VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

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Docket Nos. 50-338/339
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VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
30-DAY REPORT OF EMERGENCY CORE
COOLING SYSTEM (ECCS) MODEL CHANGES
PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

In accordance with 10 CFR 50.46(a)(3)(ii), Dominion submits information regarding changes to the Emergency Core Cooling System (ECCS) evaluation model for the Realistic Large Break Loss of Coolant Accident (RLBLOCA) analyses for North Anna Power Station Units 1 and 2 and its application in existing analyses.

Attachment 1 provides a report describing plant-specific changes associated with the AREVA RLBLOCA ECCS evaluation model for North Anna Units 1 and 2. Information regarding the effect of the ECCS evaluation model changes upon the reported RLBLOCA analyses of record (AOR) results for North Anna Units 1 and 2 is provided in Attachment 2.

Based on the information in Attachment 2, the calculated peak cladding temperature (PCT) for the RLBLOCA analysis for North Anna Unit 1 is 1893°F and for North Anna Unit 2 is 1887°F. Therefore, the RLBLOCA results for North Anna Units 1 and 2 are confirmed to have sufficient margin to the 2200°F limit of 10 CFR 50.46(b)(1). In addition, the PCT assessment for 10 CFR 50.46(a)(3)(i) accumulation (sum of the absolute magnitudes), including the current as well as previous PCT assessments, represents a significant change in PCT, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46(a)(3)(ii) requires a 30-day report to be submitted that includes a "proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with Section 50.46 requirements." Dominion has reviewed the information provided by AREVA and determined that the adjusted RLBLOCA PCT values and the manner in which they were derived continue to conform to the requirements of 10 CFR 50.46. As such, Dominion considers the schedular requirements of 10 CFR 50.46(a)(3)(ii) to be satisfied with the submission of this notification. Dominion routinely tracks adjustments to the Large Break Loss of Coolant Accident (LBLOCA) calculated PCT values to ensure that reasonable margins to the acceptance value set by 10 CFR 50.46 are maintained.

This information satisfies the 30-Day reporting requirements of 10 CFR 50.46(a)(3)(ii).

If you have any further questions regarding this submittal, please contact Mr. E. Thomas Shaub at (804) 273-2763.

Very truly yours,

J. Alan Price
Vice President – Nuclear Engineering

Commitments made in this letter:

1. None.

Attachments:

1. Report of Changes in AREVA RLBLOCA ECCS Evaluation Model – North Anna Power Station Units 1 and 2.

2. 30-Day Reporting of 10 CFR 50.46 Margin Utilization – North Anna Power Station Units 1 and 2.

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ATTACHMENT 1

30-DAY REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

REPORT OF CHANGES IN AREVA RLBLOCA ECCS EVALUATION MODEL

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2

REPORT OF CHANGES IN AREVA RLBLOCA ECCS EVALUATION MODEL

The AREVA Realistic Large Break Loss of Coolant Accident (RLBLOCA) Evaluation Model (EM) is used to analyze the LBLOCA for the AREVA fuel product utilized at North Anna Units 1 and 2. The S-RELAP5 computer code is one of the codes utilized in the RLBLOCA EM. AREVA identified the change described below and provided the results of an assessment to determine the impact on peak cladding temperature (PCT).

Radiation to Fluid Heat Transfer Model Change

AREVA, during development of Revision 2 of its Realistic Large Break LOCA (RLBLOCA) evaluation model (EM), discovered an error in its S-RELAP5 computer code. The calculation of the wall-to-vapor emissivity was incorrect. Discovery revealed the source of the miscalculation to be Figure 23 in the TRAC Model Description report [1]. The scale of the x-axis in Figure 23 is in error by a feet-to-meters squared conversion factor.

In S-RELAP5, the computation of the wall-to-vapor emissivity is based on a correlation taken from a FLECHT SEASET report, specifically Equation 6-6 in Reference 2. As implemented in S-RELAP5 the correlation, Equation 6-6, was modified by a factor derived from comparison to the curves in Figure 23 of Reference 1. Since Figure 23 is in error, the factor AREVA applied to Equation 6-6 in implementing the correlation in its S-RELAP5 computer code is also in error, which created the error in the S-RELAP5 computation of the wall-to-vapor emissivity. The result is that the S-RELAP5 radiation to fluid correlation under predicts the radiative heat transfer.

AREVA has corrected the S-RELAP5 code by implementing the Equation 6-6 emissivity correlation from reference 2 without modification.

AREVA evaluated the impact on the RLBLOCA PCT resulting from this discrepancy. This change resulted in a 32°F decrease in the RLBLOCA PCT for North Anna Units 1 and 2.

Conclusion

Dominion has performed an evaluation of PCT for comparison to 10 CFR 50.46 requirements. Considering the current PCT change as well as previously reported changes, the corrected RLBLOCA PCTs are 1893°F for North Anna Unit 1 and 1887°F for North Anna Unit 2. The RLBLOCA results have sufficient margin to the 2200°F limit specified in 10 CFR 50.46(b)(1). As identified in Attachment 2, the PCT assessment for 10 CFR 50.46(a)(3)(i) accumulation (sum of the absolute magnitudes) since the last 30-day report or reanalysis includes the current assessment (32°F) and two previous assessments resulting in a total accumulation of 81°F (32°F +29°F +20°F) for North

Anna Unit 1 and 71°F (32°F +19°F +20°F) for North Anna Unit 2. The 10 CFR 50.46(a)(3)(i) accumulation of PCT changes for North Anna Units 1 and 2 is greater than the 50°F limit for reporting; hence, the changes are significant and submittal of this 30-day report to the NRC is required.

References

1. NUREG/CR-3633 (EGG-2294), Volume 1, "TRAC-BD1/MOD1: An Advanced Best Estimate Computer Program for Boiling Water Reactor Transient Analysis," April 1984.

2. NUREG/CR-2256 (EPRI NP-2013 and WCAP-9891), "PWR FLECHT SEASET Unblocked Bundle, Forced and Gravity Reflood Task Data Evaluation and Analysis Report," NRC/EPRI/Westinghouse Report No. 10, November 1981.

ATTACHMENT 2

30-DAY REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

30-DAY REPORTING OF 10 CFR 50.46 MARGIN UTILIZATION

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2

10 CFR 50.46 MARGIN UTILIZATION – AREVA LARGE BREAK LOCA

Plant Name: North Anna Power Station, Unit 1
Utility Name: Virginia Electric and Power Company

Analysis Information

EM: AREVA RLBLOCA EM **Limiting Break Size:** DEGB
Analysis Date: 2004
Vendor: AREVA
FQ: 2.32 **FΔH:** 1.65
Fuel: Mixed NAIF/Advanced Mark-BW **SGTP (%):** 12
Notes: None

		Clad Temp (°F)	
LICENSING BASIS			
	Analysis of Record PCT	1853	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	Forslund-Rohsenow Correlation Modeling	64	
2.	RWST Temperature Assumption	8	
3.	LBLOCA/Seismic SG Tube Collapse	0	
4.	RLBLOCA Choked Flow Disposition	-26	
5.	RLBLOCA Changes in Uncertainty Parameters	10	
6.	Mixture Level Model Limitation in the S-RELAP5 Code	-29	{1}
7.	Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-20	{1}
B.	**Planned Plant Modification Evaluations**		
1.	Advanced Mark-BW Top Nozzle Modification	65	
C.	**Current ECCS Model Assessments**		
1.	Radiation to Fluid Heat Transfer Model Change	-32	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =**	**1893**

{1} The current accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is **greater** than 50°F and **is** significant, as defined in 10CFR50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION – AREVA LARGE BREAK LOCA

Plant Name: North Anna Power Station, Unit 2
Utility Name: Virginia Electric and Power Company

Analysis Information

EM: AREVA RLBLOCA EM **Limiting Break Size:** DEGB
Analysis Date: 2004
Vendor: AREVA
FQ: 2.32 **FΔH:** 1.65
Fuel: Mixed: NAIF/Advanced Mark-BW **SGTP (%):** 12
Notes: None

		Clad Temp (°F)	
LICENSING BASIS			
	Analysis of Record PCT	1789	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	Forslund-Rohsenow Correlation Modeling	64	
2.	RWST Temperature Assumption	8	
3.	LBLOCA/Seismic SG Tube Collapse	0	
4.	RLBLOCA Choked Flow Disposition	22	
5.	RLBLOCA Changes in Uncertainty Parameters	10	
6.	Mixture Level Model Limitation in the S-RELAP5 Code	-19	{1}
7.	Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-20	{1}
B.	**Planned Plant Modification Evaluations**		
1.	Advanced Mark-BW Top Nozzle Modification	65	
C.	**Current ECCS Model Assessments**		
1.	Radiation to Fluid Heat Transfer Model Change	-32	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =**	**1887**

{1} The current accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is **greater** than 50°F and **is** significant, as defined in 10CFR50.46(a)(3)(i).