

Tornadoes

The working group performed a risk evaluation of tornado threats to spent fuel pools (details are in Appendix 4). It is assumed that very severe tornadoes (F4 to F5 tornadoes) would be required to consider significant damage to a PWR or BWR spent fuel pool. The working group then looked at the frequency of such tornadoes occurring and the conditional probability that if such a tornado hit the site, it would seriously damage the spent fuel pool or its support systems. To do this the working group examined the frequency and intensity of tornadoes in each of the continental United States using the methods described in NUREG/CR-2944, "Tornado Damage Risk Assessment," Brookhaven National Laboratory, September 1982.

The likelihood of exceeding an F4 to F5 tornado is estimated to be 5.6×10^{-7} per year for the central U.S., with a U.S. average value of 2.2×10^{-7} per year. The working group determined, based on the buildings housing the spent fuel pools and the thickness of the spent fuel pools themselves, that the probability of a tornado causing a catastrophic failure of the spent fuel pool is negligible and can be ignored (the conditional probability of failure is very low).

The working group assumed that an F2 to F5 tornado would be required for possible significant damage to a spent fuel pool support system (power supply, heat exchanger or makeup water supply). The likelihood of exceeding an F2 to F5 tornado is estimated to be 1.5×10^{-5} per year for the central U.S., with a U.S. average value of 6.1×10^{-6} per year. As an initiator to failure of a support system, the tornado is bounded by other more probable events.

Overall, the likelihood of significant spent fuel pool damage from tornadoes is bounded by other more likely catastrophic spent fuel pool failure and loss of cooling modes.

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