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November 13, 2001

By Electronic Filing and U.S. Mail

Emile L. Julian
Assistant for Rulemakings and Adjudications
Rulemakings and Adjudications Staff
Office of the Secretary of the Commission
U. S. Nuclear Regulatory Commission
11555 Rockville Pike, One White Flint North
Rockville, MD 20852-2738
Attn: Docketing & Services Branch

Re: Private Fuel Storage – Docket No. 72-22 – ASLBP No. 97-732-02

To the Secretary of the Commission:

Enclosed please find the original signature pages for (1) the Joint Declaration of Krishna P. Singh, Alan I. Soler and Everett L. Redmond II, (2) the Declaration of C. Allin Cornell ("Cornell Dec.") and (3) the Declaration of Bruce E. Ebbeson to replace the faxed signature pages for the declarations filed in support of Applicant's Motion for Summary Disposition of Part B of Utah Contention L.

Further, upon reviewing the Cornell declaration as filed, we noticed that an extraneous paragraph number mistakenly appears in the middle of paragraph 45 on the top of page 25 which inadvertently divides what should be paragraph 45 into two paragraphs, 45 and 46. Accordingly, we are reserving the last four pages of the Cornell declaration (pages 24-27 including the original signature page), correcting this error which should replace pages 24 through 27 of the declaration as filed. We are also reserving a complete electronic copy of the declaration correcting this error which should replace the electronic copy of the declaration served with Applicant's motion.

Template= SECY-018

SECY-02

By copy of this letter and the accompanying e-mail, we are serving the Licensing Board and the parties with the corrected pages of the Cornell declaration as well as the corrected electronic copy. I apologize for any confusion created by this error.

If you have any questions, please contact me at (202) 663-8304.

Sincerely,

Paul A. Gaukler

cc: G. Paul Bollwerk III, Esq.
Dr. Jerry R. Kline
Dr. Peter S. Lam
Sherwin Turk, Esq.
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Office of Appellate Adjudication (by mail only)
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the fraction of time they are operating. I am informed that this fraction at the PSF IFSFI is approximately 20% or less, yielding a product of $1x10^{-4}$. In fact the actual annual failure rate leading to release will be less than this number by the a factor equal to R_R, which is 5 to 20 or more, yielding a value of about 10^{-5}.

44. In the same discovery response (September 28, 2001 discovery response to PFS Interrogatory No. 6 [Ref. 27]) the State claims that "[I]n the context of DOE-STD-1020-94, PFS has not demonstrated for its proposed ISFSI facility that use of a 2,000-year return period would achieve DOE's target performance goal, which requires consideration of such factors as the slope of the site-specific hazard curve over the annual probability range of 10^{-3} to 10^{-5}, seismic fragility curves, and quantified uncertainties in the fragility curves. (DOE-STD-1020-94) at section C." This assertion is not true. In the context of DOE-1020, to meet the performance goal one has only to follow the design procedures and acceptance criteria specified in Chapter 2 of the document; these procedures and criteria have been specifically established to meet the desired goal. No hazard curve slopes or fragility curves or quantification of uncertainty are required. Therefore, Section C of DOE Standard 1020 cited by the State is in fact merely an appendix which demonstrates, by using these slopes, fragility curves, etc., that the procedures and criteria set forth in Chapter 2 of the Standard do achieve the desired performance goal. I have further demonstrated in Attachment A that, because of the generally greater conservatism of the NRC SRP design procedures and acceptance criteria used at the PFSF, the PFSF will meet or surpass the performance goal of PC3 in DOE Standard 1020.

45. In Basis 5 to Part B of Utah L, the State challenges the grant of the PFSF exemption claiming that the Staff's reliance on the 1998 exemption granted to DOE for the Idaho National Engineering and Environmental Laboratory ("INEEL") ISFSI for the Three Mile Island, Unit 2 ("TMI-2") facility fuel is misplaced because the grant of the exemption there was based on circumstances not present with the PFS ISFSI, including (a) existing INEEL design standards for a higher risk facility at the ISFSI host site; and (b) the use of a peak design basis horizontal acceleration of 0.36 g that was higher than

the 2,000-year return period value of 0.30 g. However, this decision by the Staff and Commission was not intended to be so narrowly interpreted. This is evident in the NRC Staff's final statement to the Commissions in SECY-98-071, pg. 4 [Ref. 15]: "If the staff grants the exemption to 10 CFR 72.102 (f)(1), this may impact the licensing process for other ISFSIs in the western United States. Until the ISFSI seismic requirement in Part 72 is amended by rulemaking, the staff may receive similar exemption requests for other ISFSIs to be sited west of the Rocky Mountain front." Thus, the Staff was advising the Commission that the granting of the exemption for INEEL would be relied upon as precedent for other exemption applications, as was done in the case of the PFSF.

46. In Basis 6 to Part B of Utah L, the State claims that the 2,000-year mean return period for the PFS facility does not ensure an adequate level of conservatism because design levels for certain new Utah building construction and highway bridges are more stringent. As set forth in the State's September 28, 2001 discovery response [Ref. 27] to Interrogatory No. 8, this conclusion was based on the observation that, for example, the International Building Code 2000 (or [Paul; OK?]"IBC-2000") will, when in effect in the future, require a MRP of approximately 2500 years for the DBE, which is greater than the 2,000-year MRP DBE proposed for PFS. One should not draw the erroneous conclusion, however, that this difference in the definition of the DBE implies a lower probability of failure for SSCs designed to IBC-2000 versus those, such as the PFSF, designed to the 2,000-year MRP and the NRC's SRP design procedures and criteria. As described in detail in Section III, the safety achieved depends on *both* the DBE MRP and on the design procedures and criteria utilized. The design procedures and criteria of the IBC-2000 are much less conservative than those of the SRP. For example, as described by the State, a first step of the IBC-2000 design procedures and criteria is to multiply the DBE by two-thirds, which at the PFSF site would reduce the effective IBC-2000 DBE MRP from 2500 years to about 800 years. Only in the case of those "essential structures" that merit the IBC-2000 "importance factor" of 1.5 is this two-thirds reduction, in effect, recovered.

47. Further, the model building codes' design procedures and acceptance criteria are significantly less conservative than those in the SRP. The IBC-2000 and

UBC model building codes permit much more liberal allowances for the benefits of post-elastic behavior than either DOE 1020 PC-3 and PC-4 criteria or the NRC SRPs. As shown in Table 1, the net effect of the UBC design and acceptance criteria, which are quite similar to those in IBC-2000 and to DOE 1020 PC1 and PC2, is a risk reduction ratio R_R of only 2, versus a value of 10 for DOE-1020 (PC-4) and typically 5 to 20 or more for the facilities designed to the NRC SRP. This represents a factor of 2.5 to 10 or more in increased conservatism in the design procedures of the latter standards over model building codes, even if the multiplier of two-thirds in the IBC-2000 is ignored. Therefore, even though the use of IBC-2000 for essential or hazardous buildings will imply a DBE with a 25% larger MRP than that for the PFSF (assumes applicability of the effective 2500 MRP for "essential structures" in IBC-2000), the more conservative design procedures and criteria of the SRP will provide that the typical PFSF SSCs have a mean annual probability of failure several times (2.5 to 5 or more) lower than buildings designed to IBC-2000 standards. In addition, as discussed above, a number of key safety-to-important SSCs in the PFSF have great robustness and/or fractional operating periods, which reduce their failure probabilities even further.

48. While I am less familiar with bridge codes, it is my general understanding that they have design procedures and criteria similar to those of model building codes such as UBC and IBC-2000. Therefore, assuming that a 2500-MRP DBE is used in the design of certain essential bridges in Utah, my discussion of IBC-2000 standards is equally applicable to bridges; the design of the PFSF under a 2,000-year return period earthquake and NRC seismic SRP design criteria provides higher safety levels than those available in the design of these special Utah bridges.

49. The State also claims in Basis 6 to Part B of Utah L that the 2,000-year mean return period for the PFS facility does not ensure an adequate level of conservatism because the return period was chosen based on the twenty-year initial licensing period rather than a potential thirty to forty-year operating period. This contention is unfounded because in virtually all areas of public safety hazards are measured as annual probabilities (or frequencies) of occurrence, regardless of the length of the activity in question, the exposure time, the estimated facility life, or the licensing duration [Ref. 12 (Paté-Cornell

paper)]. This is also the case with respect to the risk acceptance guidelines promulgated by the NRC where the subsidiary performance objectives are the risk metrics Core Damage Frequency (CDF) and Large Early Release Frequency (LERF). [Ref. 5 (Reg. Guide 1.174 at p. 10)] and [Ref. 22 (SECY-00-0077 at p. 6)]. The reasons for focusing on annual risks in making facility safety decisions include the fact that any facility providing a needed service will, at the end of its operating life, most likely be replaced by some other facility used for the same purposes with its own, similar risks. The spent fuel to be stored at the proposed PFSF is currently being stored in or near nuclear power plants, and after leaving the PFSF it will likely be stored at the proposed Yucca Mountain facility.

V. SUMMARY

50. In this Declaration I have explained why the use of probabilistic seismic hazard analysis to establish the design basis ground motions at the PFSF site is consistent with current NRC practice and that in other technical fields. I have showed that the 2000-year mean return period ground motions (i.e., those with mean annual probabilities of exceedance of $5x10^{-4}$) together with the NRC SRPs design procedures and acceptance criteria will provide an appropriate level of public safety for the PFS ISFSI. Finally, I have addressed each of the bases asserted by the State in support of Part B of Contention Utah L and established that they do not undercut or controvert my conclusions.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on November 9, 2001.

C. Allin Cornell

acceptance criteria, the nominal capacity is 400 kips, and the maximum strut load due to the 2000 year return period earthquake is 395 kips. However, based on an evaluation of the critical components of the assembly (tie rods, tie rod welds, strut pins, strut pipe strut pipe end welds, and bracket welds), the ultimate capacity is at least 571 kips, which is approximately 45% greater that the load imposed by the 2000 year return period earthquake. Accordingly, the seismic struts to be used in the PFSF CTB would be able to withstand the forces resulting from an earthquake with a return period significantly greater than the 2000 years of the design basis earthquake.

V. SUMMARY AND CONCLUSIONS

27. Based on the information presented above, there is no doubt that the CTB and the important-to-safety SSCs it houses can withstand acceleration levels well in excess of those associated with the design basis earthquake, and have a high likelihood of surviving without loss of safety function an earthquake with a return period significantly greater than the 2000 years of the design basis earthquake. Also, certain SSCs in the CTB are in an important to safety operational mode only a fraction of the time.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on November 9, 2001.

Bruce E. Ebbeson

37. (KPS, AIS, ELR) It is therefore our opinion that the HI-STORM storage casks and the MPCs they contain will be able to withstand without adverse safety consequences the forces imparted upon them by a seismic event more severe than the design-basis 2,000 year return period earthquake, including a 10,000 year return period earthquake.

We declare under penalty of perjury that the foregoing is true and correct.

Executed on November 9, 2001.

Krishna P. Singh

Alan I. Soler

Everett L. Redmond II