

From: Sada Pullan. 9/27/00

**Response to Questions Concerning Spent Fuel Pool  
Seismic-Induced Failure Modes and Locations and the  
Expected Level of Collateral Damage**

by  
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**1. Introduction**

This brief report responds to the following two questions from the NRC Staff:

- 1) What are the most likely spent fuel pool failure modes and locations?
- 2) What is the expected level of collateral damage given a seismic event necessary to fail the spent fuel pool?

The following responses are based upon my judgement without performing any calculations.

**2. Most Likely Spent Fuel Pool Failure Modes and Locations**

Ref. 1 presents seismic fragility estimates for the Vermont Yankee (BWR) and Robinson (PWR) spent fuel pools. These two fragility estimates are the only spent fuel pool fragility estimates that I have seen. Therefore, my judgement is heavily based on the results presented in Ref. 1.

For Vermont Yankee (BWR), Ref. 1 states that the critical failure mode for the gross structural failure of the pool is an out-of-plane shear failure of the pool floor slab. With this failure mode, the liner will be breached and a large crack will develop through the concrete floor slab within a distance equal to the floor slab thickness from the pool walls. Possibly the entire floor will drop out, but I think that such a gross failure is unlikely. However, the concrete crack will be sufficiently large that the water in the pool will quickly drain out.

Although not reported as the critical failure mode in Ref. 1, my judgement is that for BWR pools, it is at least equally likely that the critical failure mode will be an out-of-plane shear failure of one or more of the pool walls. With this failure mode, the liner will be breached and a major concrete crack will form along the length of the wall within a wall thickness distance from the top of the floor slab.

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