

To summarize the staff recommendation for seismic vulnerability of spent fuel pools, (1) all sites must conduct an assessment of the spent fuel pool structures using the revised seismic check list in order to identify any structural degradation, potential for seismic interaction from superstructures and over head cranes, and to verify that they have a seismic HOLPF value of 0.5 g or higher, (2) those sites that cannot demonstrate that a seismic HOLPF value exists, may either under take appropriate remedial action or conduct site-specific seismic risk assessment and (3) Pilgrim, H. B. Robinson, Vogtle, Diablo Canyon and San Onofre sites would have to use the seismic check list to identify any structural degradation or other anomalies and then conduct a site specific seismic risk assessment if they desire an exemption from EP when their sites are in decommissioning.

WHY CAN'T A PLANT FOREGO THE CHECKLIST AND JUST DO THE PLANT-SPECIFIC ANALYSIS (IF THEY KNOW THEY NEED TO DO A PLANT-SPECIFIC ANALYSIS ANYWAY). WHAT IS COVERED IN THE CHECKLIST THAT WOULD NOT BE PART OF THE PLANT-SPECIFIC ANALYSIS? NEED TO CLARIFY THIS POINT.

EVERY PLANT SHOULD BE REQUIRED TO DO A PLANT-SPECIFIC ANALYSIS IF IT CANNOT DEMONSTRATE THAT IT HAS A SEISMIC HOLPF VALUE OF 0.5 G OR HIGHER.

Based on existing spent fuel pool fragility analyses and engineering judgement, the staff determined that a high confidence, low probability of failure (HCLPF)² value of 1.2 g peak spectral acceleration (or in terms of peak ground acceleration, which is not as good an estimator, 0.5 g PGA)³ probably existed for most SFPs. Given this assumption, with the assistance of Dr. Robert P. Kennedy (See Appendix 2b, Attachment 2), it was determined that the annual frequency of seismically induced failure of spent fuel pool structures varies from less than 1.0×10^{-6} to 13.6×10^{-6} per year.

The staff used a measure of 3×10^{-6} per year for the adequacy of seismic return period in its earlier versions of the report. However, comments from the Advisory Committee on Reactor Safeguards and other stake holders indicated that the proposed measure and the approach the staff was using were too conservative. Also, the proposed approach contained different assessments for the Eastern and the Western United States and was complicated by the fact that seismic fragility information for ground motion levels beyond 0.5 g is not readily available from a peer reviewed data base.

The staff reexamined the results of Table 3, Appendix 2b, Attachment 2, which estimates the return frequencies of large earthquakes that could fail spent fuel pools. It was decided that the HCLPF value of 1.2 g peak spectral acceleration was a good measure of seismic adequacy for decommissioning plant SFPs that need only be tied to the return period of the earthquake and not to the safe shutdown earthquake magnitude for the site. The staff's review indicates that only three operating eastern plant sites have frequencies greater than 4.6×10^{-6} per year of having an earthquake with a peak spectral acceleration greater than 1.2 g. The staff finds 4.5×10^{-6} per year to be an acceptable criterion for seismic return period for earthquakes that could fail the spent fuel pools since it is a factor of 2 less than the 1×10^{-5} per year PPG and the estimated frequency of zirconium cladding fires from other initiators is an order of magnitude lower. Such a margin is warranted due to the uncertainties of the seismic hazard and spent fuel pool fragilities at each site.

3. Seismic Checklist

The staff determined that absent specific information about SFP seismic capacities, that some plant-specific evaluation of spent fuel pool capacity was warranted. During stakeholder interactions with the staff, the staff proposed the use of a seismic checklist that built on the work done for and could provide assurance of the capacity of spent fuel pools. In a letter dated August 18, 1999, NEI proposed a checklist that could be used to show robustness for a seismic ground motion with a peak ground acceleration (PGA) of approximately 0.5g. This checklist was reviewed and enhanced by the staff (See Appendix 2b, Attachment 1). Dr. Kennedy reviewed the enhanced checklist and concluded that the screening criteria are

²The HCLPF value is defined as the peak seismic acceleration at which there is 95% confidence that less than 5% of the time the structure, system, or component will fail.

³Damage to critical structures, systems, and components (SSCs) does not correlate very well to peak ground acceleration (PGA) of the ground motion. However, damage correlates much better with the spectral acceleration of the ground motion over the natural frequency range of interest, which is generally between 10 and 25 Hertz for nuclear power plant SSCs. The spectral acceleration of 1.2 g corresponds to the screening level recommended in the reference document cited in the NEI checklist, and this special ordinate is approximately equivalent to a ground motion of 0.5 g PGA.

NEI PPA
will use in
main report

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