

From: Nathan Siu *RES*
To: Michael Cheok
Date: Thu, Jan 27, 2000 11:45 AM
Subject: SFP Risk Follow-Up Comments

Mike -

I've reviewed Gareth's comments and they are fine for me. After reviewing Appendix 2e, I still have problems with the tornado/high wind analysis. My comments are attached.

Nathan

CC: Charles Tinkler, Gareth Parry, George Hubbard, ...

F/13

Follow-Up Comments: Spent Fuel Pool Risk at Decommissioning Plants

1. Gareth's comments/suggested responses are fine. (Need to change "core uncover" to "fuel uncover").
2. I've reviewed Appendix 2e regarding tornado analysis and still have the same concern.
 - a. According to the analysis, the frequency of strikes involving tornadoes of intensity F2 or higher is $1.5\text{E-}5/\text{yr}$ for plants in Region A. [Note that the qualifying phrase "or lower" on p. A5-31 needs to be followed by "(for plants in other regions)" to avoid implying that the $1.5\text{E-}5$ value is bounding.]
 - b. Appendix 2e states that this frequency "is bounded by other more likely initiators that can cause loss of support systems." The problem is that the tornado-induced damage may be non-repairable (e.g., catastrophic failure of on-site water tanks), so the scenario is different from other scenarios involving loss of electric power and makeup water supply.
 - c. This is not to say that tornadoes pose a large risk. A bad scenario could involve non-recoverable loss of onsite water supply and offsite power, but not direct loss of SFP inventory (at least without an additional failure - I'm discounting the tornado sucking water out of the SFP!). It would take a very long time for SFP boil-off to cause fuel uncover. Note that a 20 gpm boil-off rate implies roughly 30,000 gallons in a day, and 200,000 gallons in a week. This water requirement might be a problem for plants (if any) that either lack large cooling ponds or are not near major bodies of water.
 - d. Using the value of 0.03 for HEP-INV-OFFSITE suggested by Gareth, a crude estimate of the scenario frequency is $(1.5\text{E-}5/\text{yr})(0.03) = 4.5\text{E-}7/\text{yr}$. (This takes no credit for offsite power recovery or for recovery of onsite makeup.) This is significantly higher than the tornado missile scenario frequency reported in Table 3.1, and is higher than most of the other contributors in that table.
 - e. Hurricanes are dismissed in the report based on qualitative grounds; p. A5-29 states that "The winds associated with hurricanes and other storms are generally less intense and lower in magnitude than those associated with tornadoes." This is fine in the context of a missile analysis, but it doesn't address the concern with loss of support systems. Level 3 hurricanes have windspeeds ranging from 111 to 130 mph; Level 4 hurricanes have windspeeds ranging from 131 to 155 mph. Together, these cover the range for F2 tornadoes (113-157 mph). The annual probability of site strikes by hurricane force winds is not 1.0, but large hurricanes hitting or passing near the East Coast seem to be annual occurrences, i.e., the frequency of site strikes is probably not negligibly small for a number of plants.
 - f. Note that Table A2e-1 indicates significant frequencies (up to $3\text{E-}5/\text{yr}$) of "damage" due to high winds. However, this information is not used in the SFP analysis. (Note that the source of the numbers, NUREG/CR-5042, indicates that

these are CDFs, i.e., the damage is serious.) The analysis needs to be revised to either provide an estimate of the risk due to high winds (including hurricanes), or provide a better justification for neglecting this risk.