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Dominion®

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

Serial No.	08-0348
NL&OS/ETS	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. (DEK)
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)
VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
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
2007 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

In accordance with 10 CFR 50.46(a)(3)(ii), DEK, DNC, and Dominion hereby submit the annual summary of permanent changes to the emergency core cooling system (ECCS) evaluation models for Kewaunee Power Station (KPS), Millstone Power Station (MPS) Units 2 and 3, North Anna Power Station (NAPS) Units 1 and 2, and Surry Power Station (SPS) Units 1 and 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 and 3, NAPS 1 and 2, and SPS 1 and 2.

Information regarding the effect of the ECCS evaluation model changes upon the reported SBLOCA and LBLOCA analyses of record (AOR) results is provided for KPS, MPS 2 and 3, NAPS 1 and 2, and SPS 1 and 2 in Attachments 2, 3, 4 and 5, respectively. The cores at NAPS 1 and 2 were comprised of both Westinghouse fuel and AREVA fuel in 2007. Therefore, there are two sets of margin utilization data for NAPS 1 and 2. The calculated peak cladding temperatures (PCT) for the SBLOCA and LBLOCA analyses for KPS, MPS 2 and 3, NAPS 1 and 2, and SPS 1 and 2 are

summarized below:

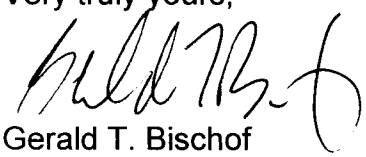
Kewaunee – Small break – Westinghouse Evaluation Model:	1065°F
Kewaunee – Large break – Westinghouse Evaluation Model:	2045°F
Millstone Unit 2 - Small break - AREVA Evaluation Model:	1778°F
Millstone Unit 2 - Large break - AREVA Evaluation Model:	1825°F
Millstone Unit 3 - Small break - Westinghouse Evaluation Model:	1009°F
Millstone Unit 3 – Large break - Westinghouse Evaluation Model:	2087°F
North Anna Unit 1 - Small break - Westinghouse Evaluation Model:	1809°F
North Anna Unit 1 - Large break - Westinghouse Evaluation Model:	2131°F
North Anna Unit 1 - Small break - AREVA Evaluation Model:	1372°F
North Anna Unit 1 - Large break - AREVA Evaluation Model:	1925°F
North Anna Unit 2 - Small break - Westinghouse Evaluation Model:	1809°F
North Anna Unit 2 - Large break - Westinghouse Evaluation Model:	2131°F
North Anna Unit 2 - Small break - AREVA Evaluation Model:	1362°F
North Anna Unit 2 - Large break - AREVA Evaluation Model:	1919°F
Surry Units 1 and 2 - Small break - Westinghouse Evaluation Model:	1845°F
Surry Units 1 and 2 - Large break - Westinghouse Evaluation Model:	2095°F

The LOCA results for KPS, MPS 2 and 3, NAPS 1 and 2, and SPS 1 and 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. Independently, as described in our letter dated July 31, 2007 (Serial No. 06-0936B), Dominion previously committed to perform a full Best Estimate-LBLOCA reanalysis for Surry Units 1 and 2 and submit the reanalysis results to the NRC by December 31, 2008.

This information satisfies the 2007 annual reporting requirements of 10 CFR 50.46(a)(3)(ii).

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

Very truly yours,



Gerald T. Bischof
Vice President – Nuclear Engineering
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Dominion Nuclear Connecticut, Inc.
Virginia Electric and Power Company

Commitments made in this letter: None

Attachments: (5)

1. Report of Changes in Westinghouse and AREVA ECCS Evaluation Models.
2. 2007 Annual Reporting of 10 CFR 50.46 Margin Utilization - Kewaunee Power Station.
3. 2007 Annual Reporting of 10 CFR 50.46 Margin Utilization - Millstone Power Station Units 2 and 3.
4. 2007 Annual Reporting of 10 CFR 50.46 Margin Utilization – North Anna Power Station Units 1 and 2.
5. 2007 Annual Reporting of 10 CFR 50.46 Margin Utilization – Surry Power Station Units 1 and 2.

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NRC Senior Resident Inspector
Kewaunee Power Station

NRC Senior Resident Inspector
Millstone Power Station

NRC Senior Resident Inspector
North Anna Power Station

NRC Senior Resident Inspector
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ATTACHMENT 1

2007 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

Kewaunee Power Station

1. Westinghouse identified the following changes and errors applicable to the KPS 1999 Westinghouse Best Estimate LBLOCA Evaluation Model (BE LBLOCA EM) with application to PWRs with upper plenum injection:

   - Revised Upper Plenum Volume Inputs
   - Steam Generator Nozzle Volume Accounting Error
   - Errors in Reactor Vessel Nozzle Data Collections
   - Lower Plenum Unheated Conductors

   These items were evaluated to have a 0°F impact on PCT.

2. Westinghouse identified the following changes and errors applicable to the KPS 1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP:

   - Errors in Reactor Vessel Nozzle Data Collections
   - Pump Weir Resistance Modeling
   - General Code Maintenance

   These items were evaluated to have a 0°F impact on PCT.

3. Westinghouse identified an error in the fuel relocation model in the HOTSPOT code. This error applies to the KPS 1999 Westinghouse BE LBLOCA EM, with application to PWRs with upper plenum injection. In the axial node where burst is predicted to occur, a fuel relocation model in HOTSPOT is used to account for the likelihood that additional fuel pellet fragments above that elevation may settle into the burst region. It was discovered that the effect of fuel relocation on local linear heat rate was being calculated, but then cancelled out later in the coding. A HOTSPOT reanalysis using the corrected code version resulted in an increase in the BE LBLOCA PCT of 10°F.

Millstone Power Station Unit 2

1. AREVA did not identify any changes or errors in the Realistic LBLOCA (RLBLOCA) and SBLOCA analyses for the 2007 calendar year.

2. In a notification dated March 3, 2008, AREVA identified a legacy FORTRAN programming issue with the point kinetics solution of the RELAP5-based computer codes. A programming error was made during the development of RELAP5 when the point kinetics package was installed, ca. 1980. The error consists of incorrect indexing in the four summations that compute terms for the delayed neutron fractions from each group that contributes to total power. The error adds an additional term to each of the summations. In most cases, the

additional term seems to be much smaller than the legitimate terms in the summation so there has been negligible effect on the sum. The change in fission power, as well as total power, is less than 0.2%. The effect of the error was not discernable on the test problems used for the implementation testing; consequently the error was not detected. This error affects all versions of RELAP5 based computer programs. RELAP4 is not impacted by this error. AREVA determined that the impact of this programming error is an 8°F decrease in the PCT for the MPS2 SBLOCA analysis.

Millstone Power Station Unit 3

1. Westinghouse identified the following changes and errors applicable to the MPS3 1981 Westinghouse LBLOCA Evaluation Model with BASH:

   - BASH-EM Accumulator Water Temperature
   - BASH Pellet Volumetric Heat Generation Rate
   - Errors in Reactor Vessel Nozzle Data Collections
   - LOCBART Specific Heat Model for Optimized ZIRLO™ Cladding
   - Pump Weir Resistance Modeling
   - General Code Maintenance
   - LOCBART Oxide-to-Metal Ratio

   These items were evaluated to have a 0°F impact on PCT.

2. Westinghouse identified the following changes and errors applicable to the MPS3 1985 Westinghouse SBLOCA Evaluation Model with NOTRUMP:

   - Errors in Reactor Vessel Nozzle Data Collections
   - Pump Weir Resistance Modeling
   - General Code Maintenance

   These items were evaluated to have a 0°F impact on PCT.

3. Westinghouse modified the LOCBART code to correct an inverted term in the calculation of the pellet volumetric heat generation rate. The LOCBART code is one of several computer codes used in the BASH LBLOCA Evaluation model for MPS3. This change affects the steady-state and transient heat generation for the hot rod and hot assembly, and could result in either an increase or decrease in PCT for a given calculation. Westinghouse determined that the LOCBART Pellet Volumetric Heat Generation Rate assessment for Millstone Unit 3 was +39°F using the difference between the PCTs from LOCBART calculations with and without the error correction.

North Anna Power Station Units 1 and 2

1. Westinghouse identified the following changes and errors applicable to the NAPS 1 and 2 1981 Westinghouse LBLOCA Evaluation Model with BASH:

   - BASH-EM Accumulator Water Temperature
   - BASH Pellet Volumetric Heat Generation Rate
   - Errors in Reactor Vessel Nozzle Data Collections
   - LOCBART Specific Heat Model for Optimized ZIRLO™ Cladding
   - Pump Weir Resistance Modeling
   - General Code Maintenance
   - LOCBART Oxide-to-Metal Ratio

   These items were evaluated to have a 0°F impact on PCT.

2. Westinghouse identified the following changes and errors applicable to the NAPS 1 and 2 1985 Westinghouse SBLOCA Evaluation Model with NOTRUMP:

   - Errors in Reactor Vessel Nozzle Data Collections
   - Pump Weir Resistance Modeling
   - General Code Maintenance

   These items were evaluated to have a 0°F impact on PCT.

3. Westinghouse modified the LOCBART code to correct an inverted term in the calculation of the pellet volumetric heat generation rate. The LOCBART code is one of several computer codes used in the BASH LBLOCA Evaluation model for NAPS 1 and 2. This change affects the steady-state and transient heat generation for the hot rod and hot assembly, and could result in either an increase or decrease in PCT for a given calculation. Westinghouse determined that a bounding value for the LOCBART Pellet Volumetric Heat Generation Rate assessment was +45°F based on non-plant specific sensitivity calculations. Since Westinghouse is not the holder of the BASH LBLOCA analysis for NAPS 1 and 2, Dominion elected to apply the bounding value from available non-plant-specific sensitivity calculations (+45°F) for NAPS 1 and 2. This change is only applicable to the Westinghouse fuel.

4. AREVA identified a mixture level model limitation in the S-RELAP5 code. This error affects the AREVA RLBLOCA Evaluation Model which is used to analyze the LBLOCA for the AREVA fuel in NAPS 1 and 2. The S-RELAP5 mixture level model detection logic determines the locations of mixture level by primarily looking at the void distributions in stacks of consecutive vertical volumes. Under certain circumstances, the removal of extra mixture levels according to heat structure conditions may not be performed properly, resulting in random removal of mixture levels. This issue can arise in the AREVA RLBLOCA methodology where level tracking is important in stacked volumes such as the downcomer. As

a result, AREVA has performed code modifications to fix this logic error in S-RELAP5 in order to eliminate potential level tracking problems. AREVA evaluated the impact of this correction as a change in PCT of -29°F for NAPS 1 and -19°F for NAPS 2.

5. AREVA identified a legacy FORTRAN programming issue with the point kinetics solution of the RELAP5-based computer codes. This error affects both the AREVA RLBLOCA Evaluation Model and the AREVA SBLOCA Evaluation Model which are used to analyze the LBLOCA and SBLOCA for the AREVA fuel in NAPS 1 and 2. A programming error was made during the development of RELAP5 when the point kinetics package was installed, ca. 1980. The error consists of incorrect indexing in the four summations that compute terms for the delayed neutron fractions from each group that contributes to total power. The error adds an additional term to each of the summations. In most cases, the additional term seems to be much smaller than the legitimate terms in the summation so there has been negligible effect on the sum. The change in fission power, as well as total power, is less than 0.2%. The effect of the error was not discernable on the test problems used for the implementation testing; consequently the error was not detected. This error affects all versions of RELAP5 based computer programs. AREVA determined that the impact of this programming error is an 8°F decrease in the PCT for the NAPS 1 and 2 SBLOCA analyses and a 20°F decrease in the PCT for the NAPS 1 and 2 RLBLOCA analyses.

Surry Power Station Units 1 and 2

1. Westinghouse identified the following changes and errors applicable to the SPS 1 and 2 1985 Westinghouse SBLOCA Evaluation Model with NOTRUMP:

   - Errors in Reactor Vessel Nozzle Data Collections
   - Pump Weir Resistance Modeling
   - General Code Maintenance

   These items were evaluated to have a 0°F impact on PCT.

2. Westinghouse identified the following changes and errors applicable to the SPS 1 and 2 2004 Westinghouse Best Estimate (BE) LBLOCA Evaluation Model Using ASTRUM:

   - Sampling of the Integrated Power Fraction in the Lower Third Section of the Core (PBOT) and Integrated Power Fraction in the Mid Third Section of the Core (PMID)
   - Steam Generator Nozzle Volume Accounting Error
   - Errors in Reactor Vessel Nozzle Data Collections

   These items were evaluated to have a 0°F impact on PCT.

3. Westinghouse identified an error in the fuel relocation model in the HOTSPOT code. This error applies to the SPS 2004 Westinghouse BE-LBLOCA Evaluation Model Using ASTRUM. In the axial node where burst is predicted to occur, a fuel relocation model in HOTSPOT is used to account for the likelihood that additional fuel pellet fragments above that elevation may settle into the burst region. It was discovered that the effect of fuel relocation on local linear heat rate was being calculated, but then cancelled out later in the coding. A HOTSPOT reanalysis using the corrected code version resulted in an increase in the BE-LBLOCA PCT (of 51°F) from 2044°F to 2095°F. Discussion of this computer code error was provided to the NRC in a letter dated July 31, 2007 (Serial No. 06-0936B). The results of this evaluation were reviewed and accepted by the NRC in a letter dated September 6, 2007, issuing Licensing Amendments 254/253 (TAC Nos. MD3609 and MD3610). Our letter dated July 31, 2007 also committed to perform a full BE-LBLOCA reanalysis for Surry Units 1 and 2 and submit the reanalysis results to the NRC by December 31, 2008.

Conclusion

The LOCA results for KPS, MPS 2 and 3, NAPS 1 and 2, and SPS 1 and 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. 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 2007 annual reporting requirements of 10 CFR 50.46(a)(3)(ii).

ATTACHMENT 2

2007 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2007 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 Tavg
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)
LICENSING BASIS		
	Analysis of Record PCT	1030
PCT ASSESSMENTS (Delta PCT)		
A.	**Prior ECCS Model Assessments**	
1.	NOTRUMP Bubble Rise/Drift Flux Model Inconsistency Corrections	35
2.	NOTRUMP-EM Refined Break Spectrum	0
B.	**Planned Plant Modification Evaluations**	
1.	None	0
C.	**2007 ECCS Model Assessments**	
1.	None	0
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1065**

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)
LICENSING BASIS		
	Analysis of Record PCT	2084
PCT ASSESSMENTS (Delta PCT)		
A.	**Prior ECCS Model Assessments**	
1.	Revised Blowdown Heatup Uncertainty Distribution	5
2.	Spacer Grid Heat Transfer Model Inputs	5
3.	Inconsistent Vessel Vertical Level Modeling	0
4.	Revised Downcomer Gap Inputs	-59
5.	Core Support Column Heat Slab Discrepancy	0
B.	**Planned Plant Modification Evaluations**	
1.	None	0
C.	**2007 ECCS Model Assessments**	
1.	HOTSPOT Fuel Relocation Error	10
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 2045**

ATTACHMENT 3

2007 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2007 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)
LICENSING BASIS		
	Analysis of Record PCT	1941
PCT ASSESSMENTS (Delta PCT)		
A.	**Prior ECCS Model Assessments**	
1.	Decay Heat Model Error	-133
2.	Revised SBLOCA Guideline	0
3.	Core Exit Modeling-Upper Tie Plate Flow Area	-22
B.	**Planned Plant Modification Evaluations**	
1.	None	0
C.	**2007 ECCS Model Assessments**	
1.	Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-8
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1778**

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)
LICENSING BASIS		
	Analysis of Record PCT	1814
PCT ASSESSMENTS (Delta PCT)		
A.	**Prior ECCS Model Assessments**	
1.	Corrected Corrosion Enhancement Factor	-1
2.	ICECON Coding Errors	0
3.	Setting RFPAC Fuel Temperatures at Start of Reflood	-2
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
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
17.	Incorrect Pump Junction Area Used in RELAP4	0
18.	Error in TOODEE2 Clad Thermal Expansion	-1
19.	Accumulator Line Loss Error	-1
20.	Inconsistent Loss Coefficients Used for Robinson LBLOCA	0
21.	Pump Head Adjustment for Pressure Balance Initialization	-3
22.	ICECON Code Errors	0
B.	**Planned Plant Modification Evaluations**	
1.	Containment Sump Modification and Replacement PZR	2
C.	**2007 ECCS Model Assessments**	
1.	None	0
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT =**	**1825**

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)
LICENSING BASIS	
Analysis of Record PCT	1009
PCT ASSESSMENTS (Delta PCT)	
A. Prior ECCS Model Assessments	
1. NOTRUMP Bubble Rise / Drift Flux Model Inconsistency Corrections	0
2. NOTRUMP-EM Refined Break Spectrum	0
B. Planned Plant Modification Evaluations	
1. CHG/SI Alternate MiniFlow	0
C. 2007 ECCS Model Assessments	
1. None	0
D. Other	
1. None	0
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT = 1009**

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)
LICENSING BASIS	
Analysis of Record PCT	1974
PCT ASSESSMENTS (Delta PCT)	
A. Prior ECCS Model Assessments	
1. BASH Minimum and Maximum Time Step Sizes	44
B. Planned Plant Modification Evaluations	
1. CHG/SI Alternate MiniFlow	0
C. 2007 ECCS Model Assessments	
1. LOCBART Pellet Volumetric Heat Generation Rate	39
D. Other	
1. Rebaseline of AOR	30
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT = 2087**

ATTACHMENT 4

2007 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2007 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)
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
6.	Removal of Part Length CRDMs	1
7.	NOTRUMP-Bubble Rise/Drift Flux Model Inconsistencies	35
8.	NOTRUMP-EM Refined Break Spectrum	85
B.	**Planned Plant Modification Evaluations**	
1.	None	0
C.	**2007 ECCS Model Assessments**	
1.	None	0
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1809**

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)
LICENSING BASIS	
Analysis of Record PCT	2086
PCT ASSESSMENTS (Delta PCT)	
A. Prior ECCS Model Assessments	
1. LOCBART Fluid Property Logic Issue	0
2. BASH Minimum and Maximum Time Step Sizes	0
B. Planned Plant Modification Evaluations	
1. None	0
C. 2007 ECCS Model Assessments	
1. LOCBART Pellet Volumetric Heat Generation Rate	45
D. Other	
1. None	0
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT = 2131**

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)
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
C. 2007 ECCS Model Assessments	
1. Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-8
D. Other	
1. None	0
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT = 1372**

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
B.	**Planned Plant Modification Evaluations**	
1.	Advanced Mark-BW Top Nozzle Modification	65
C.	**2007 ECCS Model Assessments**	
1.	Mixture Level Model Limitation in the S-RELAP5 Code	-29
2.	Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-20
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1925**

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)
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
6.	NOTRUMP-Mixture Level Tracking Errors	13
7.	NOTRUMP-Bubble Rise/Drift Flux Model Inconsistencies	35
8.	NOTRUMP-EM Refined Break Spectrum	85
B.	**Planned Plant Modification Evaluations**	
1.	None	0
C.	**2007 ECCS Model Assessments**	
1.	None	0
D.	**Other**	
1.	None	0

LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT =**	**1809**

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)
LICENSING BASIS		
	Analysis of Record PCT	2086
PCT ASSESSMENTS (Delta PCT)		
A.	**Prior ECCS Model Assessments**	
1.	LOCBART Fluid Property Logic Issue	0
2.	BASH Minimum and Maximum Time Step Sizes	0
B.	**Planned Plant Modification Evaluations**	
1.	None	0
C.	**2007 ECCS Model Assessments**	
1.	LOCBART Pellet Volumetric Heat Generation Rate	45
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT =**	**2131**

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)
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. 2007 ECCS Model Assessments	
1. Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-8
D. Other	
1. None	0
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT = 1362**

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
B.	**Planned Plant Modification Evaluations**	
1.	Advanced Mark-BW Top Nozzle Modification	65
C.	**2007 ECCS Model Assessments**	
1.	Mixture Level Model Limitation in the S-RELAP5 Code	-19
2.	Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-20
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1919**

ATTACHMENT 5

2007 ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL CHANGES PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46

2007 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)
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
4.	NOTRUMP-EM Refined Break Spectrum	85
B.	**Planned Plant Modification Evaluations**	
1.	Westinghouse IFBA Fuel Product Implementation	10
C.	**2007 ECCS Model Assessments**	
1.	None	0
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1845**

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE LARGE BREAK LOCA WITH ASTRUM

Plant Name:	Surry Power Station, Unit 1		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	ASTRUM (2004)	**Limiting Break Size:**	DEG
Analysis Date:	7/1/06		
Vendor:	Westinghouse		
FQ:	2.6	**FΔH:**	1.7
Fuel:	OFA	**SGTP (%):**	15
Notes:	None		

	Clad Temp (°F)
LICENSING BASIS	
Analysis of Record PCT	2044
PCT ASSESSMENTS (Delta PCT)	
A. Prior ECCS Model Assessments	
1. None	0
B. Planned Plant Modification Evaluations	
1. None	0
C. 2007 ECCS Model Assessments	
1. HOTSPOT Fuel Relocation Error	51
D. Other	
1. None	0
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT = 2095**

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)
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
4.	NOTRUMP-EM Refined Break Spectrum	85
B.	**Planned Plant Modification Evaluations**	
1.	Westinghouse IFBA Fuel Product Implementation	10
C.	**2007 ECCS Model Assessments**	
1.	None	0
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 1845**

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE LARGE BREAK LOCA WITH ASTRUM

Plant Name:	Surry Power Station, Unit 2		
Utility Name:	Virginia Electric and Power Company		
Analysis Information			
EM:	ASTRUM (2004)	**Limiting Break Size:**	DEG
Analysis Date:	7/1/06		
Vendor:	Westinghouse		
FQ:	2.6	**FΔH:**	1.7
Fuel:	OFA	**SGTP (%):**	15
Notes:	None		

		Clad Temp (°F)
LICENSING BASIS		
	Analysis of Record PCT	2044
PCT ASSESSMENTS (Delta PCT)		
A.	**Prior ECCS Model Assessments**	
1.	None	0
B.	**Planned Plant Modification Evaluations**	
1.	None	0
C.	**2007 ECCS Model Assessments**	
1.	HOTSPOT Fuel Relocation Error	51
D.	**Other**	
1.	None	0
LICENSING BASIS PCT + PCT ASSESSMENTS		**PCT = 2095**