



January 13, 2014

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS), UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
CONCERNING 2012 ANNUAL ECCS EVALUATION MODEL
REVISIONS REPORT

- References:
1. Thomas D. Gatlin, SCE&G Letter to Document Control Desk, *ECCS Evaluation Model Revisions Report*, dated June 13, 2013 [ML13169A054]
 2. Shawn Williams, NRC Letter to Thomas D. Gatlin, *Virgil C. Summer Nuclear Station, Unit 1 – Request for Additional Information (TAC NO. MF2722)*, dated December 2, 2013 [ML13324A813]

South Carolina Electric & Gas Company (SCE&G) received a NRC letter dated December 2, 2013 (Reference 2), requesting additional information regarding the Virgil C. Summer Nuclear Station Unit 1 annual ECCS Evaluation Model Revisions Report for 2012 (Reference 1). SCE&G has reviewed the request for additional information (RAI) and hereby submits the attached response.

If you have any questions or require additional information, please contact Mr. Bruce Thompson at (803) 931-5042.

Very truly yours,

Thomas D. Gatlin

TS/TDG/wm

Enclosure – Response to RAI Concerning Annual ECCS Evaluation Model Revisions Report
Attachments (2)

c:	K. B. Marsh	S. A. Williams
	S. A. Byrne	NRC Resident Inspector
	J. B. Archie	K. M. Sutton
	N. S. Carns	NSRC
	J. H. Hamilton	RTS (CR-13-05091, LTD 321)
	J. W. Williams	File (818.02-17)
	W. M. Cherry	PRSF (RC-14-0001)
	V. M. McCree	

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NRR

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RC-14-0001
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**VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12**

ENCLOSURE

**VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1 – RESPONSE TO REQUEST FOR
ADDITIONAL INFORMATION CONCERNING 2012 ANNUAL ECCS EVALUATION MODEL
REVISIONS REPORT (TAC NO. MF2722)**

REQUESTS FOR ADDITIONAL INFORMATION

EMERGENCY CORE COOLING SYSTEM EVALUATION MODEL REVISIONS REPORT

VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1

DOCKET NO. 50-395

Pursuant to Title 10 of the Code of *Federal Regulations* (10 CFR) 50.46(a)(3), South Carolina Electric and Gas Company (the licensee), submitted a report describing "changes and enhancements to the ECCS [emergency core cooling system] Evaluation Models," and an estimate of the effects of the changes and enhancements on the predicted peak cladding temperature for Virgil C. Summer Nuclear Station, Unit 1. The report was submitted by letter dated June 13, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13169A054).

Page 6 of 7 of Attachment II to the June 13, 2013, letter lists an "Upflow Conversion" under Line Item B., "Planned Plant Modification Evaluations," with an associated estimated effect on predicted peak cladding temperature (PCT) estimated as 148 °F.

Since 148 °F exceeds the 50 °F threshold at which the NRC defines a significant change and the submitted report is described as an annual report, it is not clear how this change applies to the plant nor how the report complies with 10 CFR 50.46(a)(3)(ii) requirements. Therefore please provide the following additional information.

RAI 1

Provide a more detailed description of the upflow conversion and explain its implementation status.

SCE&G Response

During Cycle 16, V. C. Summer experienced fuel failure because of grid to rod fretting. This failure mechanism was initiated by reactor coolant cross-flow jetting through the joints between baffle plates. The susceptibility to this condition was due in part to the reactor internals flow configuration.

The V. C. Summer reactor vessel lower internals assembly consists of a core barrel into which baffle plates, supported by interconnecting former plates, are installed. The original reactor vessel internals configuration incorporated downward coolant flow in the region between the core barrel and the baffle plates as depicted in Figure 1. Since the flow direction through the baffle-barrel region was opposite to the direction of the flow through the core, there was an axial pressure gradient across the baffle plates, which varies from a maximum at the top of the core

to a minimum at the bottom of the core. This pressure gradient provided the driving force for cross flow jetting through the joints between baffle plates.

In order to substantially reduce the possibility of the baffle jetting, the reactor vessel internals were field modified during Refuel 18 (Fall 2009) to reverse the secondary coolant flow pattern in the baffle-barrel region in order to reduce the jet-driving pressure gradient across the baffle joints. The hardware change for this modification (i.e., Upflow Conversion), consisted of plugging the existing flow holes in the core barrel between the top and second former level and machining new flow holes in the top former plates. These changes resulted in a substantial reduction in the driving force for coolant jetting through the baffle plate joints. Section 4.2.2.2 of the V. C. Summer FSAR contains a brief description of the modification and its impact on the flow pattern within the baffle-barrel region.

In addition to V. C. Summer, Upflow Conversions have been successfully implemented at a number of other Westinghouse plants including J. M. Farley Units 1 and 2, Kori Unit 1 in South Korea, Point Beach Units 1 and 2, Beaver Valley Unit 1, Ringhals Unit 2 in Sweden, Jose Cabrera in Spain, North Anna Unit 1 and Diablo Canyon Unit 2.

RAI 2

Explain how the June 13, 2013, report, which appears to be the first disclosure of this model change to the NRC, satisfies the portion of 10 CFR 50.46(a)(3)(i) requiring significant ECCS evaluation model changes to be reported to the NRC in 30 days.

SCE&G Response

The Westinghouse Electric Company holds the small break loss of coolant accident (SBLOCA) analysis of record for V. C. Summer. To assist SCE&G in meeting the reporting requirements of 10 CFR 50.46(a), errors or changes in the Emergency Core Cooling System (ECCS) Evaluation Model (EM) are provided by Westinghouse in accordance with the process outlined in WCAP-13451, Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting. For consistency, the generic WCAP interpretations were applied by SCE&G in responding to the reporting requirements of 10 CFR 50.46 for the Upflow Conversion.

As described in the response to Item 3 below, the impact of the Upflow Conversion was evaluated prior to implementation via execution of the Westinghouse SBLOCA EM. The results were utilized in the 10 CFR 50.59 evaluation for the Upflow Conversion. The SBLOCA evaluation included plant specific input values to explicitly model the impact of the Upflow Conversion on pre-accident initial conditions. These input changes were not considered changes in the Evaluation Model since (1) the SBLOCA Evaluation Model is applied to both upflow and downflow plants, (2) the input changes were not made to correct a prior error and (3) no modification in a feature of the Evaluation Model or in its application as described to the NRC in licensing documentation resulted. With the Upflow Conversion being a planned change, the peak clad temperature (PCT) change was not counted toward the accumulation of changes pertaining to 10 CFR 50.46 reporting requirements related to a significant change (> 50 °F). Instead, consistent with Section 3.5 of WCAP-13451, the PCT change was included in the V. C.

Summer Nuclear Station 2009 annual report provided to the NRC by SCE&G letter number RC-10-0073, dated June 7, 2010. The 2009 annual report and three subsequent reports showing the Upflow Conversion as a line item on the SBLOCA PCT rack up sheet under Line Item B, "Planned Plant Modification Evaluations," can be found in Attachment 2 of this response. It should be noted, Westinghouse typically shows all changes as planned until a new analysis of record is performed. In this context, planned does not mean future; it means a plant specific input change made under 10 CFR 50.59.

RAI 3

When a significant (i.e., >50 °F) ECCS evaluation model error or change is reported to the NRC, 10 CFR 50.46(a)(3)(ii) requires that "the applicant or licensee shall...include with the report a proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with 50.46 requirements..." Please provide a disposition for this requirement that is consistent with the response to Items 1) and 2), above.

SCE&G Response

An evaluation was performed to assess the impact of the V. C. Summer Upflow Conversion on the current SBLOCA analysis of record using the standard Westinghouse Appendix K SBLOCA Evaluation Model (NOTRUMP-EM; [1], [2] and [3]).

The majority of the inputs for the Upflow Conversion remained unchanged from the V. C. Summer SBLOCA analysis of record. Key changes included the plant as an upflow baffle-barrel configuration and associated reactor vessel hydraulic and geometric data.

A partial break spectrum with an upflow baffle-barrel configuration was evaluated using the NOTRUMP-EM to confirm the limiting break size. Fuel burnup sensitivity studies were also performed for the limiting break size to determine the worst times in life that maximize the resulting PCT and cladding oxidation. The results are summarized in Section 15.3.1.2.7 of the FSAR. Overall, the results demonstrate that the requirements of 10CFR 50.46 continued to be met for this planned plant modification.

In summary, the impact of the Upflow Conversion for V. C. Summer was evaluated via a partial reanalysis with an approved SBLOCA EM, and results have been incorporated into the V. C. Summer FSAR.

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RC-14-0001
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References:

1. WCAP-10079-P-A, Rev. 0, "NOTRUMP - A Nodal Transient Small Break and General Network Code," August 1985.
2. WCAP-10054-P-A, Rev. 0, "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code," August 1985.
3. WCAP-10054-P-A, Addendum 2, Rev. 1, "Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection into the Broken Loop and COSI Condensation Model," July 1997.

**VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
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ATTACHMENT 1

FIGURE 1 - V.C. SUMMER BAFFLE-BARREL REGION DOWNFLOW PATH

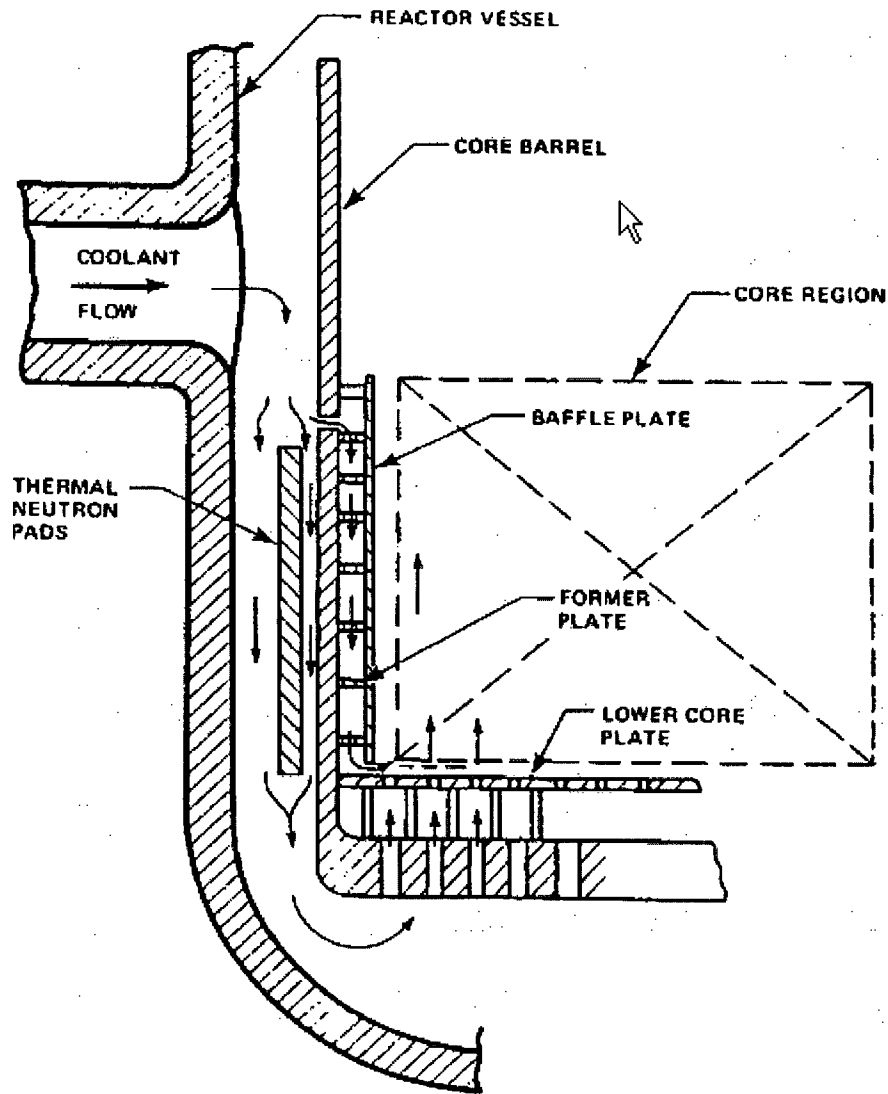


Figure 1. V. C. Summer Baffle-Barrel Region Downflow Path

**VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12**

ATTACHMENT 2

2009 – 2012 ECCS Evaluation Model Revisions Reports

Thomas D. Gatlin
Vice President, Nuclear Operations
803.345.4342



June 7, 2010

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

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION UNIT 1
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
ECCS EVALUATION MODEL REVISIONS REPORT

South Carolina Electric & Gas Company (SCE&G) hereby submits the 2009 Emergency Core Cooling System (ECCS) Evaluation Model Revisions Annual Report for the Virgil C. Summer Nuclear Station (VCSNS). This report is being submitted pursuant to 10 CFR 50.46, which requires licensees to notify the NRC on at least an annual basis of corrections to or changes in the ECCS Evaluation Models.

Summary sheets describing changes and enhancements to the ECCS Evaluation Models for 2009 are included in Attachment I. Peak Clad Temperature (PCT) sheets are included in Attachment II.

If you have any questions, please call Bruce L. Thompson at (803) 931-5042.

Very truly yours,

Thomas D. Gatlin

GAR/TDG/wm
Attachments

c: K. B. Marsh
S. A. Byrne
J. B. Archie
N. S. Carns
J. H. Hamilton
R. J. White
W. M. Cherry
L. A. Reyes

R. E. Martin
NRC Resident Inspector
K. M. Sutton
NSRC
RTS (LTD 321, RR 8375)
File (818.02-17)
PRSF (RC-10-0073)

ML101610084

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: V. C. Summer
Utility Name: South Carolina Electric & Gas
Revision Date: 1/27/10

Analysis Information

EM: NOTRUMP **Analysis Date:** 9/12/06 **Limiting Break Size:** 3 Inch
FQ: 2.45 **FdH:** 1.62
Fuel: Vantage + **SGTP (%):** 10
Notes:

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	1775	9	(a)
PCT ASSESSMENTS (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. None	0		
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. Upflow Conversion	148	10, 11	
C. 2009 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT = 1923		

References:

1. CGE-94-205, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Notification and Reporting Information," February 8, 1994.
2. CGE-94-228, "South Carolina Electric and Gas Company, Virgil C. Summer Station, SBLOCTA Axial Nodalization," October 27, 1994.
3. CGE-95-201, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Notification and Reporting Information," February 3, 1995.
4. CGE-96-202, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Annual Notification and Reporting," February 9, 1996.
5. CGE-96-213, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Small Break LOCA Notification and Reporting," July 8, 1996.
6. CGE-00-044, "South Carolina Electric and Gas Company, Virgil C. Summer Nuclear Station, 10 CFR 50.46 Appendix K (BART / BASH / NOTRUMP) Evaluation Model, Mid-Year Notification and Reporting for 2000," June 30, 2000.
7. CGE-03-80, "10 CFR 50.46 Mid-Year Notification and Reporting for 2003," January 2004.

8. LTR-LIS-06-344, "Transmittal of Updated V. C. Summer SBLOCA PCT Rackup Sheets," November 2006.
9. LTR-LIS-06-662, Transmittal of V. C. Summer SBLOCTA PCT Rackup Sheets for HHSI Throttle Valve Replacement," November 2006.
10. WCAP-16980-P, Revision 1, "Reactor Internals Upflow Conversion Program Engineering Report V. C. Summer Nuclear Station Unit 1," December 2008.
11. LTR-LIS-09-18, "10 CFR 50.46 Report for the V. C. Summer (CGE) Upflow Conversion Program Break LOCA Evaluation," January 2009.

Notes:

- (a) The Rebaseline Analysis includes the impacts of the following model assessments:
 1. LUCIFER Error Corrections (Ref. 1)
 2. Effect of SI in Broken Loop (Ref. 1)
 3. Effect of Improved Condensation Model (Ref. 1)
 4. Axial Nodalization, RIP Model Revision and SBLOCTA Error Corrections Analysis (Ref. 2)
 5. Boiling Heat Transfer Error (Ref. 3)
 6. Steam Line Isolation Logic Error (Ref. 3)
 7. NOTRUMP Specific Enthalpy Error (Ref. 4)
 8. SALIBRARY Double Precision Error (Ref. 4)
 9. SBLOCTA Fuel Rod Initialization Error (Ref. 5)
 10. NOTRUMP Mixture Level Tracking / Region Depletion Errors (Ref. 6)
 11. NOTRUMP Bubble Rise / Drift Flux Model Inconsistency Corrections (Ref. 7)
 12. Refined Break Spectrum (Ref. 8)
 13. High Head Safety Injection (HHSI) Flow Increase (Ref. 9)

Thomas D. Gatlin
Vice President, Nuclear Operations
803.345.4342



June 6, 2011

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U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
ECCS EVALUATION MODEL REVISIONS REPORT

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Summary sheets describing changes and enhancements to the ECCS Evaluation Models for 2010 are included in Attachment I. Peak Clad Temperature (PCT) sheets are included in Attachment II.

If you have any questions, please call Bruce L. Thompson at (803) 931-5042.

Very truly yours,

Thomas D. Gatlin

GAR/TDG/jw
Attachments

c: K. B. Marsh
S. A. Byrne
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R. E. Martin
NRC Resident Inspector
K. M. Sutton
NSRC
RTS (LTD 321, RR 8375)
File (818.02-17)
PRSF (RC-11-0080)

ML11159A210

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: V. C. Summer
Utility Name: South Carolina Electric & Gas Company
Revision Date: 1/14/11

Analysis Information

EM: NOTRUMP **Analysis Date:** 9/12/06 **Limiting Break Size:** 3 Inch
FQ: 2.45 **FdH:** 1.62
Fuel: Vantage + **SGTP (%):** 10
Notes:

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	1775	9	(a)
PCT ASSESSMENTS (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. None	0		
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. Upflow Conversion	148	10, 11	
C. 2010 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT =	1923	

References:

1. CGE-94-205, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Notification and Reporting Information," February 8, 1994.
2. CGE-94-228, "South Carolina Electric and Gas Company, Virgil C. Summer Station, SBLOCTA Axial Nodalization," October 27, 1994.
3. CGE-95-201, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Notification and Reporting Information," February 3, 1995.
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5. CGE-96-213, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Small Break LOCA Notification and Reporting," July 8, 1996.
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8. LTR-LIS-06-344, "Transmittal of Updated V. C. Summer SBLOCA PCT Rackup Sheets," November 2006.
9. LTR-LIS-06-662, "Transmittal of V. C. Summer SBLOCTA PCT Rackup Sheets for HHSI Throttle Valve Replacement," November 2006.
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11. LTR-LIS-09-18, "10 CFR 50.46 Report for the V. C. Summer (CGE) Upflow Conversion Program Small Break LOCA Evaluation," January 2009.

Notes:

- (a) The Rebaseline Analysis includes the impacts of the following model assessments:
 - 1-LUCIFER Error Corrections (Ref. 1)
 - 2-Effect of SI in Broken Loop (Ref. 1)
 - 3-Effect of Improved Condensation Model (Ref. 1)
 - 4-Axial Nodalization, RIP Model Revision and SBLOCTA Error Corrections Analysis (Ref. 2)
 - 5-Boiling Heat Transfer Error (Ref. 3)
 - 6-Steam Line Isolation Logic Error (Ref. 3)
 - 7-NOTRUMP Specific Enthalpy Error (Ref. 4)
 - 8-SALIBRARY Double Precision Error (Ref. 4)
 - 9-SBLOCTA Fuel Rod Initialization Error (Ref. 5)
 - 10-NOTRUMP Mixture Level Tracking / Region Depletion Errors (Ref. 6)
 - 11-NOTRUMP Bubble Rise / Drift Flux Model Inconsistency Corrections (Ref. 7)
 - 12-Refined Break Spectrum (Ref. 8)
 - 13-High Head Safety Injection (HHSI) Flow Increase (Ref. 9)

Thomas D. Gatlin
Vice President, Nuclear Operations
803.345.4342



June 6, 2012

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U. S. Nuclear Regulatory Commission
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Summary sheets describing changes and enhancements to the ECCS Evaluation Models for 2011 are included in Attachment I. Peak Clad Temperature (PCT) sheets are included in Attachment II.

If you have any questions, please call Bruce L. Thompson at (803) 931-5042.

Very truly yours,

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NSRC
RTS (LTD 321, RR 8375)
File (818.02-17)
PRSF (RC-12-0089)

M12160A354

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: V. C. Summer
Utility Name: South Carolina Electric & Gas Company
Revision Date: 2/20/2012

Analysis Information

EM: NOTRUMP **Analysis Date:** 9/12/2006 **Limiting Break Size:** 3 Inch
FQ: 2.45 **FdH:** 1.62
Fuel: Vantage + **SGTP (%):** 10

Notes:

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	1775	9	(a)
PCT ASSESSMENTS (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. None	0		
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. Upflow Conversion	148	10,11	
C. 2011 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT = 1923		

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 - 3-Effect of Improved Condensation Model (Ref. 1)
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 - 12-Refined Break Spectrum (Ref. 8)
 - 13-High Head Safety Injection (HHSI) Flow Increase (Ref. 9)

Thomas D. Gatlin
Vice President, Nuclear Operations
803.345.4342



June 13, 2013

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ECCS EVALUATION MODEL REVISIONS REPORT

South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority, hereby submits the 2012 Emergency Core Cooling System (ECCS) Evaluation Model Revisions Annual Report for VCSNS. This report is being submitted pursuant to 10 CFR 50.46, which requires licensees to notify the NRC on at least an annual basis of corrections to or changes in the ECCS Evaluation Models.

Summary sheets describing changes and enhancements to the ECCS Evaluation Models for 2012 are included in Attachment I. Peak Clad Temperature (PCT) sheets are included in Attachment II.

If you have any questions, please call Bruce L. Thompson at (803) 931-5042.

Very truly yours,

Thomas D. Gatlin

TS/TDG/wm
Attachments

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NRC Resident Inspector
K. M. Sutton
NSRC
RTS (LTD 321, RR 8375)
File (818.02-17)
PRSF (RC-13-0080)

ML13169A054

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: V. C. Summer
Utility Name: South Carolina Electric & Gas
Revision Date: 3/1/2013

Analysis Information

EM: NOTRUMP **Analysis Date:** 9/12/2006 **Limiting Break Size:** 3 Inch
FQ: 2.45 **FdH:** 1.62
Fuel: Vantage + **SGTP (%):** 10
Notes:

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	1775	9	(a)
PCT ASSESSMENTS (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. None	0		
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. Upflow Conversion	148	10,11	
C. 2012 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT =	1923	

References:

1. CGE-94-205, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Notification and Reporting Information," February 8, 1994.
2. CGE-94-228, "South Carolina Electric and Gas Company, Virgil C. Summer Station, SBLOCTA Axial Nodalization," October 27, 1994.
3. CGE-95-201, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Notification and Reporting Information," February 3, 1995.
4. CGE-96-202, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Annual Notification and Reporting," February 9, 1996.
5. CGE-96-213, "South Carolina Electric and Gas Company, Virgil C. Summer Station, 10 CFR 50.46 Small Break LOCA Notification and Reporting," July 8, 1996.
6. CGE-00-044, "South Carolina Electric and Gas Company, Virgil C. Summer Nuclear Station, 10 CFR 50.46 Appendix K (BART / BASH / NOTRUMP) Evaluation Model, Mid-Year Notification and Reporting for 2000," June 30, 2000.
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8. LTR-LIS-06-344, "Transmittal of Updated V. C. Summer SBLOCA PCT Rackup Sheets," November 2006.
9. LTR-LIS-06-662, Transmittal of V. C. Summer SBLOCTA PCT Rackup Sheets for HHSI Throttle Valve Replacement," November 2006.
10. WCAP-16980-P, Revision 1, "Reactor Internals Upflow Conversion Program Engineering Report V. C. Summer Nuclear Station Unit 1," December 2008.
11. LTR-LIS-09-18, "10 CFR 50.46 Report for the V. C. Summer (CGE) Upflow Conversion

Program Small Break LOCA Evaluation," January 2009.

Notes:

- (a) The Rebaseline Analysis includes the impacts of the following model assessments:
 - 1-LUCIFER Error Corrections (Ref. 1)
 - 2-Effect of SI in Broken Loop (Ref. 1)
 - 3-Effect of Improved Condensation Model (Ref. 1)
 - 4-Axial Nodalization, RIP Model Revision and SBLOCTA Error Corrections Analysis (Ref. 2)
 - 5-Boiling Heat Transfer Error (Ref. 3)
 - 6-Steam Line Isolation Logic Error (Ref. 3)
 - 7-NOTRUMP Specific Enthalpy Error (Ref. 4)
 - 8-SALIBRARY Double Precision Error (Ref. 4)
 - 9-SBLOCTA Fuel Rod Initialization Error (Ref. 5)
 - 10-NOTRUMP Mixture Level Tracking / Region Depletion Errors (Ref. 6)
 - 11-NOTRUMP Bubble Rise / Drift Flux Model Inconsistency Corrections (Ref. 7)
 - 12-Refined Break Spectrum (Ref. 8)
 - 13-High head safety injection (HHSI) flow increase (Ref. 9)