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50-425

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555

Ladies and Gentlemen:

**VOGTLE ELECTRIC GENERATING PLANT  
10 CFR 50.46 ECCS EVALUATION MODELS SIGNIFICANT CHANGE REPORT**

Pursuant to the requirements of 10 CFR 50.46 (a)(3)(ii), Southern Nuclear Operating Company (SNC) is submitting a significant change report to report changes in the Large-Break Loss of Coolant Accident (LBLOCA) and Small-Break Loss of Coolant Accident (SBLOCA) Emergency Core Cooling System (ECCS) models for both Unit 1 and Unit 2. The report is based on information provided by Westinghouse on June 18, 2002, of changes to the Vogtle Electric Generating Plant (VEGP) LBLOCA and SBLOCA ECCS Evaluation Models and has been prepared in accordance with the guidance in WCAP-13451 and additional guidance provided by Westinghouse.

Westinghouse has reanalyzed the LBLOCA and SBLOCA for VEGP Unit 1 and Unit 2. The total change in the LBLOCA and SBLOCA peak clad temperature (PCT) was greater than 50 °F for both units. This is considered to be significant per 10 CFR 50.46 (a)(3)(i). This report is being submitted pursuant to 10 CFR 50.46 (a)(3)(ii).

In the 2001 Annual Report (LCV-1602, March 22, 2002), SNC reported the following values for the LBLOCA and SBLOCA PCT for each unit:

LBLOCA – 2144 °F for Unit 1 and Unit 2

SBLOCA – 1900 °F for Unit 1 and 1896 °F for Unit 2.

These results included cumulations of previous model errors and changes that have been reported in prior significant error and change reports. In the significant error report submitted on October 19, 1999 (LCV-1388), SNC stated that it intends to commence reanalysis of the LBLOCA. In addition, SNC decided to reanalyze the SBLOCA. The assessments against the current LBLOCA and SBLOCA models have been incorporated into the revised analyses, resulting in reduced values of PCT.

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The LBLOCA analyses were performed with the approved 1981 Version of the Westinghouse ECCS Evaluation Model using BASH, including changes in the methodology that have been submitted by Westinghouse to the NRC. The SBLOCA analyses were performed with the approved ECCS Evaluation Model using NOTRUMP, including changes in the methodology that have been submitted by Westinghouse to the NRC. To address potential future changes in the Integrated Fuel Burnable Absorber (IFBA) loading in fuel assemblies, the LBLOCA analyses were performed to assess the PCT for fuel assemblies containing 128 and 156 IFBA rods, respectively. Because the current fuel assembly design in both VEGP units contains 128 IFBA rods, the PCT for 128 IFBA rods will be considered the analysis-of-record value for reporting purposes until such time when designs with 156 IFBA rods are implemented.

The revised LBLOCA and SBLOCA PCT for both units are:

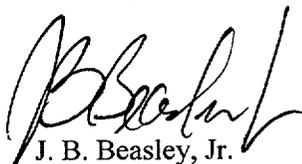
LBLOCA – 2040.5 °F (128 IFBA) and 2062.1 °F (156 IFBA)

SBLOCA – 1138.0 °F.

The resultant LBLOCA and SBLOCA PCT for each unit remains in compliance with the criterion set forth in 10 CFR 50.46 (b)(1). The criterion requires that the PCT does not exceed 2200 °F.

Per 10 CFR 50.46 (a)(3)(ii), reanalysis or taking other action is not required because compliance with 10 CFR 50.46 (b)(1) has been demonstrated for both LBLOCA and SBLOCA. The results of this report will be incorporated in a future Updated Final Safety Analysis Report (UFSAR) update.

Sincerely,



J. B. Beasley, Jr.

JBB/RJF  
Attachment

cc: Southern Nuclear Operating Company  
Mr. J. T. Gasser  
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U. S. Nuclear Regulatory Commission  
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Mr. J. Zeiler, Senior Resident Inspector, Vogtle

State of Georgia  
Mr. L. C. Barnett, Commissioner, Department of Natural Resources

**ATTACHMENT**  
**VOGTLE ELECTRIC GENERATING PLANT**  
**10 CFR 50.46 ECCS EVALUATION MODELS SIGNIFICANT CHANGE REPORT**

**BACKGROUND**

Provisions in 10 CFR 50.46 require applicants and holders of operating licenses or construction permits to notify the Nuclear Regulatory Commission (NRC) of errors and changes in the Emergency Core Cooling System (ECCS) Evaluation Models on an annual basis when the errors and changes are not significant, and within 30 days of discovery when the errors and changes are significant. A significant error or change, as defined by 10 CFR 50.46, is one which results in a calculated fuel peak cladding temperature (PCT) different by more than 50°F from the temperature calculated for the limiting transient using the last acceptable model, or a cumulation of changes and errors such that the sum of the absolute magnitudes of the respective temperature changes is greater than 50 °F.

The following presents a summary of the effects of errors and changes to the Westinghouse ECCS Evaluation Models on the Vogtle Electric Generating Plant (VEGP) Units 1 and 2 loss of coolant accident (LOCA) analyses since the 2001 Annual Report (Reference 10). This report has been prepared in accordance with the methodology presented in WCAP-13451 (Reference 1) and additional guidance provided by Westinghouse (Reference 2). The LBLOCA and SBLOCA analyses, Evaluation Model assessments, and planned plant change evaluation results reported herein will be included in a future VEGP Final Safety Analysis Report (FSAR) update.

**LARGE-BREAK LOCA**

**A. LBLOCA BASH ECCS MODEL ANALYSIS-OF-RECORD**

In the 2001 Annual Report (Reference 10), SNC reported a LBLOCA PCT of 2144 °F for both Unit 1 and Unit 2. The revised analysis-of-record LBLOCA PCT is 2040.5 °F for both Unit 1 and Unit 2. This value is based on fuel designs containing 128 Integral Fuel Burnable Absorber (IFBA) rods.

The LBLOCA analysis was performed with the 1981 Version of the Westinghouse ECCS Evaluation Model using BASH (Reference 3), including changes in the methodology for execution of the model described in References 4 and 5, and the latest acceptable LOCBART model. The limiting size break analysis assumes the following information important to the LBLOCA analyses:

- o 17x17 VANTAGE+ Fuel Assembly
- o Core Power = 1.02 \* 3565 MWt
- o Vessel Average Temperature = 570.7 °F
- o Steam Generator Plugging Level = 10%
- o  $F_Q = 2.50$
- o  $F_{\Delta H} = 1.65$

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For VEGP Units 1 and 2, the limiting size break continues to be the double-ended guillotine rupture of the cold leg piping with a discharge coefficient of  $C_D = 0.6$ . The LBLOCA LOCBART analysis-of-record calculated PCT value is 2040.5 °F for both Unit 1 and Unit 2.

**B. PRIOR 10 CFR 50.46 LARGE-BREAK ECCS MODEL ASSESSMENTS**

There are no LBLOCA prior assessments.

**C. CURRENT 10 CFR 50.46 BASH LARGE-BREAK ECCS MODEL ASSESSMENTS**

There are no LBLOCA current assessments.

**D. CURRENT PLANNED PLANT CHANGE EVALUATIONS**

There are no current planned plant changes that affect PCT for Unit 1 and Unit 2.

**E. LBLOCA 10 CFR 50.46 ECCS MODEL ASSESSMENT SUMMARY**

For Unit 1, the absolute sum of the LBLOCA PCT assessments is 0 °F.

For Unit 2, the absolute sum of the LBLOCA PCT assessments is 0 °F.

UNIT 1 LICENSING BASIS LBLOCA PCT

Based on the above discussions concerning the VEGP-specific application of the Westinghouse BASH large-break ECCS Evaluation Model, the licensing basis LBLOCA PCT is as follows:

A.	LBLOCA BASH ECCS Model Analysis-of-Record	
	LOCBART Analysis Result (128 IFBA)	2040.5 °F
B.	Prior 10 CFR 50.46 Large-Break ECCS Model Assessments	
	Combined assessments previously reported as significant	+0 °F
	Combined planned plant change evaluations	+0 °F
C.	Current 10 CFR 50.46 BASH Large-Break ECCS Model Assessments	
	None	+0 °F
D.	Current Planned Plant Change Evaluations	
	None	+0 °F
	Licensing Basis LBLOCA PCT	= <u>2040.5</u> °F

Conclusion

When the effects of assessments to the BASH ECCS Evaluation Model and planned plant change evaluations were combined with the VEGP LBLOCA analysis results, it was determined that compliance with the requirements of 10 CFR 50.46 is being maintained for Unit 1.

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UNIT 2 LICENSING BASIS LBLOCA PCT

Based on the above discussions concerning the VEGP-specific application of the Westinghouse BASH large-break ECCS Evaluation Model, the licensing basis LBLOCA PCT is as follows:

A.	LBLOCA BASH ECCS Model Analysis-of-Record	
	LOCBART Analysis Result (128 IFBA)	2040.5 °F
B.	Prior 10 CFR 50.46 Large-Break ECCS Model Assessments	
	Combined assessments previously reported as significant	+0 °F
	Combined planned plant change evaluations	+0 °F
C.	Current 10 CFR 50.46 BASH Large-Break ECCS Model Assessments	
	None	+0 °F
D.	Current Planned Plant Change Evaluations	
	None	+ 0 °F
	Licensing Basis LBLOCA PCT	= <u>2040.5 °F</u>

Conclusion

When the effects of assessments to the BASH ECCS Evaluation Model and planned plant change evaluations were combined with the VEGP LBLOCA analysis results, it was determined that compliance with the requirements of 10 CFR 50.46 is being maintained for Unit 2.

## **SMALL-BREAK LOCA**

### **A. SBLOCA NOTRUMP ECCS MODEL ANALYSIS-OF-RECORD**

In the 2001 Annual Report (Reference 10), SNC reported a SBLOCA PCT of 1900 °F for Unit 1 and 1896 °F for Unit 2. The revised analysis-of-record SBLOCA PCT is 1138.0 °F for both Unit 1 and Unit 2.

The SBLOCA analysis was performed with the Westinghouse ECCS Evaluation Model using NOTRUMP (References 6 and 7), including changes to the methodology described in References 8 and 9, and the latest acceptable SBLOCTA model. The limiting size break analysis assumes the following information important to the SBLOCA analyses:

- o 17x17 VANTAGE+ Fuel Assembly
- o Core Power = 1.02 \* 3565 MWt
- o Vessel Average Temperature = 570.7 °F
- o Steam Generator Plugging Level = 10%
- o  $F_Q = 2.58$
- o  $F_{\Delta H} = 1.70$

For VEGP Units 1 and 2, the limiting size small-break continues to be a three-inch equivalent diameter break in the cold leg. The SBLOCA SBLOCTA analysis-of-record calculated PCT value is 1138.0 °F for both Unit 1 and Unit 2.

### **B. PRIOR 10 CFR 50.46 SMALL-BREAK ECCS MODEL ASSESSMENTS**

There are no SBLOCA prior assessments.

### **C. CURRENT 10 CFR 50.46 NOTRUMP SMALL-BREAK ECCS MODEL ASSESSMENTS**

There are no SBLOCA current assessments.

### **D. CURRENT PLANNED PLANT CHANGE EVALUATIONS**

There are no current planned plant changes that affect PCT for Unit 1 and Unit 2.

### **E. SBLOCA 10 CFR 50.46 ECCS MODEL ASSESSMENT SUMMARY**

For Unit 1, the absolute sum of the SBLOCA PCT assessments is 0 °F.

For Unit 2, the absolute sum of the SBLOCA PCT assessments is 0 °F.

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UNIT 1 LICENSING BASIS SBLOCA PCT

Based on the above discussions concerning the VEGP-specific application of the Westinghouse NOTRUMP small-break ECCS Evaluation Model, the licensing basis SBLOCA PCT is as follows:

A. SBLOCA NOTRUMP ECCS Model Analysis-of-Record

SBLOCA Analysis Result 1138.0 °F

B. Prior 10 CFR 50.46 Small-Break ECCS Model Assessments

Combined assessments previously reported as significant + 0 °F

Combined planned plant change evaluations + 0 °F

C. Current 10 CFR 50.46 NOTRUMP Small-Break ECCS Model Assessments

None + 0 °F

D. Current Planned Plant Change Evaluations

None + 0 °F

Licensing Basis SBLOCA PCT = 1138.0 °F

Conclusion

When the effects of assessments to the NOTRUMP ECCS Evaluation Model and planned plant changes were combined with the VEGP SBLOCA analysis results, it was determined that compliance with the requirements of 10 CFR 50.46 is being maintained for Unit 1.



**REFERENCES**

1. WCAP-13451, "Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting," October 1992.
2. Westinghouse letter GP-17337, "Southern Nuclear Operating Company, Inc., Vogtle Electric Generating Plant Units 1 and 2, 10 CFR 50.46 Annual Notification Reporting for 2001," March 1, 2002.
3. "The 1981 Version of the Westinghouse ECCS Evaluation Model Using the BASH Code," WCAP-10266-P-A, Revision 2 (Proprietary) and WCAP-11524-A, Revision 2 (Non-Proprietary), March 1987.
4. Westinghouse letter NTD-NRC-94-4143 from N. J. Liparulo to W. T. Russell (USNRC), "Change in Methodology for Execution of BASH Evaluation Model," May 23, 1994.
5. Westinghouse letter NTD-NRC-95-4540 from N. J. Liparulo to W. T. Russell (USNRC), "Change in Methodology for Execution of BASH Evaluation Model," August 29, 1995.
6. "NOTRUMP: A Nodal Transient Small Break and General Network Code," WCAP-10079-P-A (Proprietary) and WCAP-10080-A (Non-Proprietary), August 1985.
7. "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code," WCAP-10054-P-A, August 1985.
8. "Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection into the Broken Loop and COSI Condensation Model," WCAP-10054-P-A, Addendum 2, Revision 1, July 1997.
9. "Model Changes to the Westinghouse Appendix K Small Break LOCA NOTRUMP Evaluation Model: 1988 – 1997," WCAP-15085, July 1998.
10. LCV-1602, "Vogtle Electric Generating Plant, 10 CFR 50.46 ECCS Evaluation Models 2001 Annual Report," letter from J. B. Beasley, Jr. (SNC) to USNRC, March 22, 2002.