

Mitman, Jeffrey

From: Ferrante, Fernando *in*  
Sent: Friday, April 23, 2010 11:33 AM  
To: Mitman, Jeffrey  
Subject: FW: Question arising from the Duke Meeting yesterday on Major Project Plans  
Attachments: image003.jpg; image004.jpg

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From: Ferrante, Fernando *in*  
Sent: Friday, April 23, 2010 11:11 AM  
To: Galloway, Melanie  
Cc: James, Lois; Cunningham, Mark  
Subject: RE: Question arising from the Duke Meeting yesterday on Major Project Plans

Melanie,

I believe they must be referring to ANSI/ANS-58.21-2007 "External-Events PRA Methodology". Under High Level Requirement A: Flood Hazard Analysis (page 84), the following statement is made:

**NOTE FLOOD-A6:** See also Requirement FLOOD-A2. Several generic databases exist on U.S. dam failures, categorized by the different dam types (earthfill dams, concrete dams, etc.) See Refs. 78 and 79. These databases must be used with care, depending on how closely the specific dam fits into the database. The mean failure rate for all U.S. dams is in the range between about  $10^{-4}$  and  $10^{-5}$ /year [15]. However, for some modern dams with extensive engineering, values below  $10^{-5}$ /year have been quoted [80], while for older, poorly constructed dams, values near  $10^{-3}$ /year could be appropriate. An accurate and useful probabilistic analysis of any specific dam would require detailed engineering evaluations.

Where FLOOD-A2 is:

**FLOOD-A2**

Not applicable

In the hazard analysis for extreme river flooding, including floods due to single or cascading dam failures, USE up-to-date data for the relevant phenomena. It is acceptable to utilize both site-specific and regional data.

**NOTE FLOOD-A2:** The river-flooding design basis for most nuclear power plants is based on the Army Corps of Engineers "Probable Maximum Flood" (PMF). Although the method for selecting the PMF is not directly linked to its annual frequency or return period, the PMF annual frequencies are typically in the range of from 0.01 to 0.001/year [15].

It is difficult to develop hazard curves for much larger river floods, with annual frequencies much below  $\sim 0.001$ /year. One prestigious study by a government advisory committee [76] was very pessimistic about the technical basis for such hazard curves, but another study [75] was more optimistic, believing that methods do exist for making estimates down to the range of 0.001/year or even lower, if appropriate watershed data can be obtained. The fundamental problem is that when extrapolations beyond the historical record must be made, there is a need to understand the correlations between weather phenomena, which correlations are neither understood theoretically nor reliably known from actual data at most sites. See Ref. 15 for a discussion of these issues. The U.S. Nuclear Regulatory Commission's guidance in this area is in Regulatory Guide 1.59. Because this hazard aspect is difficult to analyze, the peer-review team should concentrate on it.

There is also an older ANSI/ANS standard that may have language similar to the above. I will look into it and I will let you know shortly.

Thank you,  
Fernando

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**From:** Galloway, Melanie *mmk*  
**Sent:** Friday, April 23, 2010 10:58 AM  
**To:** Ferrante, Fernando  
**Cc:** James, Lois; Cunningham, Mark  
**Subject:** Question arising from the Duke Meeting yesterday on Major Project Plans

Fernando,

Mark mentioned that in the Duke meeting yesterday that Duke noted that there was a standard (ASME or ANS or ANS/ASME) that noted an external hazards initiating event frequency for dam failure and seemed to further indicate that it was in line with our estimate of  $10E-4$ .

With your previous exercise in researching and summarizing relevant info from the regs, SRP, RGs and standards, can you track this reference down and provide us with the exact quote?

Thanks.

Melanie