

Wordperfect file from Steve Long's computer  
named "PKA review.wpd"  
dated 11/9/2001 5:35pm  
annotated at meeting as indicated below

Davis Besse CRDM Risk Insights:

CCDP for LOCA is 2.7E-3

IE calc by licensee is based on their crack growth model and assumptions about previous inspection adequacy - - we don't agree

Their event tree has a structure that starts with total number of leaking CRDMs = 1.1.  
The median for other 6 B&W units between 1 and 3, but their average is 3.2

Their event tree then combines circ cracking and failure probabilities to get total failure "frequency" = 2.6E-3/R<sub>Y</sub> (taking credit for inspections having 95% POD for leakage for each nozzle) or 0.037/R<sub>Y</sub> if inspections aren't credited.

If inspections aren't credited, their analysis gives ΔCDF = 1.0E-4/R<sub>Y</sub>.

The probability distribution they use for the age of their 1.1 flaws is:

	# flaws	
< 2 years	1.1	$\times 2 = 2.2$
> 2 years	0.377	$\times 2 = .754$
> 4 years	0.260	$\times 2 = .520$
> 6 years	0.013	$\times 2 = .026$
> 8 years	0	
		<u>3.500</u> flaws still in head.

*So because event tree effectively multiplies initiator frequency by factor of 2;*

*So, model predicts/assumes 5.3 flaws found and repaired in previous outages. But none were actually found. So model over-predicts crack initiation freq. or under-predicts inspection effectiveness (or both)*

Their failure probabilities as a function of age are:

< 2 years	1/3E-5
2 - 4 years	1.5E-4
4 - 6 years	8.4E-3
6 - 8 years	2.5E-2

Our analysis indicates that:

Previous inspections should not be credited.

Davis Besse is about in middle of susceptibility range for B&W plant group:

Oconee 1	22.1 EFPY @ 600°F	with 9 leaking nozzles, with 0 circ. cracks
Oconee 2	22.0 EFPY @ 600°F	with 4 leaking nozzles, with 1 circ. crack
Oconee 3	21.7 EFPY @ 600°F	with 1 leaking nozzle, with 3 circ cracks
ANO-1	19.5 EFPY @ 600°F	with 1 leaking nozzle, with 0 circ cracks
Davis Besse	17.9 EFPY @ 600°F	with unknown condition of nozzles
TMI-1	17.5 EFPY @ 600°F	with 3 leaking nozzles, with 0 circ. cracks
CR-3	15.6 EFPY @ 600°F	with 1 leaking nozzle, with 1 circ. crack

So we expect that Davis Besse has one or two leaking nozzles. They used 1.1 (but talked about 1.25).

**Questions:**

**1. Using the same approach as in your 11/1/01 submittal:**

**what is the implicit probability that there is a leaking CRDM nozzle in the plant now?**

**what is the effective conditional probability of a nozzle failure / LOCA per leaking nozzle at this time?**

**2. Explain how Bayesian updating of information from 5 plants with partial information from one plant can be consistent with a factor of 3 reduction in the CRDM leak frequency derived from the data for the 5 plants.**