NRC FORM 658
(9-1999)

U.S. NUCLEAR REGULATORY COMMISSION

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DATE OF MEETING
11/14/2001

The attached document(s), which was/were handed out in this meeting, is/are to be placed in the public domain as soon as possible. The minutes of the meeting will be issued in the near future. Following are administrative details regarding this meeting:

Docket Number(s)	**05000346**
Plant/Facility Name	**Davis-Besse Nuclear PowerStation**
TAC Number(s) (if available)	**MB2626**
Reference Meeting Notice	
Purpose of Meeting (copy from meeting notice)	**To discuss the licensee's response to NRC Bulletin 2001-01**

NAME OF PERSON WHO ISSUED MEETING NOTICE	TITLE
Stephen Sands	**Project Manager**

OFFICE
NRR

DIVISION
Division of Licensing Project Management

BRANCH
LPD3

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Why We're Here:

☆ Discuss revised PSA which now reflects comments received from staff on November 9th.

☆ Discuss comparison between plant specific Allowable Flaw size and flaw size calculated by NRC (EMC2) and EPRI MRP-44.

☆ Answer NRC questions concerning Davis-Besse response to RAI's and other submittals.

Risk-Informed Evaluation

PSA Issues

- ☆ Crack Growth Rate
- ☆ Leakage Detection

Crack Growth Rate

☆ Preliminary staff assessment of nozzle cracking hypothesized that heats exhibiting cracking in the field may have higher susceptibility to PWSCC than the overall population of heats.

☆ Davis-Besse has performed sensitivities on the probabilistic assessment using the data from B&W Tubular Heat 91069.

Crack Growth Rate

The data from heat 91069 was selected as the bounding case for a probabilistic analysis based on the following:

☆ High number of laboratory data points.

☆ Testing performed in three laboratories.

☆ Poor microstructure that is expected to result in a high crack growth rate.

Leakage Detection

☆ Davis-Besse believes that the 1998 and 2000 inspections provide a reasonable level of assurance for nozzles without masking boron deposits.

☆ Sensitivities using different leakage detection rates have been performed.

Other Sensitivities Investigated

- ☆ Initial crack size
- ☆ Initial crack depth
- ☆ Temperature
- ☆ Stress Profile
- ☆ Stress Intensity Factor

Preliminary Results

Heat 69 Case:

- ☆ CDF - 3.6E-5 / year
- ☆ LERF - 5.4E-8 / year

Heat 69 with HEP assumed to be 0.5:

- ☆ CDF - 6.8E-5 / year
- ☆ LERF - 9.6E-8 / year

Results

Heat 69 results are bounding due to many assumptions. Summary of bounding assumptions includes the following:

- ☆ Leak Initiation Frequency
- ☆ Probability of OD Crack Initiation
- ☆ Time to OD Crack Initiation
- ☆ Crack Growth Model Stresses
- ☆ Probability of Core Damage

Results

A more realistic (conservative but not bounding) approximation of the fraction of different events applied in other studies results in the following:

Heat 69 Case

- ☆ CDF - 2.1E-6 / year
- ☆ LERF - 3.0E-9 / year

Analyses

DBNPS's evaluation is based on our visual inspections performed in 10, 11, and 12 RFO (May 1996, April 1998, and April 2000 respectively)

The inspection results afford us assurance that all but 4 nozzle penetrations were inspected in 1996. All but 19 penetrations were inspected in 1998. And all but 24 penetrations were inspected in 2000.

The limiting nozzle population is those nozzles that could not be inspected in 1998 or 2000.

It is conservatively assumed that for these penetrations, an axial through weld flaw occurs immediately upon startup from 10 RFO (May 1996)

Initial Flaw Size

Initial flaw depth of 0.5 mm, 172° around the nozzle, is assumed to exist immediately upon achieving a full penetration axial flaw.

BASIS:

☆ This is a conservative flaw initiation site size.

☆ It is further conservatively assumed that multiple starting flaws could exist and that these would eventually link together.

☆ It is conservative in that by assuming this starting point, we also are assuming that we have already had several years of flaw propagation axially through the Alloy 182 weld material.

Use of Modified Scott Model

The Modified Scott Model is still deemed credible as a mean curve for crack growth rates.

☆ Data received to date does not negate the curve.

☆ Numerous curves have been developed and to a certain degree, they all rest on **engineering judgement**.

☆ The data from OTSGs for Alloy 600 is relevant for developing the CGR curves and in fact is conservative in that the Alloy properties are still relevant and because any cold-working of the tubes at the tube support sheet would increase the failure rate over non-worked Alloy 600, will make this conservative.

Allowable Crack Size Determination

3 separate Allowable (safety factor of 3) determinations have been documented:

- ☆ MRP-44 (Dominion Engineering) - 273 degrees.
- ☆ EMC2 - (NRC funded) - 270 degrees.
- ☆ SIA (Davis-Besse plant specific) - 302 degrees.

Why the difference?

Variable	Dominion	SIA	EMC2
P	2,500 psi	2,185 psig	2,500 psi
σ_{flow}	51,950 psi	69,900 psi	(Y+U)2.4 (43,290 psi ?)
A_{bore}	6.0045 in^2	5.90 in^2	?
A_{wall}	6.5744 in^2	6.67 in^2	?
FS	3.0	3.0	?

What does larger Allowable Crack size do for us?

Applying it to the CGR models developed so far, the additional 32 degrees would result in the following additional runtime when compared to the NRC Assessment - Figure 23.

325 Bounding - 6 additional months.

318 Bounding - 8 additional months.

315 Bounding - 10 additional months.

318 Mean - 20 additional months.

315 Mean - 22 additional months.

Summary:

Based on review of the latest information, there is reasonable assurance that Davis-Besse is safe to operate until the next refueling outage (March 2002).