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Dominion®

June 28, 2006

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Serial No. 06-521
NL&OS/PRW R1
Docket Nos. 50-305
50-336/423
50-338/339
50-280/281
License Nos. DPR-43
DPR-65/NPF-49
NPF-4/7
DPR-32/37

DOMINION ENERGY KEWAUNEE, INC.
DOMINION NUCLEAR CONNECTICUT, INC.
VIRGINIA ELECTRIC AND POWER COMPANY
KEWAUNEE POWER STATION
MILLSTONE POWER STATION UNITS 2 AND 3
NORTH ANNA POWER STATION UNITS 1 AND 2
SURRY POWER STATION UNITS 1 AND 2
2005 ANNUAL 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 Energy Kewaunee, Inc. (DEK), Dominion Nuclear Connecticut, Inc. (DNC) and Virginia Electric and Power Company (Dominion) hereby submit the annual summary of changes to the emergency core cooling system (ECCS) evaluation models for Kewaunee Power Station (KPS), Millstone Power Station Units 2 and 3 (MPS 2&3), North Anna Power Station Units 1 and 2 (NAPS 1&2), and Surry Power Station Units 1 and 2 (SPS 1&2), respectively.

Attachment 1 of this letter provides a report describing plant-specific evaluation model changes associated with the Westinghouse and AREVA Small Break Loss of Coolant Accident (SBLOCA) and Large Break Loss of Coolant Accident (LBLOCA) ECCS Evaluation Models for KPS, MPS 2&3, NAPS 1&2, and SPS 1&2.

Information regarding the effect of the ECCS evaluation model changes on the SBLOCA and LBLOCA analyses of record (AOR) results is provided for KPS, MPS 2&3, NAPS 1&2, and SPS 1&2 in Attachments 2, 3, 4 and 5, respectively. Currently, the cores at NAPS 1&2 are comprised of both Westinghouse fuel and AREVA fuel. Therefore, there are two sets of margin utilization data for NAPS 1&2. The calculated peak cladding temperature (PCT) for the SBLOCA and LBLOCA analyses for KPS, MPS 2&3, NAPS 1&2, and SPS 1&2 are summarized below.

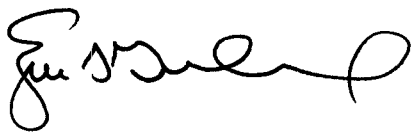
Kewaunee – Small break – Westinghouse Evaluation Model:	1065°F
Kewaunee – Large break – Westinghouse Evaluation Model:	2094°F
Millstone Unit 2 - Small break - AREVA Evaluation Model :	1808°F
Millstone Unit 2 - Large break - AREVA Evaluation Model :	1823°F
Millstone Unit 3 - Small break - Westinghouse Evaluation Model :	1009°F
Millstone Unit 3 – Large break - Westinghouse Evaluation Model :	2004°F
North Anna Unit 1 - Small break - Westinghouse Evaluation Model :	1724°F
North Anna Unit 1 - Large break - Westinghouse Evaluation Model :	2086°F
North Anna Unit 1 - Small break - AREVA Evaluation Model :	1380°F
North Anna Unit 1 - Large break - AREVA Evaluation Model :	1974°F
North Anna Unit 2 - Small break - Westinghouse Evaluation Model :	1724°F
North Anna Unit 2 - Large break - Westinghouse Evaluation Model :	2086°F
North Anna Unit 2 - Small break - AREVA Evaluation Model :	1370°F
North Anna Unit 2 - Large break - AREVA Evaluation Model :	1958°F
Surry Units 1 and 2 - Small break - Westinghouse Evaluation Model :	1760°F
Surry Units 1 and 2 - Large break - Westinghouse Evaluation Model :	2194°F

The LOCA results for KPS, MPS 2&3, NAPS 1&2, and SPS 1&2 are confirmed to have sufficient margin to the 2200°F limit for PCT specified in 10 CFR 50.46. Based on the evaluation of this information and the resulting changes in the applicable licensing basis PCT results, no further action is required to demonstrate compliance with the 10 CFR 50.46 requirements. However, as indicated in a letter dated April 20, 2006 (Serial No. 06-312), reanalysis of the LBLOCA, utilizing the NRC-approved Westinghouse ASTRUM methodology (WCAP-16009-P-A, January 2005), for Surry Units 1 and 2 is scheduled to be complete by September 30, 2006.

In a letter dated February 27, 2006, DEK submitted the annual operating report for KPS which contained the 10 CFR 50.46 annual report for 2004. Therefore, the (2005) information contained in Attachments 1 and 2 is the second report submitted this year for KPS.

If you have any questions regarding this submittal, please contact Mr. Paul R. Willoughby at (804) 273-3572.

Very truly yours,



Eugene S. Grecheck
Vice President – Nuclear Support Services

Commitments made in this letter:

No new commitments are being made in this letter; however, in a letter dated April 20, 2006 (Serial No. 06-312), Dominion committed to completion of the LBLOCA reanalysis for Surry Units 1 and 2 by September 30, 2006.

Attachments: (5)

1) Report of Changes in Westinghouse and AREVA ECCS Evaluation Models.

2) 2005 Annual Reporting of 10 CFR 50.46 Margin Utilization - Kewaunee Power Station.

3) 2005 Annual Reporting of 10 CFR 50.46 Margin Utilization - Millstone Power Station Units 2 and 3.

4) 2005 Annual Reporting of 10 CFR 50.46 Margin Utilization – North Anna Power Station Units 1 and 2.

5) 2005 Annual Reporting of 10 CFR 50.46 Margin Utilization – Surry Power Station Units 1 and 2.

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ATTACHMENT 1

2005 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

REPORT OF CHANGES IN WESTINGHOUSE AND AREVA ECCS EVALUATION MODELS

DOMINION ENERGY KEWAUNEE, INC.
DOMINION NUCLEAR CONNECTICUT, INC.
VIRGINIA ELECTRIC AND POWER COMPANY
KEWAUNEE POWER STATION
MILLSTONE POWER STATION UNITS 2 AND 3
NORTH ANNA POWER STATION UNITS 1 AND 2
SURRY POWER STATION UNITS 1 AND 2

REPORT OF CHANGES IN WESTINGHOUSE AND AREVA ECCS EVALUATION MODELS

Generic Westinghouse PCT Assessments with No Impact on PCT

Westinghouse identified the following errors and changes applicable to the NOTRUMP Small Break Loss of Coolant Accident (SBLOCA) and BASH Large Break Loss of Coolant Accident (LBLOCA) evaluation models. Each was evaluated to have a PCT impact of 0°F. Since these items have no impact on PCT, they will not be shown on the PCT Margin Utilization sheets provided in Attachments 2 through 5.

a. Pressurizer Fluid Volumes (BASH/NOTRUMP)
b. Lower Guide Tube Assembly Weight (BASH/NOTRUMP)
c. Discrepancy in NOTRUMP RWST Draindown Calculation (NOTRUMP)
d. General Code Maintenance (BASH/NOTRUMP)

Westinghouse identified the following errors and changes in the 1999 Westinghouse Best Estimate LBLOCA evaluation model with application to PWRs with upper plenum injection. This evaluation model is utilized at Kewaunee Power Station. Each was evaluated to have a PCT impact of 0°F. Since these items have no impact on PCT, they will not be shown on the PCT Margin Utilization sheets applicable to Kewaunee which are provided in Attachment 2.

a. Revised Iteration Algorithm for Calculating the Average Fuel Temperature
b. Pellet Radial Profile Option
c. Improved Automation of End of Blowdown Time
d. General Code Maintenance
e. Thermodynamic Properties from THERMO
f. Pressurizer Fluid Volumes
g. Vessel Unheated Conductor Noding
h. Level Boundary Selection
i. Containment Relative Humidity Assumption

The following summarizes the plant specific PCT assessments since the previous annual reports.

Kewaunee Power Station

1. No changes or errors were identified in the NOTRUMP SBLOCA analysis.

2. Westinghouse identified a discrepancy in the Spacer Grid Heat Transfer Model Inputs whereby the spacer grid blocked area ratio and open area fraction inputs were revised or corrected, but were not evaluated for impact on the LBLOCA

analysis. Using revised values, a plant-specific evaluation was performed and determined the PCT effect of the blocked area ratio and open area fraction differences to be ΔPCT=+5°F.

3. Westinghouse identified a discrepancy during the course of a 1999 Westinghouse Best Estimate LBLOCA Evaluation Model analysis whereby some prior analyses failed to model the diffuser plate. As such, the total liquid volume in the lower plenum is overestimated and the total metal mass in the lower plenum is underestimated. The pressure drop calculated through the vessel did account for the loss due to the diffuser plate. A plant specific evaluation was completed for the affected plants. This evaluation concluded that there is no significant impact on the LBLOCA analysis results due to the small increase in lower plenum liquid volume and small decrease in lower plenum metal mass modeled, leading to an estimated impact on PCT of ΔPCT=0°F. Since this item has no impact on PCT, it will not be shown on the LBLOCA PCT Margin Utilization sheet applicable to Kewaunee which is provided in Attachment 2.

4. Westinghouse identified a discrepancy during the course of a 1999 Westinghouse Best Estimate LBLOCA Evaluation Model analysis whereby the momentum area specified at the top of the downcomer in some prior analyses is inconsistent with the analysis input guidelines. An evaluation was completed to estimate the effect of these differences on typical LBLOCA analysis results for plants with Upper Plenum Injection. This evaluation concluded that there is no significant impact on the LBLOCA analysis results due to the modeling of the momentum area at the top of the downcomer, leading to an estimated impact on PCT of ΔPCT=0°F. Since this item has no impact on PCT, it will not be shown on the LBLOCA PCT Margin Utilization sheet applicable to Kewaunee which is provided in Attachment 2.

<u>Millstone Power Station Units 2 and 3</u>

1. No changes or errors were identified in the SBLOCA or LBLOCA ECCS evaluation models for Millstone Unit 2.

2. No changes or errors were identified in the Westinghouse SBLOCA or LBLOCA ECCS evaluation models for Millstone Unit 3.

3. Westinghouse evaluated the impact of a planned plant modification to the Millstone Unit 3 charging pump alternate miniflow line, which required a revision to the charging/safety injection (CHG/SI) flowrates. Westinghouse evaluated the impact of the revised CHG/SI flows on PCT. The evaluation indicated that the revised CHG/SI flows had a negligible impact on both the SBLOCA and LBLOCA

Analyses of Record (AOR). As such, the impact of this modification will be tracked as ΔPCT=0°F for both SBLOCA and LBLOCA.

North Anna Power Station Units 1 and 2

1. No changes or errors were identified in the Westinghouse SBLOCA or LBLOCA ECCS evaluation models for North Anna Units 1 and 2.

2. No changes or errors were identified in the AREVA SBLOCA evaluation model for North Anna Units 1 and 2.

3. AREVA evaluated the following changes and errors in the Realistic LBLOCA evaluation model for North Anna Units 1 and 2:

	NAPS1 ΔPCT	NAPS2 ΔPCT
RLBLOCA Choked Flow Disposition	-26°F	22°F
RLBLOCA Changes in Uncertainty Parameters	10°F	10°F
Advanced Mark-BW Top Nozzle Modification	65°F	65°F

These items were previously reported to the NRC in letter Serial No. 06-312, dated April 20, 2006 to meet the 30-day reporting requirements of 10 CFR 50.46 (a)(3)(ii).

Surry Power Station Units 1 and 2

1. Dominion quantified the impact on the SBLOCA PCT resulting from the implementation of the Westinghouse Integral Fuel Burnable Absorber (IFBA) fuel product. The current SBLOCA analysis for Surry Units 1 and 2 was performed using the Westinghouse NOTRUMP evaluation model. For SBLOCA, IFBA need not be explicitly analyzed due to the insignificant difference between IFBA and non-IFBA PCTs. However, the use of annular pellets at the ends of the fuel rods does have a small impact on the SBLOCA analyses. Westinghouse has quantified a generic 10°F PCT penalty to accommodate the impact of annular pellets.

2. Dominion quantified Surry-specific sensitivities to assess the PCT impact on the Surry Units 1 and 2 BASH LBLOCA results for the following items:

	SPS1 & 2 ΔPCT
LOCBART ZIRLO™ Cladding Specific Heat Model Error	16°F
PAD 4.0 Initial Pellet Temperatures	-122°F
Removal of Part Length CRDMs	-66°F
Pressurizer Surge Line Piping Schedule Reconciliation	8°F

These items were previously reported to the NRC in letter Serial No. 05-383, dated July 7, 2005 to meet the 30-day reporting requirements of 10 CFR 50.46 (a)(3)(ii).

3. Dominion quantified Surry-specific sensitivities to assess the PCT impact on the Surry Units 1 and 2 BASH LBLOCA results for the following items:

	SPS1 & 2 ΔPCT
Revised Containment Heat Sink Input	113°F
Revised Containment Spray Flowrate	-17°F
Revised Containment Free Volume	-17°F
PAD 4.0 Initial Pellet Temperatures	-11°F
LOCBART Fluid Property Logic Issue - Augmented	10°F

The -11°F PCT assessment for the PAD 4.0 Initial Pellet Temperatures is a revised value from the PCT assessment of -122°F which was previously reported as indicated in Item 2 above.

These items were previously reported to the NRC in letter Serial No. 05-828, dated January 3, 2006 to meet the 30-day reporting requirements of 10 CFR 50.46 (a)(3)(ii).

4. Dominion quantified the impact on the LBLOCA PCT resulting from the implementation of the Westinghouse Integral Fuel Burnable Absorber (IFBA) fuel product for the following items:

	SPS1 & 2 ΔPCT
Westinghouse IFBA Fuel Product Implementation	41°F
LOCBART Fluid Property Logic Issue - Augmented	-10°F

These items were previously reported to the NRC in letter Serial No. 06-312, dated April 20, 2006 to meet the 30-day reporting requirements of 10 CFR 50.46 (a)(3)(ii).

Conclusion

Based on the information contained in Attachments 2 through 5, the LOCA results for Kewaunee Power Station, Millstone Power Station Units 2 and 3, North Anna Power Station Units 1 and 2, and Surry Power Station Units 1 and 2 are confirmed to have sufficient margin to the 2200°F limit of 10 CFR 50.46. Based upon our evaluation of this information and the associated changes in the applicable licensing basis PCT results, no further action is required to demonstrate compliance with the 10 CFR 50.46 requirements. Reporting of this information is required per 10 CFR 50.46(a)(3)(ii), which obligates each licensee to report the effect upon calculated temperature of any change or error in evaluation models or their application on an annual basis.

This information satisfies the 2005 annual reporting requirements of 10 CFR 50.46(a)(3)(ii). In addition, no reanalysis or other actions are necessary to demonstrate compliance with 10 CFR 50.46 requirements.

Serial Number 06-521
Docket No. 50-305

ATTACHMENT 2

2005 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2005 ANNUAL REPORTING OF 10 CFR 50.46 MARGIN UTILIZATION

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION

10 CFR 50.46 MARGIN UTILIZATION - SMALL BREAK LOCA

Plant Name:	Kewaunee Power Station
Utility Name:	Dominion Energy Kewaunee, Inc.

Analysis Information

EM:	NOTRUMP	**Limiting Break Size:**	3 Inch CL, High Tav
Analysis Date:	05/14/02		
Vendor:	Westinghouse		
FQ:	2.5	**FdH:**	1.8
Fuel:	422 Vantage +	**SGTP(%):**	10
Notes:	Uprate to 1772 MWt. Effective beginning Cycle 26		

	Clad Temp (°F)	Notes
LICENSING BASIS		
Analysis of Record PCT	1030	{1}
PCT ASSESSMENTS (Delta PCT)		
A. Prior ECCS Model Assessments		
1. NOTRUMP Bubble Rise/Drift Flux Model Inconsistency Corrections	35	{2}
B. Planned Plant Modification Evaluations		
1. None	0	
C. 2005 ECCS Model Assessments		
1. None	0	{2}
D. Other		
1. None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT = 1065**	

NOTES:

{1} Transition cycles containing FRA-ANP fuel are bounded by the analysis for a full core of Westinghouse 422+ fuel.

{2} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION - LARGE BREAK LOCA

Plant Name:	Kewaunee Power Station		
Utility Name:	Dominion Energy Kewaunee, Inc.		
Analysis Information			
EM:	UPI (1999)	**Limiting Break Size:**	Split
Analysis Date:	03/25/02		
Vendor:	Westinghouse		
FQ:	2.5	**FdH:**	1.8
Fuel:	422 Vantage +	**SGTP(%):**	10
Notes:	Uprate to 1772 MWt. Effective beginning Cycle 26		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	2084	{1}
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	Revised Blowdown Heatup Uncertainty Distribution	5	{2}
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	Spacer Grid Heat Transfer Model Inputs	5	{2}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =**	**2094**

Notes:

{1} Transition cycles containing FRA-ANP fuel are bounded by the analysis for a full core of Westinghouse 422+ fuel.

{2} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

Serial Number 06-521
Docket Nos. 50-336/423

ATTACHMENT 3

2005 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2005 ANNUAL REPORTING OF 10 CFR 50.46 MARGIN UTILIZATION

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3

10 CFR 50.46 MARGIN UTILIZATION - SMALL BREAK LOCA

Plant Name: Millstone Power Station, Unit 2
Utility Name: Dominion Nuclear Connecticut, Inc.

Analysis Information

EM: PWR Small Break LOCA, S-RELAP5 Based
Limiting Break Size: 0.08 ft^2
Analysis Date: 01/02
Vendor: AREVA
Peak Linear Power: 15.1 kW/ft
Notes: None

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1941	{1}
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	Decay Heat Model Error	-133	
2.	Revised SBLOCA Guideline	0	{2}
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	None	0	{3}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1808**	

NOTES:

{1} New Analysis of Record using S-RELAP5 based methodology.

{2} Assessment of this change resulted in a ΔPCT = +66°F. FRA-ANP provided this assessment for information. The +66°F assessment does not apply since the current Analysis of Record incorporates the revised SBLOCA guideline.

{3} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION - LARGE BREAK LOCA

Plant Name: Millstone Power Station, Unit 2
Utility Name: Dominion Nuclear Connecticut, Inc.

Analysis Information

EM: SEM/PWR-98 **Limiting Break Size:** 1.0 DECLG
Analysis Date: 11/98
Vendor: AREVA
Peak Linear Power: 15.1 kW/ft
Notes: None

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1814	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	Corrected Corrosion Enhancement Factor	-1	{1}
2.	ICECON Coding Errors	0	
3.	Setting RFPAC Fuel Temperatures at Start of Reflood	-2	{1}
4.	SISPNCH/ujun98 Code Error	0	
5.	Error in Flow Blockage Model in TOODEE2	0	
6.	Change in TOODEE2-Calculation of QMAX	0	
7.	Change in Gadolinia Modeling	0	
8.	PWR LBLOCA Split Break Modeling	0	
9.	TEOBY Calculation Error	0	
10.	Inappropriate Heat Transfer in TOODEE2	0	
11.	End-of-Bypass Prediction by TEOBY	0	
12.	R4SS Overwrite of Junction Inertia	0	
13.	Incorrect Junction Inertia Multipliers	1	{1}
14.	Errors Discovered During RODEX2 V&V	0	
15.	Error in Broken Loop SG Tube Exit Junction Inertia	0	
16.	RFPAC Refill and Reflood Calculation Code Errors	16	{1}
17.	Incorrect Pump Junction Area Used in RELAP4	0	
18.	Error in TOODEE2 Clad Thermal Expansion	-1	{1}
19.	Accumulator Line Loss Error	-1	{1}
20.	Inconsistent Loss Coefficients Used for Robinson LBLOCA	0	
21.	Pump Head Adjustment for Pressure Balance Initialization	-3	{1}
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **1823**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION - SMALL BREAK LOCA

Plant Name:	Millstone Power Station, Unit 3		
Utility Name:	Dominion Nuclear Connecticut, Inc.		
Analysis Information			
EM:	NOTRUMP	**Limiting Break Size:**	3 Inches
Analysis Date:	04/04		
Vendor:	Westinghouse		
FQ:	2.6	**FΔH:**	1.7
Fuel:	RFA/Vantage 5H	**SGTP (%):**	10
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1009	{1}
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	NOTRUMP Bubble Rise / Drift Flux Model Inconsistency Corrections	0	{2},{3}
B.	**Planned Plant Modification Evaluations**		
1.	CHG/SI Alternate MiniFlow	0	{3}
C.	**2005 ECCS Model Assessments**		
1.	None	0	{3}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **1009**	

Notes:

{1} The SBLOCA was reanalyzed in 2001 using NOTRUMP with the COSI condensation model. The reanalysis did not become the Analysis of Record (AOR) until 2004.

{2} This error was identified by Westinghouse in 2003. It is applied to the 2004 ECCS Model Assessments consistent with the AOR date.

{3} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION - LARGE BREAK LOCA

Plant Name:	Millstone Power Station, Unit 3		
Utility Name:	Dominion Nuclear Connecticut, Inc.		
Analysis Information			
EM:	BASH	**Limiting Break Size:**	Cd=0.6
Analysis Date:	08/90		
Vendor:	Westinghouse		
FQ:	2.6	**FΔH:**	1.7
Fuel:	Vantage 5H	**SGTP (%):**	10
Notes:	VH5/RFA		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1974	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	None	0	
B.	**Planned Plant Modification Evaluations**		
1.	CHG/SI Alternate MiniFlow	0	{1}
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	Rebaseline of AOR	30	{1}
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **2004**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

Serial Number 06-521
Docket Nos. 50-338/339

ATTACHMENT 4

2005 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2005 ANNUAL 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 – WESTINGHOUSE SMALL BREAK LOCA

Plant Name:	North Anna Power Station, Unit 1		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	NOTRUMP	**Limiting Break Size:**	3 Inches
Analysis Date:	1995		
Vendor:	Westinghouse		
FQ:	2.32	**FΔH:**	1.65
Fuel:	NAIF	**SGTP (%):**	7
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1704	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	NOTRUMP Specific Enthalpy Error	20	
2.	SALIBRARY Double Precision Error	-15	
3.	Fuel Rod Initialization Error	10	
4.	Loop Seal Elevation Error	-44	
5.	NOTRUMP-Mixture Level Tracking Errors	13	{1}
6.	Removal of Part Length CRDMs	1	{1}
7.	NOTRUMP-Bubble Rise/Drift Flux Model Inconsistencies	35	{1}
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =**	**1724**

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE LARGE BREAK LOCA

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

Analysis Information

EM:	BASH	**Limiting Break Size:**	Cd=0.4
Analysis Date:	2004		
Vendor:	Westinghouse		
FQ:	2.19	**FΔH:**	1.55
Fuel:	NAIF	**SGTP (%):**	7
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	2086	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	LOCBART Fluid Property Logic Issue	0	{1}
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **2086**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION – AREVA SMALL BREAK LOCA

Plant Name:	North Anna Power Station, Unit 1		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	AREVA SB EM	**Limiting Break Size:**	5.2 Inches (SI Line)
Analysis Date:	2004		
Vendor:	AREVA		
FQ:	2.32	**FΔH:**	1.65
Fuel:	Advanced Mark-BW	**SGTP (%):**	7
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1404	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	None	0	
B.	**Planned Plant Modification Evaluations**		
1.	Revised Test Flow Curve for HHSI	-24	{1}
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **1380**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

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)	Notes
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	{1}
B.	**Planned Plant Modification Evaluations**		
1.	Advanced Mark-BW Top Nozzle Modification	65	
C.	**2005 ECCS Model Assessments**		{2}
1.	RLBLOCA Choked Flow Disposition	-26	
2.	RLBLOCA Changes in Uncertainty Parameters	10	
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1974**	

Notes:

{1} A generic steam generator LOCA/seismic load evaluation was performed by Westinghouse to quantify the potential steam generator tube collapse, which may occur at the time of the LOCA due to combined LOCA and seismic loads. Based on this analysis, a total steam generator tube reduction equivalent to 5% tube plugging was allocated as a permanent assessment for those plants that do not have a detailed analysis. The 5% steam generator tube plugging reduction will be used to account for the effects of a combined LOCA/seismic event at North Anna Unit 1 with the AREVA evaluation model.

{2} All current and prior PCT assessments have been previously reported to the NRC to meet the 30-Day reporting requirements of 10 CFR50.46 (a)(3)(ii). Therefore, the current accumulation of PCT assessments is 0°F.

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE SMALL BREAK LOCA

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

Analysis Information

EM:	NOTRUMP	**Limiting Break Size:**	3 Inches
Analysis Date:	1995		
Vendor:	Westinghouse		
FQ:	2.32	**FΔH:**	1.65
Fuel:	NAIF	**SGTP (%):**	7
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1704	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	NOTRUMP Specific Enthalpy Error	20	
2.	SALIBRARY Double Precision Error	-15	
3.	Fuel Rod Initialization Error	10	
4.	Loop Seal Elevation Error	-44	
5.	Removal of Part Length CRDMs	1	{1}
6.	NOTRUMP-Mixture Level Tracking Errors	13	{1}
7.	NOTRUMP-Bubble Rise/Drift Flux Model Inconsistencies	35	{1}
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **1724**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE LARGE BREAK LOCA

Plant Name:	North Anna Power Station, Unit 2		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	BASH	**Limiting Break Size:**	Cd=0.4
Analysis Date:	2004		
Vendor:	Westinghouse		
FQ:	2.19	**FΔH:**	1.55
Fuel:	NAIF	**SGTP (%):**	7
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	2086	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	LOCBART Fluid Property Logic Issue	0	{1}
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =**	**2086**

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION – AREVA SMALL BREAK LOCA

Plant Name:	North Anna Power Station, Unit 2		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	AREVA SB EM	**Limiting Break Size:**	3 Inches
Analysis Date:	2004		
Vendor:	AREVA		
FQ:	2.32	**FΔH:**	1.65
Fuel:	Advanced Mark-BW	**SGTP (%):**	7
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1370	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	None	0	
B.	**Planned Plant Modification Evaluations**		
1.	None	0	
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **1370**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(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)	Notes
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	{1}
B.	**Planned Plant Modification Evaluations**		
1.	Advanced Mark-BW Top Nozzle Modification	65	
C.	**2005 ECCS Model Assessments**		{2}
1.	RLBLOCA Choked Flow Disposition	22	
2.	RLBLOCA Changes in Uncertainty Parameters	10	
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1958**	

Notes:

{1} A generic steam generator LOCA/seismic load evaluation was performed by Westinghouse to quantify the potential steam generator tube collapse, which may occur at the time of the LOCA due to combined LOCA and seismic loads. Based on this analysis, a total steam generator tube reduction equivalent to 5% tube plugging was allocated as a permanent assessment for those plants that do not have a detailed analysis. The 5% steam generator tube plugging reduction will be used to account for the effects of a combined LOCA/seismic event at North Anna Unit 2 with the AREVA evaluation model.

{2} All current and prior PCT assessments have been previously reported to the NRC to meet the 30-Day reporting requirements of 10 CFR 50.46(a)(3)(ii). Therefore, the current accumulation of PCT assessments is 0°F.

Serial Number 06-521
Docket Nos. 50-280/281

ATTACHMENT 5

2005 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2005 ANNUAL REPORTING OF 10 CFR 50.46 MARGIN UTILIZATION

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE SMALL BREAK LOCA

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

Analysis Information

EM:	NOTRUMP	**Limiting Break Size:**	3 Inches
Analysis Date:	1996		
Vendor:	Westinghouse		
FQ:	2.5	**FΔH:**	1.7
Fuel:	SIF	**SGTP (%):**	15
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1717	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	NOTRUMP - Mixture Level Tracking Errors	13	
2.	Removal of Part Length CRDMs	-15	
3.	NOTRUMP-Bubble Rise/Drift Flux Model Inconsistencies	35	
B.	**Planned Plant Modification Evaluations**		
1.	Westinghouse IFBA Fuel Product Implementation	10	{1}
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **1760**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE LARGE BREAK LOCA

Plant Name:	Surry Power Station, Unit 1		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	BASH	**Limiting Break Size:**	Cd=0.4
Analysis Date:	2001		
Vendor:	Westinghouse		
FQ:	2.32	**FΔH:**	1.62
Fuel:	SIF	**SGTP (%):**	15
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	2117	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	LBLOCA/Seismic SG Tube Collapse	0	{1}
2.	BASH EM Transient Termination	0	
3.	LOCBART Fluid Property Logic Issue	10	
B.	**Planned Plant Modification Evaluations**		
1.	Westinghouse IFBA Fuel Product Implementation	41	
C.	**2005 ECCS Model Assessments**		{2}
1.	LOCBART ZIRLO™ Cladding Specific Heat Model Error	16	
2.	PAD 4.0 Initial Pellet Temperatures	-11	
3.	Removal of Part-Length CRDMs	-66	
4.	Pressurizer Surge Line Piping Schedule Reconciliation	8	
5.	LOCBART Fluid Property Logic Issue-Augmented	10	
6.	Revised Containment Heat Sink Input	113	
7.	Revised Containment Spray Flowrate	-17	
8.	Revised Containment Free Volume	-17	
D.	**2006 ECCS Model Assessments**		{2}
1.	LOCBART Fluid Property Logic Issue-Augmented	-10	
E.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 2194**	

Notes:

{1} A generic steam generator LOCA/seismic load evaluation was performed by Westinghouse to quantify the potential steam generator tube collapse, which may occur at the time of the LOCA due to combined LOCA and seismic loads. Based on this analysis, a total steam generator tube reduction equivalent to 5% tube plugging was allocated as a permanent assessment for those plants that do not have a detailed analysis. The 5% steam generator tube plugging reduction will be used to account for the effects of a combined LOCA/seismic event at Surry.

{2} All current and prior PCT assessments have been previously reported to the NRC to meet the 30-Day reporting requirements of 10 CFR 50.46(a)(3)(ii). Therefore, the current accumulation of PCT assessments is 0°F.

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE SMALL BREAK LOCA

Plant Name:	Surry Power Station, Unit 2		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	NOTRUMP	**Limiting Break Size:**	3 Inches
Analysis Date:	1996		
Vendor:	Westinghouse		
FQ:	2.5	**FΔH:**	1.7
Fuel:	SIF	**SGTP (%):**	15
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	1717	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	NOTRUMP - Mixture Level Tracking Errors	13	
2.	Removal of Part Length CRDMs	-15	
3.	NOTRUMP-Bubble Rise/Drift Flux Model Inconsistencies	35	
B.	**Planned Plant Modification Evaluations**		
1.	Westinghouse IFBA Fuel Product Implementation	10	{1}
C.	**2005 ECCS Model Assessments**		
1.	None	0	{1}
D.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **1760**	

Notes:

{1} The accumulation of changes for these items (sum of absolute magnitudes) since the last 30-day report or reanalysis is less than or equal to 50°F and is **not** significant, as defined in 10 CFR 50.46(a)(3)(i).

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE LARGE BREAK LOCA

Plant Name:	Surry Power Station, Unit 2		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	BASH	**Limiting Break Size:**	Cd=0.4
Analysis Date:	2001		
Vendor:	Westinghouse		
FQ:	2.32	**FΔH:**	1.62
Fuel:	SIF	**SGTP (%):**	15
Notes:	None		

		Clad Temp (°F)	Notes
LICENSING BASIS			
	Analysis of Record PCT	2117	
PCT ASSESSMENTS (Delta PCT)			
A.	**Prior ECCS Model Assessments**		
1.	LBLOCA/Seismic SG Tube Collapse	0	{1}
2.	BASH EM Transient Termination	0	
3.	LOCBART Fluid Property Logic Issue	10	
B.	**Planned Plant Modification Evaluations**		
1.	Westinghouse IFBA Fuel Product Implementation	41	
C.	**2005 ECCS Model Assessments**		{2}
1.	LOCBART ZIRLO™ Cladding Specific Heat Model Error	16	
2.	PAD 4.0 Initial Pellet Temperatures	-11	
3.	Removal of Part-Length CRDMs	-66	
4.	Pressurizer Surge Line Piping Schedule Reconciliation	8	
5.	LOCBART Fluid Property Logic Issue-Augmented	10	
6.	Revised Containment Heat Sink Input	113	
7.	Revised Containment Spray Flowrate	-17	
8.	Revised Containment Free Volume	-17	
D.	**2006 ECCS Model Assessments**		{2}
1.	LOCBART Fluid Property Logic Issue-Augmented	-10	
E.	**Other**		
1.	None	0	
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT =** **2194**	

Notes:

{1} A generic steam generator LOCA/seismic load evaluation was performed by Westinghouse to quantify the potential steam generator tube collapse, which may occur at the time of the LOCA due to combined LOCA and seismic loads. Based on this analysis, a total steam generator tube reduction equivalent to 5% tube plugging was allocated as a permanent assessment for those plants that do not have a detailed analysis. The 5% steam generator tube plugging reduction will be used to account for the effects of a combined LOCA/seismic event at Surry.

{2} All current and prior PCT assessments have been previously reported to the NRC to meet the 30-Day reporting requirements of 10 CFR 50.46(a)(3)(ii). Therefore, the current accumulation of PCT assessments is 0°F.