

June 30, 2009

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

Serial No.	09-404
NL&OS/	R0
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
2008 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 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 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:	1714°F
Millstone Unit 2 - Large break - AREVA Evaluation Model:	1825°F
Millstone Unit 3 - Small break - Westinghouse Evaluation Model:	1193°F
Millstone Unit 3 – Large break - Westinghouse Evaluation Model:	1781°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:	1395°F
North Anna Unit 1 - Large break - AREVA Evaluation Model:	1893°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:	1338°F
North Anna Unit 2 - Large break - AREVA Evaluation Model:	1887°F
Surry Units 1 and 2 - Small break - Westinghouse Evaluation Model:	1845°F
Surry Units 1 and 2 - Large break - Westinghouse Evaluation Model:	1857°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.

This information satisfies the 2008 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,


J. Alan Price
Vice President – Nuclear Engineering
Dominion Energy Kewaunee, Inc.
Dominion Nuclear Connecticut, Inc.
Virginia Electric and Power Company

Commitments made in this letter:

1. None.

Attachments: (5)

- 1) Report of Changes in Westinghouse and AREVA ECCS Evaluation Models.
- 2) 2008 Annual Report of 10 CFR 50.46 Margin Utilization - Kewaunee Power Station.
- 3) 2008 Annual Report of 10 CFR 50.46 Margin Utilization - Millstone Power Station Units 2 and 3.
- 4) 2008 Annual Report of 10 CFR 50.46 Margin Utilization – North Anna Power Station Units 1 and 2.
- 5) 2008 Annual Report of 10 CFR 50.46 Margin Utilization – Surry Power Station Units 1 and 2.

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ATTACHMENT 1

**2008 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 (KPS)

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

- Errors in Reactor Vessel Lower Plenum Surface Area Calculations
- Discrepancy in Metal Masses Used From Drawings
- 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 KPS 1999 Westinghouse Best Estimate LBLOCA Evaluation Model (BE LBLOCA EM) with application to PWRs with upper plenum injection:

- General Code Maintenance
- HOTSPOT Burst Temperature Logic Errors

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

Millstone Power Station (MPS) Unit 2

1. AREVA did not identify any additional changes or errors in the SBLOCA and LBLOCA analyses for the 2008 calendar year that were not previously reported in the 2007 Annual 10 CFR 50.46 report (letter dated June 26, 2008, Serial No. 08-0348).
2. In early 2009, AREVA evaluated the following change in the SBLOCA evaluation model for MPS2:

	MPS2 Δ PCT
Radiation to Fluid Heat Transfer Model Change	-64°F

This item was previously reported to the NRC in a letter dated June 18, 2009 (Serial No. 09-375) to meet the 30-day reporting requirements of 10 CFR 50.46(a)(3)(ii).

Millstone Power Station (MPS) Unit 3

1. Westinghouse identified the following changes and errors applicable to the MPS 3 1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP:

- Errors in Reactor Vessel Lower Plenum Surface Area Calculations
- Discrepancy in Metal Masses Used From Drawings
- 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 MPS 3 2004 Westinghouse Realistic Large Break LOCA Evaluation Model using the Automated Statistical Treatment of Uncertainty Method (ASTRUM):

- General Code Maintenance
- HOTSPOT Burst Temperature Logic Errors
- CCFL Global Volume Error

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

3. In support of a Stretch Power Uprate (SPU), Westinghouse reanalyzed both the SBLOCA with NOTRUMP and LBLOCA with ASTRUM. The reanalyses resulted in a SBLOCA PCT of 1193°F and a LBLOCA PCT of 1781°F. These results were approved by the NRC in the Safety Evaluation enclosed in a letter dated August 12, 2008 (TAC No. MD6070).

North Anna Power Station (NAPS) 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 and the 1985 Westinghouse SBLOCA Evaluation Model with NOTRUMP:

- Errors in Reactor Vessel Lower Plenum Surface Area Calculations
- Discrepancy in Metal Masses Used From Drawings
- General Code Maintenance

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

2. AREVA evaluated the following changes in the SBLOCA evaluation models for NAPS 1 and 2:

	NAPS1 Δ PCT	NAPS2 Δ PCT
RCCA Reactivity Input	-3°F	-29°F
Critical Flow Transition	26°F	5°F

These items were previously reported to the NRC for NAPS 1 in a letter dated July 30, 2008 (Serial No. 08-0442) to meet the 30-day reporting requirements of 10 CFR 50.46(a)(3)(ii).

3. AREVA evaluated an issue related to the S-RELAP5 modeling of condensation in the cold legs and downcomer during the reflood phase of a large break LOCA. AREVA determined that there is a 0°F impact on the Realistic Large Break LOCA (RLBLOCA) analysis results for NAPS 1 and 2.
4. In early 2009, AREVA evaluated the following change in the RLBLOCA evaluation models for NAPS 1 and 2:

	NAPS 1 and 2 Δ PCT
Radiation to Fluid Heat Transfer Model Change	-32°F

This item was previously reported to the NRC in a letter dated May 4, 2009 (Serial No. 09-263) to meet the 30-day reporting requirements of 10 CFR 50.46(a)(3)(ii).

Surry Power Station (SPS) 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 Lower Plenum Surface Area Calculations
 - Discrepancy in Metal Masses Used From Drawings
 - 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 Realistic Large Break LOCA Evaluation Model using the Automated Statistical Treatment of Uncertainty Method (ASTRUM):
- General Code Maintenance
 - HOTSPOT Burst Temperature Logic Errors

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

3. In a letter dated July 31, 2007 (Serial No. 06-936B), Dominion committed to perform a full Best-Estimate LBLOCA (BE-LBLOCA) reanalysis with ASTRUM for SPS 1 and 2 and to submit the reanalysis results to the NRC by December 31, 2008. The results of the reanalysis were submitted to the NRC in a letter dated December 17, 2008 (Serial No. 08-0739). The reanalysis resulted in a BE-LBLOCA PCT of 1857°F for SPS 1 and 2.
4. Westinghouse performed an evaluation to determine the impact of additional containment metal on the current licensing basis BE-LBLOCA analysis with ASTRUM. The evaluation resulted in a 0°F impact on PCT for SPS 1 and 2.

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 2008 annual reporting requirements of 10 CFR 50.46(a)(3)(ii) and includes relevant 2009 changes reported to the NRC to date.

ATTACHMENT 2

**2008 ANNUAL REPORT OF EMERGENCY CORE
COOLING SYSTEM (ECCS) MODEL CHANGES
PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46**

2008 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)

LICENSING BASIS

Analysis of Record PCT	1030
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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
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C. 2008 ECCS Model Assessments

1. None	0
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D. Other

1. None	0
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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.		
<u>Analysis Information</u>			
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
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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
6.	HOTSPOT Fuel Relocation Error	10

B. Planned Plant Modification Evaluations

1.	None	0
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C. 2008 ECCS Model Assessments

1.	None	0
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D. Other

1.	None	0
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LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 2045

ATTACHMENT 3

**2008 ANNUAL REPORT OF EMERGENCY CORE
COOLING SYSTEM (ECCS) MODEL CHANGES
PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46**

2008 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
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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
4. Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-8

B. Planned Plant Modification Evaluations

1. None	0
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C. 2008 ECCS Model Assessments

1. Radiation to Fluid Heat Transfer Model Change	-64*
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D. Other

1. None	0
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LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 1714

* Reference submittal June 18, 2009 (Serial No. 09-375)

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
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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. 2008 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:	4 Inches
Analysis Date:	02/07/07		
Vendor:	Westinghouse		
FQ:	2.6	FΔH:	1.65
Fuel:	RFA/Vantage 5H	SGTP (%):	10
Notes:	None		

Clad Temp (°F)

LICENSING BASIS

Analysis of Record PCT	1193
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PCT ASSESSMENTS (Delta PCT)

A. Prior ECCS Model Assessments

1. None	0
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B. Planned Plant Modification Evaluations

1. None	0
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C. 2008 ECCS Model Assessments

1. None	0
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D. Other

1. None	0
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LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 1193

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:	ASTRUM (2004)	Limiting Break Size:	Guillotine
Analysis Date:	04/17/07		
Vendor:	Westinghouse		
FQ:	2.6	FΔH:	1.65
Fuel:	RFA/RFA-2	SGTP (%):	10
Notes:	None		

Clad Temp (°F)

LICENSING BASIS

Analysis of Record PCT	1781
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PCT ASSESSMENTS (Delta PCT)

A. Prior ECCS Model Assessments

1. None	0
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B. Planned Plant Modification Evaluations

1. None	0
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C. 2008 ECCS Model Assessments

1. None	0
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D. Other

1. None	0
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LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 1781

ATTACHMENT 4

**2008 ANNUAL REPORT OF EMERGENCY CORE
COOLING SYSTEM (ECCS) MODEL CHANGES
PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46**

2008 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
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C. 2008 ECCS Model Assessments

1.	None	0
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D. Other

1.	None	0
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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
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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
3. LOCBART Pellet Volumetric Heat Generation Rate	45

B. Planned Plant Modification Evaluations

1. None	0
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C. 2008 ECCS Model Assessments

1. None	0
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D. Other

1. None	0
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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
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PCT ASSESSMENTS (Delta PCT)

A. Prior ECCS Model Assessments

1. Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-8
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B. Planned Plant Modification Evaluations

1. Revised Test Flow Curve for HHSL	-24
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C. 2008 ECCS Model Assessments

1. RCCA Reactivity Input	-3
2. Critical Flow Transition	26

D. Other

1. None	0
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LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 1395

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 **SGTP (%):** 12
NAIF/Advanced Mark-BW
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
7.	Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-20

B. Planned Plant Modification Evaluations

1.	Advanced Mark-BW Top Nozzle Modification	65
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C. 2008 ECCS Model Assessments

1.	Cold Leg Condensation Under Predicted by S-RELAP5	0
2.	Radiation to Fluid Heat Transfer Model Change	-32

D. Other

1.	None	0
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LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 1893

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
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C. 2008 ECCS Model Assessments

1.	None	0
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D. Other

1.	None	0
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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
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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
3. LOCBART Pellet Volumetric Heat Generation Rate	45

B. Planned Plant Modification Evaluations

1. None	0
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C. 2008 ECCS Model Assessments

1. None	0
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D. Other

1. None	0
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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. Point Kinetics Programming Issue
with RELAP5-Based Computer Codes -8

B. Planned Plant Modification Evaluations

1. None 0

C. 2008 ECCS Model Assessments

1. RCCA Reactivity Input -29
2. Critical Flow Transition 5

D. Other

1. None 0

LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 1338

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

Clad Temp (°F)

LICENSING BASIS

Analysis of Record PCT	1789
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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
7.	Point Kinetics Programming Issue with RELAP5-Based Computer Codes	-20

B. Planned Plant Modification Evaluations

1.	Advanced Mark-BW Top Nozzle Modification	65
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C. 2008 ECCS Model Assessments

1.	Cold Leg Condensation Under Predicted by S-RELAP5	0
2.	Radiation to Fluid Heat Transfer Model Change	-32

D. Other

1.	None	0
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LICENSING BASIS PCT + PCT ASSESSMENTS

PCT = 1887

ATTACHMENT 5

**2008 ANNUAL REPORT OF EMERGENCY CORE
COOLING SYSTEM (ECCS) MODEL CHANGES
PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46**

2008 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
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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
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C. 2008 ECCS Model Assessments

1. None	0
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D. Other

1. None	0
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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		
<u>Analysis Information</u>			
EM:	ASTRUM (2004)	Limiting Break Size:	DEG
Analysis Date:	11/3/08		
Vendor:	Westinghouse		
FQ:	2.5	FΔH:	1.7
Fuel:	OFA	SGTP (%):	7
Notes:	None		

		<u>Clad Temp (°F)</u>
LICENSING BASIS		
	Analysis of Record PCT	1857
PCT ASSESSMENTS (Delta PCT)		
A. Prior ECCS Model Assessments		
1. None		0
B. Planned Plant Modification Evaluations		
1. Evaluation of Additional Containment Metal		0
C. 2008 ECCS Model Assessments		
1. None		0
D. Other		
1. None		0

LICENSING BASIS PCT + PCT ASSESSMENTS	PCT =	1857
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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
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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
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C. 2008 ECCS Model Assessments

1. None	0
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D. Other

1. None	0
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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		
<u>Analysis Information</u>			
EM:	ASTRUM (2004)	Limiting Break Size:	DEG
Analysis Date:	11/3/08		
Vendor:	Westinghouse		
FQ:	2.5	FΔH:	1.7
Fuel:	OFA	SGTP (%):	7
Notes:	None		

		<u>Clad Temp (°F)</u>
LICENSING BASIS		
Analysis of Record PCT		1857
PCT ASSESSMENTS (Delta PCT)		
A. Prior ECCS Model Assessments		
1. None		0
B. Planned Plant Modification Evaluations		
1. Evaluation of Additional Containment Metal		0
C. 2008 ECCS Model Assessments		
1. None		0
D. Other		
1. None		0

LICENSING BASIS PCT + PCT ASSESSMENTS	PCT =	1857
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