadrant of storage pads beginning on the eastern side and advancing toward the west. This sequence maximizes the distance between the personnel constructing the Phase 2 pads and the casks being placed in the SE quadrant (from east to west) to minimize potential radiation exposure to workers. Stone & Webster Calculation No. 05996.02-UR(D)-11 estimates an annual dose of 17 mrem/yr for Phase 2 pad construction activities to an individual construction worker, assuming all storage casks are HI-STORM cask, and 23 mrem/yr, assuming all storage casks are TranStor casks.

Phase 3 pad construction (northern half of the Storage Facility) will be performed while the Phase 2 (SW quadrant) pads are being loaded with casks, and will be completed before all of the Phase 2 casks are in place. Phase 3 pad construction will utilize a different sequence than that used for Phases 1 and 2 in order to assure dose rates to storage pad construction workers are as low as is reasonably achievable (ALARA). Phase 3 storage pad construction will begin in the NW quadrant, with pad construction beginning at the south end and moving north. During Phase 3 construction, storage casks will be loaded on the SW quadrant of

storage pads (which were constructed during Phase 2) beginning on the south side and advancing toward the north, maximizing the distance of pad construction workers in the NW quadrant from loaded storage casks in the SW quadrant. Following completion of the storage pad construction in the NW quadrant, workers will construct storage pads in the NE quadrant, again starting at the south end and moving north.

Phase 3 pad construction is scheduled for 5 years. It is assumed that construction of the NW quadrant pads will take place during the first 2.5 years, and construction of the NE quadrant pads during the next 2.5 years. Stone & Webster Calculation No. 05996.02-UR(D)-11 estimates an annual dose of 33 mrem/yr for Phase 3 NW quadrant pad construction activities to an individual construction worker, assuming all storage casks are HI-STORM casks, and 44 mrem/yr assuming all storage casks are TranStor casks. As for the NE quadrant pad construction, the referenced calculation estimates worker doses of 210 mrem/yr (all HI-STORM casks) and 420 mrem/yr (all TranStor casks). These doses are higher than those associated with pad construction in the previous quadrants since the SE quadrant would be fully loaded with casks throughout the period of pad construction in the NE quadrant, and construction of pads at the south end of this quadrant places construction workers relatively close to casks in the SE quadrant. ALARA measures will be taken to reduce this dose, such as placement of cooler storage casks along the north side of the SE quadrant array of storage casks.

ATTACHMENT 2

PROPOSED UPDATE TO PFSF SAFETY ANALYSIS REPORT

SECTION 7.4

7.4 ESTIMATED ONSITE COLLECTIVE DOSE ASSESSMENT

The shipping, transfer and storage casks are designed to limit dose rates to ALARA levels for operators, inspectors, maintenance, and radiation protection personnel when the canisters are being transferred from the shipping to the storage casks, when the storage casks are being moved to the storage pads, and while the storage casks are being stored on the pads.

Table 7.4-1 shows the estimated occupational exposures to PFSF personnel during receipt of the HI-STAR shipping cask, transfer of the canister from the shipping cask to the HI-STORM storage cask using the HI-TRAC transfer cask, movement of the storage cask to the pad, and emplacement on the pad. Table 7.4-2 shows the estimated occupational exposures to PFSF personnel for these operations involving the TranStor shipping, transfer, and storage systems. The estimated occupational exposures were calculated in Reference 20. The operational sequence for these operations is also described in Chapter 5.

Dose rate values include both gamma and neutron flux components, and are based on PWR fuel with 35 GWd/MTU burnup and 20-year cooling time. Fuel with these characteristics is considered to be representative of typical fuel that will be contained in canisters handled at the PFSF, and dose estimates based on fuel with these characteristics are considered to be realistic and reflect expected personnel exposures. For this reason, the values of burnup and cooling time used in Section 7.3.3.5 to assess dose rates at boundaries from the array of 4,000 casks, and shown to be conservative in that section, were not applied to estimate worker integrated doses. Evaluation of weighted average burnups and cooling times of the nations' PWR and BWR spent fuel inventory in existence at the end of 1994, as discussed in Section 7.3.3.5, indicates an overall weighted average burnup (weighted by metric tons uranium) of approximately 32.4 GWd/MTU for PWR fuel and approximately 23.8 GWd/MTU for BWR fuel, with a weighted average cooling time for both types of fuel of approximately 23.0 years (assuming 30,000 MTU of spent fuel is received during the first 15 years of PFSF

operation). Based on this evaluation, the 35 GWd/MTU burnup and 20-year cooling time characteristics for spent fuel assumed in the onsite dose assessment are considered to be representative of typical fuel expected to be received at the PFSF.

From Tables 7.4-1 and 7.4-2, the total dose from receipt of a loaded shipping cask, transfer of the canister into a storage cask, movement of the storage cask to the pad, and performance of initial surveillances is estimated to be about 247 person-mrem for the HI-STORM system, and about 327 person-mrem for the TranStor system. Assuming a storage cask loading rate of 200 casks per year, the total annual dose to operations and Radiation Protection personnel involved in these operations is estimated to be approximately 49 person-rem, assuming all storage casks are HI-STORM casks, and 65 person-rem, assuming all storage casks are TranStor casks. Occupational doses to individuals will be administratively controlled to ensure that they are maintained below 10 CFR 20.1201 limits and ALARA.

Temporarily positioned shielding will be used during transfer operations to reduce dose rates from streaming paths or relatively high radiation areas where its use will result in a net reduction in worker exposures. The effects of temporarily positioned shielding, calculated in Reference 20, are considered in the Table 7.4-1 and 7.4-2 dose estimates for canister transfer operations.

Occupational exposures are also estimated to security personnel and PFSF personnel that conduct inspections, surveillances, and maintain the storage systems. These estimates are based on the assumption that the PFSF is at its 4,000 storage cask capacity. It is estimated that security personnel that conduct security inspections will accrue approximately 0.62 person-rem (all HI-STORM casks) and 1.3 person-rem (all TranStor casks) annually, based on one 1 hour inspection per shift (3 shifts per day, 365 days per year) along the RA fence, using the 0.57 (HI-STORM) and 1.17 mrem/hr (TranStor) dose rates at the fence discussed in Section 7.3.3.5. It is considered that dose rates inside the Security and Health Physics Building are negligible due to shielding provided by the building structure. One visual inspection per quarter is

required to be performed for each storage cask to check for the buildup of debris at the inlet ducts and to inspect the cask exterior. Assuming one person spends 1.0 minute inspecting each cask, in an average dose field of 12.4 mrem/hr (assuming all storage casks are HI-STORM casks) and 30.0 mrem/hr (assuming all storage casks are TranStor casks) during the inspection, this surveillance will result in approximately 0.83 person-rem (HI-STORM) and 2.0 person-rem (TranStor) per quarter to PFSF personnel conducting the inspections, for a total of 3.3 person-rem (HI-STORM) and 8.0 person-rem (TranStor) annually. The 12.4 mrem/hr and 30.0 mrem/hr average dose field estimates near a cask inside the cask array are based on the Reference 21 calculation, which assumes that storage casks contain "typical" PFSF fuel, represented by PWR fuel with 35 GWd/MTU burnup and 20 year cooling time. Conservatively assuming that 5 percent of the 4,000 casks require clearing of debris from the inlet ducts once a year at 10 minutes each (Reference 21), in a dose field of 12.4 mrem/hr (HI-STORM) and 30.0 mrem/hr (TranStor), an additional annual dose of 0.41 person-rem (HI-STORM) and 1.0 person-rem (TranStor) is estimated. Monitoring of temperatures representative of the thermal performance of the casks will be performed remotely with a data acquisition system and will not result in significant exposure. Based on the above, the total dose to personnel involved in security inspections, surveillance, and storage cask maintenance operations is estimated to be 4.3 person-rem annually, assuming all storage casks are HI-STORM casks, and 10.3 person-rem annually, assuming all storage casks are TranStor casks.

A combination of building location and shielding will minimize the dose to staff personnel working in the PFSF facilities. The west sides of the Canister Transfer Building and Security and Health Physics Building are approximately 425 ft (130 meters) and 948 ft (289 meters), respectively, from the nearest storage pad (see Figure 1.2-1). The building structures will provide shielding to reduce doses to workers in the buildings from the cask storage area to levels that are ALARA. The Operations and Maintenance Building and Administration Building will be located near the entrance gate to the OCA (see Figure 1.1-2). The Administration Building is further from the storage pads (2,580 ft) than the nearest distances to the OCA boundary (2,119 ft), and the

Operations and Maintenance Building is nearly as far away (1,960 ft). Dose rates at these buildings will be less than 25 mrem/yr (at a 2,000 hr/yr occupancy rate) without consideration for shielding provided by the building structures.