HLWYM HEmails

From: Sheena Whaley
Sent: Wednesday, May 23, 2007 9:35 AM
To: Christopher Ryder
Subject: Re: Consequences From Dropping a Transfer Cask

THanks,
sheena

>>> Christopher Ryder 5/23/2007 9:21:53 AM >>>
Sheena,

Please find attached a pdf file of the Dry Cask Storage PRA. We studied the Holtec HI-STORM system at a BWR reactor. The DCS PRA calculations may be of use to you and Oleg.

In Section 4.4.2, Fuel Rod Cladding Failure, page 4-15, Table 13 (page 4-26) gives the failure probabilities that we calculated. The probability is taken to be either zero or one, depending on whether the maximum principal strain in the cladding is less than or greater than the strain limit selected for high-Burnup fuel. When the transfer cask is dropped onto a concrete floor, the fuel is predicted to fail when the drop height is somewhere between 20 and 40 feet. Fuel that has pin holes in it will have already released the nobles; the amount of additional release is insignificant.

On page 4-27, we stated that to estimate a failure probability when no failures have been observed, the 50% confidence limit can be used; this is a typical statistical practice. For a binomial distribution, the 50% confidence limit when no failures have been observed is calculated by dividing 0.7 by the number of reported times that fuel assemblies were dropped. Thus, the probability of fuel assembly failure is estimated as 0.7/11 = 0.064. This may seem to be at odds with the above. This calculation is based on an analysis of empirical data. Lacking an engineering analysis as above, one would do this empirical analysis. We did it anyway and used it in some cases (I do not recall how) to do a probabilistic-type analysis. The calculation is acceptable as long as one understands what is being done.

On page 7-6, Table 19, the results of the risk analysis is given. When the transfer cask is moved from over the pool to the preparation area, the lid is on, but not secured. The cask is carried about 3 feet above the refueling floor. For the purposes of risk, we said that a drop would dislodge CRUD that is available for release. In fact, the CRUD would remain in the water of the cask.

Appendix C discusses details of the response of spent fuel to mechanical loads.

Chris

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Mail Envelope Properties (Sheena.Whaley@nrc.gov20070523093450)

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Recipients:
"Christopher Ryder" <Christopher.Ryder@nrc.gov>
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MESSAGE	2136	5/23/2007 9:34:50 AM

Options
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