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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Commission

In the Matter of	)	
	)	
PRIVATE FUEL STORAGE L.L.C.	)	Docket No. 72-22
	)	
(Private Fuel Storage Facility)	)	ASLBP No. 97-732-02-ISFSI

APPLICANT'S BRIEF ON THE REGULATORY STANDARD FOR AIRCRAFT CRASH HAZARDS AT THE PRIVATE FUEL STORAGE FACILITY

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July 13, 2001

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In accordance with the Commission's Order, CLI-01-15, 53 NRC __ (June 27, 2001), Applicant Private Fuel Storage L.L.C. ("Applicant" or "PFS") hereby files its brief on the appropriate regulatory standard for aircraft crash hazards at the Private Fuel Storage Facility ("PFSF"). As set forth below, the Atomic Safety and Licensing Board ("Licensing Board" or "Board") correctly held that any accident at an independent spent fuel storage facility ("ISFSI") with a probability of occurrence of less than one in a million (10^{-6} or 1 E-6) per year is not a credible accident and an ISFSI need not be designed to withstand its effects. Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Facility), LBP-01-19, 53 NRC __, slip op. at 18-21 (May 31, 2001). Thus, the Board's ruling should be affirmed.

I. BACKGROUND

At the time PFS filed its motion for summary disposition[1] that gave rise to the question here, December 2000, Contention Utah K/Confederated Tribes B – Inadequate Consideration of Credible Accidents ("Utah K") – asserted that:

[1] Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B (Dec. 30, 2000) ("PFS Motion"). PFS had filed a previous motion for summary disposition on Utah K in June 1999. See Applicant's Motion for Partial Summary Disposition of Utah Contention K and Confeder-

Footnote continued on next page

> The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the ISFSI, including the cumulative effects of the nearby hazardous waste and military testing facilities in the vicinity.

Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), LBP-99-39, 50 NRC 232, 240 (1999).[2] Further, the scope of the contention was limited to external events related to facilities that had been identified by the State in the bases of the contention, these being: 1) Salt Lake City International Airport, 2) Dugway Proving Ground ("Dugway"), 3) Hill Air Force Base ("Hill" or "Hill AFB"), and 4) the Utah Test and Training Range ("UTTR"). LBP-99-35, supra note 1, 50 NRC at 182; see LBP-01-19, slip op. at 3-5.[3]

On December 30, 2000, PFS filed its motion for summary disposition on the remaining Utah K issues – the firing of conventional ground weapons on Dugway; cruise missile hazards; commercial, general aviation and military aircraft crash hazards; and military aircraft ordnance hazards.[4] The NRC Staff supported the motion with respect to

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ated Tribes Contention B (June 7, 1999) ("June 1999 Motion"). In August 1999, the Licensing Board ruled on PFS's June 1999 Motion, granting the Motion in part, denying it in part, and deferring it in part. Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), LBP-99-35, 50 NRC 180, recons. denied, LBP-99-39, 50 NRC 232 (1999). PFS filed its December 2000 Motion on the remaining portions of Utah K in accordance with the Licensing Board's Memorandum and Order (General Schedule Revision, Withdrawal of Contentions Utah H and Utah U, and Status of Contention Utah GG) (Sept. 5, 2000) at 2 (allowing PFS to file motions for summary disposition regarding any outstanding Utah K issues).

[2] As originally admitted by the Licensing Board in April 1998, Utah K had also included assertions regarding wildfires and the intermodal transfer point (ITP). Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 253 (1998). Those portions of Utah K, however, had been dismissed by the Board in August and September 1999 based upon PFS's June 1999 Motion for Utah K and PFS's Motion for Summary Disposition of Contention Utah B concerning the ITP. LBP-99-35, 50 NRC at 198-200 (wildfires); LBP-99-39, 50 NRC at 236 (ITP).

[3] The bases of Utah K had also identified the Tekoi Rocket Engine Test Facility, but in August 1999 the Board had dismissed Utah K with respect to Tekoi based upon PFS's previous June 1999 Motion for Utah K. LBP-99-35, 50 NRC at 200. Further, based upon PFS's earlier June 1999 Motion, the Board had also previously dismissed most of the State's claims related to Dugway, including all State claims concerning chemical and biological testing conducted at Dugway as well as the State's assertions regarding landings at Michael Army Airfield (located on Dugway) by military aircraft carrying "hung bombs." Id. The only issues remaining with respect to Dugway were a) the firing of conventional ground weapons in military testing or training and b) other aircraft crash hazards related to military aircraft flying to and from Michael Army Airfield. LBP-01-19, slip op. at 3-5.

[4] Cruise missiles are tested on the UTTR. See LBP-01-19, slip op. at 10. Potential military aircraft crash (and ordnance) hazards arise from: 1) Air Force F-16 fighter aircraft transiting Skull Valley from Hill AFB

Footnote continued on next page

weapons firing on Dugway, certain military aircraft hazard issues, and certain civilian aircraft hazard issues, but took no position with respect to cruise missile hazards and other military aircraft and civilian aircraft crash hazards. NRC Staff's Response to Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes B (Jan. 30, 2001) at 1-2 ("Staff Response"). The State opposed the motion, although it made no filing with respect to munitions usage and testing at Dugway. State of Utah's Response to Applicant's Motion for Summary Disposition on Utah Contention K/Confederated Tribes Contention B (Jan. 30, 2001) ("State Response").

In its motion, PFS argued that the definition of a credible accident, i.e., an accident that the PFSF must be designed to withstand, should be one with a probability of at least 1 E-6 per year. PFS Motion at 9-10.[5] PFS's argument was based on the Commission's discussion in the statement of consideration for the 1996 amendments to 10 C.F.R. Part 60, which linked the threshold screening criterion for credible accidents at above-ground nuclear waste handling facilities at a geologic repository to the standards for credible accidents at 10 C.F.R. Part 72 facilities, including ISFSIs. Id. The NRC Staff concurred that the threshold screening criterion for credible accidents for Part 72 facilities is 1 E-6 per year. See Staff Response at 7; Safety Evaluation Report Concerning the Private Fuel Storage Facility, Docket No. 72-22 (Sept. 29, 2000) at 15-77 ("SER"). The State argued, however, that the threshold probability for credible aircraft crash hazards should be one in ten million (1 E-7) per year. State Response at 6-8. The State's argu-

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to the UTTR South Area; 2) F-16s from Hill AFB and various other military aircraft conducting training exercises on the UTTR; 3) F-16s from Hill AFB returning from the UTTR South Area to Hill AFB via the Moser Recovery Route; and 4) military aircraft flying to and from Michael Army Airfield on Dugway. Potential civilian aircraft crash hazards arise from aircraft flying on federal airways J-56 and V-257 and minimal general aviation activity. Id. at 22-24.

[5] See also "Aircraft Crash Impact Hazard at the Private Fuel Storage Facility," Revision 4 (August 10, 2000) (filed in response to Request for Additional Information from NRC Staff), Section II (hereinafter "Aircraft Report").

ment was based on the regulatory guidance[6] the NRC Staff uses to evaluate potential accidents at nuclear power reactors. Id. The State also claimed that the 1 E-6 screening standard applied in Part 60 was "a site-specific conclusion based on site-specific analyses of risk at the Yucca Mountain facility" and hence would not apply to the PFSF in any event. Id. at 7.

On May 31, 2001, the Licensing Board granted in part and denied in part PFS's motion. The Board granted the motion with respect to the firing of conventional weapons at Dugway, LBP-01-19, slip op. at 10, and cruise missile hazards, id. at 14-17. With respect to aircraft crash issues, the Board granted PFS's motion with respect to the scope of the aviation activity in the vicinity of the PFSF; the issues of air-to-ground and air-refueling training and air-delivered weapons use on the UTTR; and civilian aircraft hazards (including aircraft flying to and from Salt Lake City International Airport and general aviation). Id. at 54. The Board denied PFS's motion with respect to F-16s transiting Skull Valley (including jettisoned ordnance); air-to-air combat training on the UTTR; aircraft flying on the Moser Recovery Route; aircraft flying to and from Michael Army Airfield at Dugway; and the cumulative hazard to the PFSF from aircraft accidents and ordnance. Id.

The Board also specifically found that the appropriate screening standard for credible accidents at an ISFSI is 1 E-6 per year. See id. at 19-21. After reviewing the Part 60 statement of considerations, the Board rejected the State's arguments concerning the lack of a site-specific analysis for the PFSF. See id. at 20-21. To the contrary, the Board concluded from its review of "the Commission's discussion in the Part 60 rulemaking regarding the Part 72 facility design basis accidents" that the Commission had determined that "both were covered by the 1E-06 bounding analysis." Id. at 20. The

[6] Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-0800 (June 1987).

Board noted that the "Commission's most pointed reference" to Part 72 facilities "was to 'surface facilities' at a Part 72 monitored retrievable storage (MRS) installation that, unlike the proposed PFS interim storage facility, could include spent fuel handling and packaging operations." Id. The Board observed, however, that whatever differences may exist between the PFSF and an MRS relative to fuel handling and packaging,[7] "an MRS will utilize above-ground storage casks" as will the PFSF. Id. at 20-21. Thus, the Board determined that "in accordance with the Commission's guidance in the 1996 Part 60 rulemaking," it would "apply the 1E-06 standard outlined therein" with respect to potential aircraft hazards for the PFSF. Id. at 21.

However, given the significant policy and resource implications of this particular ruling, the Board certified to the Commission its ruling that 1 E-6 is the appropriate screening standard, or benchmark, for credible accidents for Part 72 ISFSIs generally, including the PFSF. Id. The Commission, in its June 27, 2001 Order accepted referral and requested briefing on this issue. CLI-01-15, slip op. at 2.

II. DISCUSSION

As PFS argued below and as the Licensing Board held, based on the Commission's issuance of threshold screening criterion for credible accidents for above-ground facilities performing waste storage and handling at a geologic repository, the appropriate regulatory limit for determining credible accidents for ISFSIs, such as the PFSF, is a probability of occurrence of at least 1E-6 per year. Thus, the Board's ruling should be affirmed.

[7] The Commission has recognized that the spent fuel handling and packaging operations at an MRS could pose greater risk than the mere storage operations that would take place at an ISFSI such as the PFSF. See Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS), Proposed Rule, 58 Fed. Reg. 29,795, 29,797 (1993).

A. The 1 E-6 Screening Standard is Applicable to ISFSIs

In 1996, the Commission amended its 10 C.F.R. Part 60 rules for geologic repository operations areas—including surface operations and storage—to establish a probability bound for Category 2 design basis events of 1E-6 per year. Disposal of High-Level Radioactive Wastes in Geologic Repositories; Design Basis Events, Final Rule, 61 Fed. Reg. 64,257, 64,258 (1996). Category 2 design basis events are "[o]ther natural and man-induced events that are considered unlikely but sufficiently credible to warrant consideration, taking into account the potential for significant radiological impacts on public health and safety." 10 C.F.R. § 60.2.[8] The Commission found that "events with probabilities of occurrence lower than 1 x 10^{-6} per year could be screened from further consideration due to their negligible contribution to individual risk." 61 Fed. Reg. at 64,261 (emphasis added). In doing so, the Commission intended to make the design basis for Part 60 repositories comparable to that for Part 72 facilities (ISFSIs) "[b]ecause operations at the repository are expected to be similar to operations at . . ." Part 72 facilities. Id. at 64,262.[9] The rulemaking on Part 60 design basis events "harmonize[d] part 60 with part 72" because "part 72 applies to those facilities (MRS installations) most similar to the surface facilities of a repository and for which the kinds of design basis events are also expected to be similar." Id. at 64,265. Further, the Commission expressly confirmed that Part 60 Category 2 events were equivalent to "design basis accident[s]" under

[8] The Commission also established probability bounds for Category 1 design basis events, which are "[t]hose natural and human-induced events that are reasonably likely to occur regularly, moderately frequently, or one or more times before permanent closure of the geologic repository operations area." 10 C.F.R. § 60.2; see 61 Fed. Reg. at 64,265.

[9] The State objects to the application of the Part 60 1 E-6 screening standard to ISFSIs in part on the grounds that the 1 E-6 standard applies to the design of the "preclosure area" of the repository and it is allegedly unclear that the standard also applies to "other areas." See State Response at 7 n.8. The Commission stated, however, that the "preclosure controlled area" of the repository "corresponds closely to the term 'controlled area,' as defined in 10 CFR 72.3" and is "an area over which the licensee exercises control of activities to meet regulatory requirements." 61 Fed. Reg. at 64,262. At the PFSF, the spent fuel will be located within the site owner controlled area. PFSF Safety Analysis Report at 1.2-1 to -2. Thus, the terminology provides no reason not to apply the standard here.

10 C.F.R. § 72.106 and that the difference in terminology between Part 60 and Part 72 "is not intended to be one of substance." Id.

Thus, as the Licensing Board held, it is appropriate to apply the Part 60 screening criterion to exclude from design basis accidents under 10 C.F.R. § 72.106 (the applicable standard for ISFSIs) accident events less probable than 1E-6 per year. In fact, such a standard is conservative when applied to the PFSF, in that the risks associated with the PFSF will be less than those associated with the above ground facilities at a repository because no fuel processing or repackaging will take place at the PFSF. See note 7, supra.

The rationale behind the Commission's Part 60 rulemaking further supports the application of the 1 E-6 screening standard to ISFSIs and the PFSF. The Commission stated that beyond design basis accidents at above-ground repository facilities (i.e., those with probabilities less than 1 E-6 per year) could be screened from further consideration "due to their negligible contribution to overall [cancer] risk," which the Commission estimated to be on the order of 1 E-8 per year. Id. at 64,265. As a matter of policy, the Commission has determined that the acceptable cancer risk from exposure to radiation is "in the range of 1×10^{-6} to 1×10^{-5} per year." Id.[10] On that basis, the Commission stated that the 1 E-6 screening threshold "is expected to provide conservative estimates of risk" and that "[a] higher screening criterion could probably be justified given the magnitude of the consequences and risks from this facility . . . ." Id.[11] Indeed, the discussion of risk in the Part 60 rulemaking is entirely consistent with and is even conservative in light of the Commission's policy on risk from nuclear power plants. The current policy goal is to

[10] In its argument below, the State misconstrued the Part 60 statement of considerations and erroneously claimed that the cancer risk the Commission deemed acceptable was in "the 10^{-8} [per year] range." State Response at 8.

[11] Given that 1) an accident with a probability of 1 E-6 per year would create a cancer risk of 1 E-8 per year, and 2) the Commission's standard for acceptable cancer risk is 1 E-5 to 1 E-6 per year, the Part 60/Part 72 accident screening standard could be raised from 1 E-6 to 1 E-4 and still meet the Commission's cancer risk standard. See also id. at 64,266.

limit the frequency of a large early release of radioactive material resulting from a power plant accident to 1 E-5 per reactor per year. Modifications to the Reactor Safety Goal Policy Statement, SECY-00-77 (Mar. 30, 2000), approved by Staff Requirements Memorandum (June 27, 2000).[12]

In fact, in promulgating the standard for Part 60 repositories (and Part 72 ISFSIs), the Commission explicitly distinguished the risks of such facilities from the risks associated with operating nuclear reactors. The Commission found that the "conditions are not present at a repository to generate a radioactive source term of a magnitude that, however unlikely, is potentially capable at a nuclear power plant (e.g., from a postulated loss of coolant event)." 61 Fed. Reg. at 64,266.[13] Thus, the Commission changed the Part 60 screening criterion from 1 E-9 in the proposed rule to 1 E-6 in the final rule "on the basis of repository risk perspective" and "estimated consequences from Category 2 design basis events." 61 Fed. Reg. at 64,258.[14] The same circumstances pertain to a Part 72 ISFSI, at which the primary activities are waste receipt, handling and storage. Because of the significantly lower potential consequences from an accident, it was appropriate to apply a higher probability screening standard to fuel storage and handling facilities than to reactors.

Thus, the Commission has specifically addressed and rejected the argument made by the State below, see State Response at 6, that the appropriate credible accident

[12] Given the lower potential accident consequences associated with spent fuel handling facilities and ISFSIs vis a vis reactors, it is unclear that any accident at an ISFSI would give rise to a "large" release of radioactive material as defined by the Reactor Safety Policy. See Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis (July 1998) at 1.174-5 n.5. Large early release frequency is "used as surrogate for the [Commission's] early fatality Q[uantitative] H[ealth] O[bjective]." Id. A large release is defined as a "significant, unmitigated release[] from containment in a time frame prior to effective evacuation of the close-in population such that there is a potential for early health effects." Id.

[13] See also Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23, 31 & n.1 (2000).

[14] The Commission rejected a suggestion that "the most improbable sequences and combinations of events and accidents (Category 2 and beyond) should be evaluated in repository accident analysis." Id. at 64,259.

screening standard to apply to ISFSIs is the 1 E-7 per year standard from the Standard Review Plan for nuclear power plants, NUREG-0800. NUREG-0800 uses an "NRC staff objective of approximately 10^{-7} per year" for determining design basis events for which such reactors should be designed. NUREG-0800 at 2.2.3-2; see id. at 3.5.1.6-2. Because the NUREG-0800 guidance was established for operating nuclear power plants—but not Part 60 repository facilities or Part 72 ISFSIs—the 1E-6 per year screening criterion applied by the Licensing Board, and not the NUREG guidance of 1E-7 per year, is applicable to the PFSF. Indeed, the Commission recently explicitly reaffirmed its prior statement that a primary purpose of the 1996 amendment to Part 60 was "achieving greater consistency with Part 72 requirements." Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, 64 Fed. Reg. 8,640, 8,652 (1999). Hence, the Commission has already spoken to this issue and the Board's ruling in accordance with the Commission's pronouncements should be affirmed.

B. The 1 E-6 Screening Standard is Generic and Does Not Require Site-Specific Consequences Analysis

In addition to arguing for the application of the NUREG-0800 1 E-7 standard to ISFSIs generally, the State claims that the Part 60 1 E-6 screening standard is not applicable to the PFSF because the 1 E-6 standard "was a site-specific conclusion based on site-specific analyses of risk at the Yucca Mountain facility." State Response at 7. Thus, the State asserts, the standard applicable to a particular Part 60 facility depends on an analysis of the consequences of an accident at that facility. See id. at 7-8. The State claims further that because "site-specific analysis of probability, consequences, and risk for the PFS facility [allegedly] leads to a very different result than for the proposed Yucca Mountain facility," it is not appropriate to use the 1 E-6 screening standard for the PFSF. Id. at 8. The State's claim is wrong for two reasons: 1) the 1 E-6 standard is applicable to repository facilities generally, i.e., no site specific analysis is required, and 2)

the potential events that could occur at a repository surface facility—and that the Commission considered in promulgating the rule—are no different than those that could occur at the PFSF.

First, Part 60 is a generic rule, applicable to any geologic repositories that might be licensed by the Department of Energy, not just Yucca Mountain. See 10 C.F.R. § 60.1. Furthermore, in the Statement of Considerations in which it announced the 1 E-6 screening standard, the Commission stated explicitly that assessments of conceptual designs for Yucca Mountain referred to by the State only served to provide perspective on risk:

> The dose estimates of the DOE risk assessment are only reflective of a conceptual design for a repository at Yucca Mountain, Nevada. Nonetheless, the Commission believes that they provide perspective on the magnitude of the estimated consequences to members of the public from postulated Category 2 design basis events, and that variations in repository design or site selection would not likely vary these estimates by more than an order of magnitude. The results of the DOE risk assessment also provide some perspective on the estimated probabilities of occurrence of the postulated repository design basis events and, as such, perspective on actual risk from an operating repository.

61 Fed. Reg. at 64,266 (emphasis added).[15] Thus, the Commission recognized that a repository could be designed and located differently than the conceptual facility at Yucca Mountain, but it nevertheless promulgated Part 60 as a generic rule applicable generally to repositories (and ISFSIs as shown above). See id. at 64,259, 64,265 (discussing the application of the 1 E-6 screening standard in generic terms). Therefore, Utah's arguments about differences between PFS and Yucca Mountain (see State Response at 7-8; Declaration of Dr. Marvin Resnikoff Regarding Material Facts in Dispute with Respect to Contention K (Jan. 30, 2001). ¶¶ 12-15) and dose consequences allegedly arising from an

[15] The Commission also looked to risk assessments for nuclear power plants to provide perspective on risk. See 61 Fed. Reg. at 64,266 & n.7.

accident at the PFSF are irrelevant. The 1 E-6 screening standard is applicable to Part 60 and Part 72 facilities generally.

Second, the Yucca Mountain accident assessment cited by the Commission in promulgating the Part 60 rule (61 Fed. Reg. at 64,266 n.6) included an assessment of the consequences of an aircraft crash. U.S. Department of Energy, "Site Characterization Plan Yucca Mountain Site," DOE/RW-0199 (Dec. 1988) at 6-252 to -253, -255 to -257 (citing Jackson et al., "Preliminary Safety Assessment Study for the Conceptual Design of a Repository in Tuff at Yucca Mountain," Sandia National Laboratory, SAND83-1504 (Dec. 1984)). Indeed, Yucca Mountain is located within the Nevada Test Site, adjacent to the Nellis Air Force Range, where Air Force aircraft similar to those flown on the UTTR fly. See Yucca Mountain Draft Environmental Impact Statement at 3-8;[16] Kimura et al., Crash Hit Frequency Analysis of Aircraft Overflights of the Nevada Test Site (NTS) and The Device Assembly Facility (DAF), Lawrence Livermore National Laboratory, UCRL-ID-131259 Rev. 1 (Dec. 16, 1998) at 7. Therefore, there is no need to perform a site-specific assessment to determine which credible accident probability threshold should apply to the PFSF.

[16] U.S. Department of Energy, Office of Civilian Radioactive Waste Management, Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (July 1999).

III. CONCLUSION

For the foregoing reasons, the Licensing Board's ruling should be affirmed.

Respectfully submitted,

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Dated: July 13, 2001

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CERTIFICATE OF SERVICE

I hereby certify that copies of the "Applicant's Brief on the Regulatory Standard for Aircraft Crash Hazards at the Private Fuel Storage Facility" were served on the persons listed below (unless otherwise noted) by e-mail with conforming copies by U.S. mail, first class, postage prepaid, this 13th day of July 2001.

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