



## NRR Executive Team Meeting

-Tentative-

Tuesday, September 25, 2001

2:00 p.m. - 2:30 p.m.

Room: TBD

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**Purpose:**

- 1) To discuss and focus on the results of the staff's Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles," response reviews for the high susceptibility plants
- 2) To discuss the basis for the next Regulatory Action to be taken

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**Success:**

- 1) ET understands the results of the staff's review
- 2) ET Alignment on the next Regulatory Action

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<b>Introduction:</b>	Jake Zimmerman	2:00 p.m. - 2:05 p.m.
<b>Discussion of Reviews:</b>	Allen Hiser	2:05 p.m. - 2:15 p.m.
<b>Discussion of Next Regulatory Action(s):</b>	Rich Barrett	2:15 p.m. - 2:25 p.m.
<b>Closing Remarks:</b>	Jack Strosnider	2:25 p.m. - 2:30 p.m.

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Type of Meeting: Decision Making

Information in this record was deleted  
in accordance with the Freedom of Information  
Act, exemptions 4

FOIA- 2002-229

E-11

Old

## PLANTS WITH CRACKING/LEAKAGE HISTORY (BIN 1) AND HIGH SUSCEPTIBILITY PLANTS (BIN 2)

Plants	Last Inspection		Next Inspection				CCDP* (IPE)	Regulatory Action Proposed ?
	Date	Method	Date		Method			
Oconee-1	11/2000	Qual. Visual - 100%	03/2002	OK	Qual. Visual - 100%	OK	1E-2 3.5E-3 (Response)	NO
Oconee-2	04/2001	Qual. Visual - 100%	[REDACTED]	OK	Qual. Visual - 100%	OK	1E-2 3.5E-3 (Response)	NO
Oconee-3	2/2001	Qual. Visual - 100%	11/2001	OK	Qual. Visual - 100%	OK	1E-2 3.5E-3 (Response)	NO
ANO-1	03/2001	Qual. Visual - 100%	[REDACTED]	OK	Qual. Visual - 100%	OK	3E-3	NO
D.C. Cook-2	09/1994	ID NDE - 91%	11/2001	OK	Remote Visual & ECT/UT	OK	4.7E-3	NO
North Anna-1	02/1996	ID NDE - 31%	09/2001	OK	Qual. Visual (100%) & ECT/UT	OK	6.6E-3	NO ***
Surry-1	Spr. 2000	****	10/2001	OK	Qual. Visual - 100%	OK	5.3E-3	NO ***
TMI-1	09/1999	Eff. Visual - 100%	10/2001	OK	Qual. Visual - 100%	OK	7.5E-3	NO
Robinson	04/2001	Eff. Visual - 100%	[REDACTED]	NO	Qual. Visual - 100%	OK	2E-2	YES **
Davis-Besse	08/2000	Visual - Partial	04/2002	NO	Qual. Visual - 100%	OK	6.9E-3	YES
North Anna-2	Spr. 2001	****	[REDACTED]	NO	Qual. Visual - 100%	OK	6.6E-3	YES ***
Surry-2	Fall 2000	****	03/2002	NO	Qual. Visual - 100%	OK	5.3E-3	YES ****

\* Conditional core damage probability.

\*\* Prior examination was not qualified - licensee is performing qualification determination for [REDACTED] RFO.

\*\*\* Licensee has committed to qualified visual examination per conference call (September 21, 2001).

\*\*\*\* Prior inspection at last RFO, in accordance with GL 88-05 &amp; GL 97-01.

## **PROCESS/STATUS/SCHEDULE**

### **Actions Items Completed**

Bulletin Issued - August 3, 2001

Bulletin Responses Received - September 4, 2001

Preliminary Review of Responses Complete - September 12, 2001

- NRR & RES - 7 Submittals
  - ▶ Plant that have found Cracking & Leakage (5 plants) - Bin 1
  - ▶ Plants with High Susceptibility, < 5 EFPY of Oconee 3 (7 plants) - Bin 2
- NRR/DLPM PM "Tiger" Team - 37 Submittals
  - ▶ Plants with Moderate Susceptibility, b/w 5 & 30 EFPY of Oconee 3 (32 plants) - Bin 3
  - ▶ Plants with Low Susceptibility, > 30 EFPY of Oconee 3 (25 plants) - Bin 4

Temporary Instruction (TI) Issued to Regions - September 20, 2001

## PERFORMANCE GOALS

### ● **Maintain Safety**

- ▶ Purpose of the Bulletin Is to Collect Information to Determine If Additional Regulatory Action Is Necessary
- ▶ Information Provided to Date ~~Does Not~~ Provide a Sufficient Technical Basis to Show That Conditions Adverse to Quality Are Being Effectively Managed *for most but not all plants in short term*

### ● **Increase Public Confidence**

- ▶ Disciplined and Timely reviews of plant-specific responses *and regulatory actions*
- ▶ Participation at public meetings via telephone
- ▶ Maintaining current information on Bulletin 2001-01 & Alloy 600 Web Sites

### ● **Make NRC activities and decisions more effective, efficient, and realistic**

- ▶ Reviews prioritized based on susceptibility *ranking* and plant outage schedules
- ▶ Use of Risk Insights *groupings*

### ● **Reduce Unnecessary Regulatory Burden**

- ▶ Information Request in The Bulletin Was Minimized
- ▶ Stakeholder Meetings on Resolution of Issue (Short- and Long-term)
- ▶ Additional Cracking Should Be Anticipated
- ▶ Inspection, Assessment, and Repair Methods must Be Developed to Manage this Issue

## **NEXT REGULATORY ACTION**

- **Adequate Protection**
  - ▶ Special Circumstance
  - ▶ Risk
  - ▶ Deterministic Standards
  
- **Regulatory Action**
  - ▶ Phone call with Licensee
  - ▶ Meeting with Licensee
  - ▶ Implement Regulatory Action

## **STEPS TO SUPPORT REGULATORY ACTION**

- **Brief NRR Leadership Team - 9/20/01 (Complete)**
- **Brief NRR Executive Team - 9/25/01**
- **Brief Committee to Review Generic Requirements**
- **Brief Executive Director for Operations**
- **Brief Commission Technical Assistants**

~~-Backup Slide-~~

## **PROCESS/STATUS/SCHEDULE (cont.)**

### **Action Items Remaining**

Staff will conduct limited discussions w/ licensees for clarification of responses

Staff will prepare a report which provides a summary of licensee responses and staff assessment

Staff will prepare letters to each licensee to close out the Bulletin responses

Staff will continue to pursue next Regulatory Action(s)

Finalize TI web-based inspector guidance

Bulletin specific web page on external NRC web site

All of the above items will be worked in parallel and targeted for completion by October 1, 2001.

## **Postulated LOCA behavior and Conditional Core Damage Probability**

### **CRDM failure vs pipe break**

- REXB performed thermal-hydraulic response analysis for Oconee (B&W), Seabrook (W-4), and ANO-2 (CE)
- No uniqueness/unusual behavior discovered for several scenarios analyzed
- No collateral damages included
- Small shift in timing depending on factors including,
  - ▶ Operating upper head temperature/communication between upper plenum and upper head
  - ▶ RCS piping design, e.g., raised loop

### **Break size**

- LLOCA (diameter larger than 6"): Only as a result of collateral damage or concurrent CRDM failures
- MLOCA (diameter larger than 2"): Most likely. As a result of a catastrophic single CRDM nozzle failure (even if the control rod shaft remains in the nozzle - flow area between diameters 1.84" (shaft) vs 2.75" (nozzle ID))
- SLOCA (diameter larger than 0.5"): As a result of partial ejection or blockage
- Leak (diameter smaller than 0.5")

### **CCDPs**

- Generally in 1E-2 to 1E3 range for most PWRs
- Important contributors include,
  - ▶ failure to switchover to recirculation mode
  - ▶ common cause failure of low pressure injection
  - ▶ failure to refill RWST
- Collateral damage not included,
  - ▶ Potential reactivity concern
  - ▶ Potential sump performance issue

## **GSI-191: Parametric Evaluations for PWR Recirculation Sump Performance (DRAFT)**

### **Surry 2**

- *Very likely* for all break sizes
- Small NPSH margin
- Insulation based on 60% metal and 35% fiber

### **North Anna 2**

- *Very likely* for all break sizes
- Small NPSH margin
- Insulation based on 60% metal and 35% fiber



### **Davis Besse**

- *Unlikely for small and medium breaks & likely for large break*
- Small NPSH margin
- Insulation based on 98% metal and 2% fiber

### **Robinson**

- *Very likely* for all break sizes
- Small NPSH margin
- Insulation based on 30% metal, 30% fiber, and 30% others

### **Licensee Response**

**Oconee 1,2&3:** Only plants with a detailed risk assessment

- Refinement of the B&W Owners' Group risk assessment
- CDF increase =  $6E-8/\text{yr}$  with CCDF =  $3.5E-3$  and initiating event frequency  $\approx E-5$
- Potentially non-conservative assumptions used

**ANO 1&2, Palo Verde 1,2&3, and Indian Point 3:** Short qualitative/screening risk assessment

- ANO 1&2: IE =  $1E-2/\text{yr}$  to  $1E-3/\text{yr}$  based on expert opinion and CDF increase =  $1E-5/\text{yr}$  to  $1E-6/\text{yr}$ ; consistent with the NRC Safety Goal
- Palo Verde 1,2&3: IE =  $1E-4/\text{yr}$  to  $1E-5/\text{yr}$  based on general industry data on LOCAs and CDF increase = on the order of  $E-6$  (CCDF =  $1.5E-2$ )
- Indian Point 3: CDF/CDP increase within the RG 1.174 acceptance criteria

**All Others:** No specific risk information provided

### **Licensee compensatory measures for a potential CRDM failure event**

- Human performance
  - Training
  - Procedure
  - Simulator
- Equipment reliability and availability
- Configuration control
  - Identification of risk significant SSCs
  - Control of test and maintenance activities