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June 30, 2009



U.S. Nuclear Regulatory Commission Attention: Document Control Desk Washington, DC 20555 Serial No. NL&OS/ Docket Nos.

License Nos.

09-404 R0 50-305 50-336/423 50-338/339 50-280/281 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.
- cc: U.S. Nuclear Regulatory Commission Region I 475 Allendale Road King of Prussia, Pennsylvania 19406-1415

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U.S. Nuclear Regulatory Commission Region III 2443 Warrenville Road Suite 210 Lisle, Illinois 60532-4352

NRC Senior Resident Inspector Kewaunee Power Station

NRC Senior Resident Inspector Millstone Power Station

NRC Senior Resident Inspector North Anna Power Station

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cc: (continued)

NRC Senior Resident Inspector Surry Power Station

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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
	∆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	NAPS2
	∆PCT	ΔΡCΤ
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).

- 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
	∆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.

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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

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10 CF	R 50.46 MARC	GIN UTILIZATION - 3	SMALL BREAK	LOCA
Plant Name:	Kewaunee P	ower Station		
Utility Name:	Dominion En	ergy Kewaunee, Inc		
Analysis Informati	on			
EM:	NOTRUMP	Limiting Break Siz	e: 3 Inch C	L, High Tav
Analysis Date:	05/14/02			
Vendor:	Westinghous	se in the second se		
FQ:	2.5	FdH:	1.8	
Fuel:	422 Vantage	e + SGTP(%):	10	
Notes:	Uprate to 17	72 MWt. Effective be	eginning Cycle 2	.6
			<u>Clad T</u>	emp (°F)
LICENSING BASIS				
Analysis of F	Record PCT			1030
		_,		
PCT ASSESSMEN	TS (Delta PC	Г)		
A. Prior ECCS	Model Asses	sments		
1. NOTE	RUMP Bubble	Rise/Drift Flux Mode	Inconsistency	35
Corre	ctions		,	
2. NOTE	RUMP-EM Re	fined Break Spectru	m	0
	·			
B. Planned Pla	nt Modificatio	on Evaluations		0
1. None				U
C. 2008 ECCS	Model Asses	sments		
1. None				0
D. Other				<u>^</u>
1. None				U
LICENSING BASIS	PCT + PCT	ASSESSMENTS	PCT =	= 1065

	10 CFR 50.46 MARGIN UTILIZATION - LARGE BREAK LOCA							
Plant	Name:	ł	Kewaunee Power S	Station				
Utility	Name:	I	Dominion Energy K	ewaunee, Inc.				
Analy	sis Info	ormatio	n					
EM:		l	ŪPI (1999)	Limiting Bre	eak Size:	Split	t	
Analy	sis Date	e: (03/25/02	-		•		
Vende	or:	١	Westinghouse					
FQ:			2.5	FdH:	1.8			
Fuel:		4	422 Vantage +	SGTP(%):	10			
Notes	51	ι	Uprate to 1772 MW	/t. Effective be	eginning C	ycle 26		
					(Clad Tem	ıp (°F)	
LICEN	NSING B	BASIS			-			
	Analysi	is of Re	cord PCT				2084	
PCT A	PCT ASSESSMENTS (Delta PCT)							
Α.	Prior E	ECCS M	lodel Assessment	S				
	1. F	Revised	d Blowdown Heatup	o Uncertainty E	Distribution)	5	
	2. 3	Spacer	Grid Heat Transfer	Model Inputs			5	
	3. I	Inconsi	stent Vessel Vertic	al Level Mode	eling		0	
	4. F	Revised	d Downcomer Gap	Inputs			-59	
	5. (Core Si	upport Column Hea	at Slab Discrep	ancy		0	
	6. ł	HOTSF	POT Fuel Relocatio	on Error			10	
В.	Planne	ed Plan	t Modification Eva	luations				
	1. I	None					0	
C.	2008 E	CCS M	lodel Assessment	S				
	1. ľ	None					0	
_	0.1							
D.	Other						~	
	1. f	None					0	
LICEN	ISING B	BASIS F	PCT + PCT ASSES	SMENTS		PCT =	2045	

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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
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Plant	Name:	Millstone Power Station, Unit 2						
Utility	Name:	Dominion Nuclear Connecticut, Inc.	Dominion Nuclear Connecticut, Inc.					
Analy	<u>sis Inform</u>	ation		_				
EM:		PWR Small Break LOCA, Limiting Br S-RELAP5 Based	eak Size:	0.08 ft ²				
Analy	sis Date:	01/02						
Vende	or:	AREVA						
Peak	Linear Pov	ver: 15.1 kW/ft						
Notes	5:	None						
	Clad Temp (°F)							
LICEN	NSING BAS	SIS						
	Analysis o	f Record PCT		1941				
PCT ASSESSMENTS (Delta PCT)								
Α.	Prior ECC	CS Model Assessments						
	1. De	cay Heat Model Error		-133				
	2. Re	vised SBLOCA Guideline		0				
	3. Co	re Exit Modeling-Upper Tie Plate Flow Area		-22				
	4. Poi	nt Kinetics Programming Issue						
	with	n RELAP5-Based Computer Codes		-8				
B	Planned P	Plant Modification Evaluations						
. ,	1. No	ne		0				
	1. 1.0			Ū				
C.	2008 ECC	S Model Assessments						
	1. Ra	diation to Fluid Heat Transfer Model Change)	-64*				
D.	Other							
ы. м.	1. No	ne		0				
LICEN	NSING BAS	SIS PCT + PCT ASSESSMENTS	PCT =	1714				

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

10 CFR 50.46 MARGIN UTILIZATION - LARGE BREAK LOCA

Plant	lant Name: Millstone Power Station, Unit 2						
Utility	ility Name: Dominion Nuclear Connecticut, Inc.						
Analy	vsis Info	ormation					
EM:	EM: SEM/PWR-98 Limiting Break Size:						
Analy	vsis Da	te: 11/98					
Vende	or:	AREVA					
Peak	Linear	Power: 15.1 kW/ft					
Notes							
	<u>Clad Temp (°F)</u>						
LICEN	LICENSING BASIS						
	Analys	sis of Record PCT	1814				
PCT A	ASSES	SMENTS (Delta PCT)					
А.	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				
В.	Plann	ed Plant Modification Evaluations					
-	1.	Containment Sump Modification and Replacement PZR	2				
C.	2008 I	ECCS Model Assessments	0				
-	1.	None	0				
D.	Other	x 1	0				
	1.	None	0				
LICEN	ISING	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.						
Analy	rie Inforr	nation				······································
EM: Analy	vsis Date:	NOTRUMP 02/07/07 Westinghouse	Limiting Brea	ik Size: 4∣	nches	
FQ: Fuel: Notes	5:	2.6 RFA/Vantage 5H None	F∆H: SGTP (%):	1.65 10		
				<u>Clad Te</u>	mp (°F)	
LICE	NSING BA Analysis	SIS of Record PCT			1193	
PCT / A.	ASSESSM Prior EC 1. No	IENTS (Delta PCT) CS Model Assessments one	;		0	
В.	Planned 1. No	Plant Modification Eval	uations		0	
C.	2008 EC 1. No	CS Model Assessments			0	
D.	Other 1. No	one			0	
LICEN	NSING BA	SIS PCT + PCT ASSESS	MENTS	PCT =	1193	

10 CFR 50.46 MARGIN UTILIZATION - LARGE BREAK LOCA

Plant Name:Millstone Power Station, Unit 3Utility Name:Dominion Nuclear Connecticut, Inc.						
Analy	sis Informa	tion				
EM:		ASTRUM (2004)	Limiting Brea	k Size:	Guillotine	
Analy	sis Date:	04/17/07				
Vende	or:	Westinghouse				
FQ:		2.6	F∆H:	1.65		
Fuel:		RFA/RFA-2	SGTP (%):	10		
Notes	s:	None				
				<u>Clad</u>	Temp (°F)	
LICE	Analysis of	IS Record PCT			1781	
PCT A A.	ASSESSME Prior ECC: 1. None	NTS (Delta PCT) S Model Assessment e	ts		0	
В.	Planned Planne	lant Modification Eva e	aluations		0	
C.	2008 ECCS 1. None	S Model Assessment e	S		0	
D.	Other 1. None	6			0	
LICEN	NSING BAS	IS PCT + PCT ASSES	SMENTS	PC	Γ= 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

Plant	ant Name: North Anna Power Station, Unit 1								
Utility	/ Name:	Virginia Electric and Po	ower Company						
Analy	vsis Info	rmation							
EM:		NOTRUMP	Limiting Break	k Size: 3 In	ches				
Analy	sis Date	e: 1995							
Vende	or:	Westinghouse							
FQ:		2.32	F∆H:	1.65					
Fuel:		NAIF	SGTP (%):	7					
Notes	5:	None							
				Clad Ten	<u>пр (°F)</u>				
LICEN	NSING E	ASIS							
	Analysi	s of Record PCT			1704				
РСТ А	ASSESS	MENTS (Delta PCT)							
Α.	Prior E	CCS Model Assessments							
	1. 1	NOTRUMP Specific Enthalpy	Error		20				
	2. 3	SALIBRARY Double Precision	Y Double Precision Error -1						
	3. I	Fuel Rod Initialization Error	nitialization Error 10						
	4. l	oop Seal Elevation Error			-44				
	5. I	NOTRUMP-Mixture Level Tra	cking Errors		13				
	6. I	Removal of Part Length CRD	Ms		1				
	7. ľ	NOTRUMP-Bubble Rise/Drift	Flux Model Inco	nsistencies	35				
	8. I	NOTRUMP-EM Refined Brea	k Spectrum		85				
В.	Planne	d Plant Modification Evalua	ations						
	1. ľ	None			0				
C.	2008 E	CCS Model Assessments							
	1. I	None			0				
D.	Other								
	1. 1	None			0				
LICEN	NSING E	ASIS PCT + PCT ASSESSN	IENTS	PCT =	1809				

	10	CFR :	50.46	6 MARGIN	UTILIZATION -	- WESTINGHOUSE L	ARGE BREAK LOCA
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Plant Name:	North Anna Power Station, Unit 1							
Utility Name:	Virginia Electric and Po	wer Company						
Analysis Informati	ion							
EM:	BASH	Limiting Break Size: Cd=0.4						
Analysis Date:	2004							
Vendor:	Westinghouse							
FQ:	2.19	F∆H:	1.55					
Fuel:	NAIF	SGTP (%):	7					
Notes:	None							
			Clad	Temp (°F)				
LICENSING BASIS	3							
Analysis of F		2086						
PCT ASSESSMEN	TS (Delta PCT)							
A. Prior ECCS	Model Assessments							
1. LOCE	BART Fluid Property Log	ic Issue		0				
2. BASH	Minimum and Maximun	n Time Step Size	es	0				
3. LOCE	BART Pellet Volumetric F	leat Generation	Rate	45				
D DI		4						
B. Planned Pla	ant Modification Evalua	tions		0				
1. None				0				
	Medel Assessments							
C. 2000 ECCS	woder Assessments			0				
I. NUNE				0				
D Other								
1 None				0				
				Ŭ				
LICENSING BASIS	S PCT + PCT ASSESSM	ENTS	PCT	= 2131	<u></u>			

10 CFR 50.46 MARGIN UTILIZATION – AREVA SMALL BREAK LOCA

Plant	Name:	North Anna Power Station, Unit 1							
Utility	[,] Name):	Virginia Electric and Po	ower Company					
Analy	sis Inf	ormati	on						
EM:			AREVA SB EM	Limiting Brea	k Size:	5.2 Inches (SI Line)		
Analy	sis Da	te:	2004	-					
Vendo	or:		AREVA						
FQ:			2.32	F∆H:	1.65				
Fuel:			Advanced Mark-BW	SGTP (%):	7				
Notes			None						
					Clad	Temp (°F)			
LICEN	ISING	BASIS							
Analysis of			ecord PCT			1404			
	-								
PCT A	PCT ASSESSMENTS (Delta PCT)								
A. Prior ECCS			Model Assessments						
	1.	Point I	Kinetics Programming I	ssue					
		with R	ELAP5-Based Compute	er Codes		-8			
B.	Plann	ed Pla	nt Modification Evalua	ations					
υ.	1.	Revise	ed Test Flow Curve for	HHSI		-24			
C.	2008	ECCS I	Model Assessments						
	1.	RCCA	Reactivity Input			-3			
	2.	Critica	I Flow Transition			26			
D.	Other								
	1.	None				0			
						-			
					<u></u>				
LICEN	ISING	BASIS	PCT + PCT ASSESSN	IENTS	PC	Г = 1395			

10 CFR 50.46 MARGIN UTILIZATION – AREVA LARGE BREAK LOCA

Plant	Name:	North Anna Power	North Anna Power Station, Unit 1							
Utility	/ Name	: Virginia Electric an	d Power Company							
Analy	vsis Inf	ormation								
EM:		AREVA RLBLOCA	EM Limiting Brea	k Size: DE	GB					
Analy	vsis Da	te: 2004	-							
Vend	or:	AREVA								
FQ:		2.32	F∆H:	1.65						
Fuel:		Mixed	SGTP (%):	12						
		NAIF/Advanced M	ark-BW							
Notes	5:	None								
				Clad Ten	np (°F)					
LICEN	NSING	BASIS								
Analysis of Record PCT 1853										
DOT /										
	ASSES Driar	SIVIENTS (Delta PCT)	10							
А.	1	ECCS Model Assessmen	ns alation Madalina		64					
	ו. כ	PW/ST Temperature Assi			04 8					
	2. 3	I BLOCA/Seismic SG Tut	Seismic SG Tube Collanse							
	<u></u> Л	RI BLOCA Choked Flow	A Choked Elew Dispesition							
	5	RI BLOCA Changes in U	ncertainty Paramete	ers	10					
	6.	Mixture Level Model Limit	tation in the S-RELA	AP5 Code	-29					
	ζ.	Point Kinetics Programmi	na Issue							
		with RELAP5-Based Corr	nputer Codes		-20					
В.	Plann	ed Plant Modification Ev	aluations							
	1.	Advanced Mark-BW Top	Nozzle Modification		65					
C.	2008	ECCS Model Assessmen	Its							
	1.	Cold Leg Condensation L	Inder Predicted by S	S-RELAP5	0					
	2.	Radiation to Fluid Heat T	ransfer Model Chan	ge	-32					
Л	Other									
	1.	None			0					
LICEN	NSING	BASIS PCT + PCT ASSE	SSMENTS	PCT =	1893					

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE SMALL BREAK LOCA

Plant	Name:		North Anna Power Station, Unit 2								
Utility	v Name):	Virginia Electric and I	Power Compa	any						
Analy	sis Inf	ormati	on	· · · · · · · · · · · · · · · · · · ·							
EM:			NOTRUMP	Limiting B	reak S	ize: 3 In	ches				
Analy	sis Da	te:	1995								
Vende	or:		Westinghouse								
FQ:			2.32	F∆H:	1	.65					
Fuel:			NAIF	SGTP (%):	: 7	,					
Notes	;:		None								
						Clad Ten	ום (°F)				
LICEN	ISING	BASIS			•						
	Analys	sis of R	lecord PCT				1704				
PCT A	ASSES	SMENT	ſS (Delta PCT)								
А.	Prior	ECCS	Model Assessments								
	1.	NOTR	UMP Specific Enthalp	IP Specific Enthalpy Error 20							
	2.	SALIB	RARY Double Precisi	RY Double Precision Error -15							
	3.	Fuel F	d Initialization Error 10								
	4.	Loop	Seal Elevation Error				-44				
	5.	Remo	val of Part Length CR	DMs			1				
	6. _	NOTR	UMP-Mixture Level T	racking Errors	S		13				
	1.	NOTR	UMP-Bubble Rise/Dri	ft Flux Model	Inconsi	stencies	35				
	8.	NOTR	UMP-EM Refined Bre	eak Spectrum			85				
В.	Plann	ed Pla	nt Modification Eval	uations							
	1.	None					0				
С.	2008 I	ECCS I	Model Assessments								
	1.	None					0				
D.	Other	,									
	1.	None					0				
LICEN	ISING	BASIS	PCT + PCT ASSESS	MENTS		PCT =	1809				

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE LARGE BREAK LOCA

ï

Plant	Name:	North Anna Power S	North Anna Power Station, Unit 2							
Utility	Name:	Virginia Electric and	Power Company							
Analy	sis Info	rmation								
EM:		BASH	Limiting Brea	k Size:	Cd=0.4					
Analy	sis Date	: 2004								
Vende	or:	Westinghouse								
FQ:		2.19	F∆H:	1.55						
Fuel:		NAIF	SGTP (%):	7						
Notes	51	None								
				Clad	Temp (°F)					
LICEN	ISING B	ASIS								
	Analysis	s of Record PCT			2086					
PCT A	ASSESSI	MENTS (Delta PCT)								
А.	Prior E	CCS Model Assessments	5							
	1. L	OCBART Fluid Property L	ogic Issue		0					
	2. E	BASH Minimum and Maxim	Minimum and Maximum Time Step Sizes							
	3. L	OCBART Pellet Volumetri	c Heat Generatior	n Rate	45					
_										
В.	Planne	d Plant Modification Eval	luations		_					
	1. N	None			0					
-										
C.	2008 EQ	CCS Model Assessments	i		•					
	1. N	None			0					
-	01									
D.	Other	1			0					
	1. P	None			0					
LICEN	ISING B	ASIS PCT + PCT ASSES	SMENTS	PC1	「= 2131					

	10 CFR 50.46 MARGIN UTILI	IZATION – AREVA	A SMALL BREAK	LOCA
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Plant	Name:	:	North Anna Power Station, Unit 2								
Utility	[,] Name	: :	Virginia Electric an	id Pow	er Compar	ıy					
Analy	sis Inf	ormatio	on								
EM:			AREVA SB EM	L	Limiting Break Size: 3 Inches						
Analy	sis Da	ite:	2004								
Vendo	or:		AREVA								
FQ:			2.32	F	Δ H :	1.6	65				
Fuel:			Advanced Mark-B	N S	GTP (%):	7					
Notes	:		None								
						C	lad T	'emp (°F	F)		
LICEN	ISING	BASIS									
Analysis of Record PC			ecord PCT					137	0		
PCT ASSESSMENTS (Delta PCT) A. Prior ECCS Model Assessments 1. Point Kinetics Programming Issue with RELAP5-Based Computer Codes -8							8				
В.	 Planned Plant Modification Evaluations 1. None 								0		
C.	2008 I	ECCS I	Aodel Assessmen	Its							
	1.	RCCA	Reactivity Input					-2	9		
	2.	Critica	Flow Transition						5		
D.	Other	-									
	1.	None							0		
LICEN	ISING	BASIS	PCT + PCT ASSE	SSME	NTS		PCT =	= 133	8		

10 CFR 50.46 MARGIN UTILIZATION – AREVA LARGE BREAK LOCA

Plant	Name:		North Anna Power Station, Unit 2							
Utility	/ Name):	Virginia El	ectric and Po	ower Compar	וא				
Analy	vsis Inf	ormati	on							
EM:			AREVA R	LBLOCA EN	Limiting Br	eak S	ize: D	DEGB	}	
Analy	vsis Da	te:	2004							
Vendo	or:		AREVA							:
FQ:			2.32		F∆H:	1	.65			
Fuel:			Mixed:		SGTP (%):	1	2			
			NAIF/Adva	anced Mark-l	BW					
Notes	51		None							
							Clad T	emp	(°F)	
LICEN	NSING	BASIS	i							
Analysis of Record PCT 1789								789		
PCT A	ASSES	SMEN	۲S (Delta F	PCT)						
Α.	Prior	ECCS	Model Ass	sessments						
	1.	Forslu	nd-Rohser	now Correlati	on Modeling				64	
	2.	RWST	Temperat	emperature Assumption 8						
	3.	LBLO	CA/Seismi	VSeismic SG Tube Collapse 0						
	4.	RLBL	OCA Choke	CA Choked Flow Disposition 22						
	5.	RLBL	OCA Chan	ges in Uncer	tainty Parame	eters			10	
	6.	Mixtur	e Level Mo	del Limitatio	n in the S-RE	LAP5	Code		-19	
	7.	Point I	Kinetics Pr	ogramming l	ssue					
		with R	ELAP5-Ba	sed Compute	er Codes				-20	
B.	Plann	ed Pla	nt Modific	ation Evalua	ations					
	1.	Advan	ced Mark-	BW Top Noz	zle Modificati	on			65	
C.	2008	ECCS	Model Ass	essments						
•	1.	Cold L	.ea Condei	nsation Unde	r Predicted b	v S-R	ELAP5		0	
	2.	Radia	tion to Fluid	d Heat Trans	fer Model Ch	ange			-32	
D.	Other	,								
	1.	None							0	
	ISING	BASIS	PCT + PC				PCT =	= 1	887	

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

Serial Number 09-404 Docket No. 50-280/281 Attachment 5, Page 1 of 4

10 (CFR 50.4	46 MARGIN UTILIZATION -	WESTINGHOUS	SE SMALL	BREAK LOC	CA	
Plant	Name:	Surry Power Station, U	Init 1				
Utility	VName:	Virginia Electric and Po	ower Company				
Analy	sis Info	rmation					
EM:		NOTRUMP	Limiting Break	: Size: 3 I	nches		
Analy	sis Date	e: 1996					
Vendo	or:	Westinghouse					
FQ:		2.5	F∆H:	1.7			
Fuel:		SIF	SGTP (%):	15			
Notes	5:	None					
				<u>Clad Te</u>	mp (°F)		
LICENSING BASIS							
Analysis of Record PCI 1/1/							
PCT A	ASSESS	MENTS (Delta PCT)					
A.	Prior E	CCS Model Assessments					
	1. N	NOTRUMP - Mixture Level Tr	acking Errors		13		
	2. F	Removal of Part Length CRD	Ms		-15		
	3. N	NOTRUMP-Bubble Rise/Drift	Flux Model Inco	nsistencies	35		
	4. N	NOTRUMP-EM Refined Brea	k Spectrum		85		
В.	Planne	d Plant Modification Evalua	ations				
	1. V	Westinghouse IFBA Fuel Pro	duct Implementa	tion	10		
C.	2008 E	CCS Model Assessments					
	1. 1	Vone			0		
D.	Other						
	1. N	None			0		
LICEN	NSING B	ASIS PCT + PCT ASSESSN	IENTS	PCT =	1845		

10 (CFR 50.46	MARGIN UTILIZATION	– WESTINGHOL H ASTRUM	JSE LARGI	E BREAK LOC	CA
Plant	Name:	Surry Power Station	, Unit 1			
Utility	y Name:	Virginia Electric and	Power Company			
Analy	sis Inform	ation	· • • • • • • • • •			
EM:		ASTRUM (2004)	Limiting Brea	ak Size: D	EG	
Analy	/sis Date:	11/3/08				
Vend	or:	Westinghouse				
FQ:		2.5	F∆H:	1.7		
Fuel:		OFA	SGTP (%):	7		
Notes	5:	None				
				Clad To	emp (°F)	
LICE	NSING BAS	SIS				
	Analysis o	f Record PCT		1857		
PCT / A.	ASSESSME Prior ECC 1. Nor	NTS (Delta PCT) S Model Assessments	5		0	
В.	Planned F	Plant Modification Eval	uations			
	1. Eva	luation of Additional Co	ntainment Metal		0	
C.	2008 ECC 1. Nor	S Model Assessments ne	;		0	
D.	Other					
	1. Nor	1e			0	
LICE	NSING BAS	SIS PCT + PCT ASSES	SMENTS	PCT =	: 1857	

10 CFR 50.46 MARGIN UTILIZATION – WESTINGHOUSE SMALL BREAK LOCA										
Plant Name:		Surry Power Station,	Surry Power Station, Unit 2							
Utility Name:		Virginia Electric and F	Virginia Electric and Power Company							
Analysis Information										
EM:		NOTRUMP	Limiting Break	size: 3	3 Inches					
Analysis Date:		e: 1996								
Vendo	or:	Westinghouse								
FQ:		2.5	FΔH:	1.7						
Fuel:		SIF	SGTP (%):	15						
Notes	:	None								
				<u>Clad T</u>	[emp (°F)					
LICEN	ISING E	BASIS								
	Analys	is of Record PCT			1717					
PCT ASSESSMENTS (Delta PCT)										
А.	Prior E	CCS Model Assessments			40					
	1.	NOTRUMP - MIXture Level 1	RUMP - Mixture Level Tracking Errors oval of Part Length CRDMs RUMP-Bubble Rise/Drift Flux Model Inconsistenci							
	Z. 2	Removal of Part Length CRL								
	ა. ⊿	NOTELIME EM Refined Bro								
	4.		ak Spectrum		00					
B Planned Plant Modification Evaluations										
υ.	1	Westinghouse IEBA Fuel Pro	nduct Implementa	tion	10					
	••				10					
С.	2008 E	CCS 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,	Surry Power Station, Unit 2 Virginia Electric and Power Company					
Apoly	name.		ower company					
Analysis miornal		ASTRUM (2004)	Limiting Break Size: DEC					
EIVI. Analysis Data		A311(0)(2004)	Limiting bleak Size. DLO					
Analysis Dale:		Westinghouse						
venuc	Л.	vestingnouse	P A I I .	4 7				
		2.5		1.7				
Fuel:		OFA	SGTP (%):	1				
Notes		None						
				<u>Clad Te</u>	<u>mp (°F)</u>			
LICEN	Analys	BASIS is of Record PCT		1857				
PCT A A.	ASSESS Prior E 1.	MENTS (Delta PCT) CCS Model Assessments None		0				
В.	Planne 1.	ed Plant Modification Evalution Evalution of Additional Cor		0				
C.	2008 E 1.	CCS Model Assessments None			0			
D.	Other 1.	None			0			
LICEN	ISING I	BASIS PCT + PCT ASSESS	PCT =	1857				