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## CALVERT CLIFFS NUCLEAR POWER PLANT

March 31, 2011

U. S. Nuclear Regulatory Commission  
Washington, DC 20555

**ATTENTION:** Document Control Desk

**SUBJECT:** Calvert Cliffs Nuclear Power Plant  
Unit No. 2; Docket No. 50-318  
10 CFR 50.46 30-day Report for Changes to the Emergency Core Cooling  
System Performance Analysis

**REFERENCE:** (a) Letter from Mr. D. V. Pickett (NRC) to Mr. G. H. Gellrich (CCNPP),  
dated February 18, 2011, Amendment re: Transition from Westinghouse  
Nuclear Fuel to AREVA Nuclear Fuel (TAC Nos. ME2831 and ME2832)

This letter is submitted pursuant to 10 CFR 50.46(a)(3)(ii) to provide notification of a significant change to the peak cladding temperature analysis result for the large break loss-of-coolant accident (LB LOCA) analysis and the small break loss-of-coolant accident (SB LOCA) analyses. Because the effect on the peak cladding temperature of the changes is greater than 50°F from the temperature calculated for the limiting transient using the last acceptable model, the analysis changes qualify as significant as defined in 10 CFR 50.46(a)(3)(i) and, consequently, are provided in Attachment (1).

The analyses for the LB LOCA and SB LOCA Emergency Core Cooling System performance have been re-performed for Unit 2, Cycle 19. The analyses were performed using the latest Nuclear Regulatory Commission accepted versions of the AREVA evaluation models for Calvert Cliffs pressurized water reactors (Reference a). The new analyses explicitly model the AREVA fuel introduced into Unit 2, Cycle 19 in the spring of 2011. Reference (a) documents the Nuclear Regulatory Commission's approval of the use of AREVA methods for reactor core designs that include both AREVA and Westinghouse fuel assemblies and reactor core designs that include only AREVA fuel assemblies for both Calvert Cliffs Units 1 and 2.

The results of the new LB LOCA and SB LOCA analyses conform to the Emergency Core Cooling System acceptance criteria of 10 CFR 50.46(b) and are discussed in Reference (a). With the

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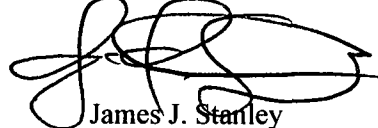
March 31, 2011

Page 2

implementation of the approved license amendment on Unit 2, the new LB LOCA and SB LOCA analyses constitute the new licensing basis for Unit 2 on March 8, 2011 when Unit 2 entered Mode 4. A description of these analyses will be incorporated into a future revision of the Updated Final Safety Analysis Report. Attachment (1) contains the results of the change in the peak cladding temperature based on the analyses for Unit 2.

Should you have questions regarding this matter, please contact Mr. Douglas E. Lauver at (410) 495-5219.

Very truly yours,

A handwritten signature in black ink, appearing to read 'JJS', with a horizontal line extending to the right.

James J. Stanley  
Manager-Engineering Services

JJS/PSF/bjd

Attachment: (1) 10 CFR 50.46 – 30 Day Report

cc: D. V. Pickett, NRC  
W. M. Dean, NRC

Resident Inspector, NRC  
S. Gray, DNR

**ATTACHMENT (1)**

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**10 CFR 50.46 - 30 DAY REPORT**

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**ATTACHMENT (1)**  
**10 CFR 50.46 – 30 DAY REPORT**

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**INTRODUCTION**

This letter is submitted pursuant to 10 CFR 50.46(a)(3)(ii) to provide notification of a significant change to the peak cladding temperature analysis result for the large break loss-of-coolant accident (LB LOCA) analysis and the small break loss-of-coolant accident (SB LOCA) analyses. Because the effect on the peak cladding temperature of the changes is greater than 50°F from the temperature calculated for the limiting transients using the last acceptable model, the analyses changes qualify as significant as defined in 10 CFR 50.46(a)(3)(i) and, consequently, are provided below.

Calvert Cliffs request to amend the Unit 2 renewed operating license to transition from Westinghouse to AREVA-designed fuel was approved by the Nuclear Regulatory Commission (NRC) in Reference 1. As part of that transition, the Emergency Core Cooling System performance for both the LB LOCA and the SB LOCA were re-analyzed. The analyses were performed with the latest NRC accepted versions of EMF-2103(P)(A), "Realistic Large Break LOCA Methodology for Pressurized Water Reactors," and EMF-2328(P)(A), "PWR Small Break LOCA Evaluation Model, S-RELAP5 Based." The analyses comply with the limitations and constraints imposed by Reference 1.

Note that these new LB LOCA and SB LOCA analyses are not assessments (i.e., they do not provide an estimate of the effect of the changes on the limiting Emergency Core Cooling System analysis). Rather, they are complete re-analyses that use acceptable evaluation models that are applicable to Calvert Cliffs Unit 2. A summary of the new analysis and their compliance with 10 CFR 50.46 is provided below.

**LB LOCA**

The Unit 2 LB LOCA Emergency Core Cooling System performance analysis was performed with the AREVA evaluation method approved in Reference 1. The analysis included the implementation of the M5 cladding material properties into the LB LOCA methodology.

The analysis resulted in an absolute change in peak clad temperature from the prior Westinghouse analysis of record of greater than 50°F. A comparison of peak clad temperature results is provided in Table 1. Note, the change in peak clad temperature is due to a switch in fuel vendors and is not the result of a calculation or methodology error.

**Table 1, AREVA versus Westinghouse LB LOCA Peak Clad Temperature Analysis Results**

<b>Item</b>	<b>Peak Clad Temperature, °F</b>
New Analysis of Record (includes AREVA fuel)	1,670
Old Analysis of Record (Westinghouse fuel)	2,057

Table 2 provides the results of the new LB LOCA analysis demonstrating conformance with the acceptance criteria of 10 CFR 50.46(b).

**Table 2, LB LOCA versus Acceptance Criteria**

<b>Parameter</b>	<b>Criterion</b>	<b>Result</b>
Peak Cladding Temperature, °F	2200	1670
Maximum Cladding Oxidation, %	<17	0.907
Maximum Core-Wide Cladding Oxidation, %	<1	0.011
Coolable Geometry	Yes	Yes

**ATTACHMENT (1)**  
**10 CFR 50.46 – 30 DAY REPORT**

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**SB LOCA**

Additionally, AREVA performed a complete SB LOCA analysis for Calvert Cliffs. The analysis was performed with the AREVA evaluation method approved in Reference 1.

The analysis resulted in an absolute change in peak clad temperature from the prior Westinghouse analysis of record of greater than 50°F. A comparison of peak clad temperature results is provided in Table 3. Note, the change in peak clad temperature is due to a switch in fuel vendors and is not the result of a calculation or methodology error.

**Table 3, AREVA versus Westinghouse SB LOCA Peak Clad Temperature Analysis Results**

Item	Peak Clad Temperature, °F
AREVA Fuel Analysis of Record	1,626
Westinghouse Fuel Analysis of Record	1,855

Table 4 provides the results of the new SB LOCA analysis demonstrating conformance with the acceptance criteria of 10 CFR 50.46(b).

**Table 4, SB LOCA versus Acceptance Criteria**

Parameter	Criterion	Result
Peak Cladding Temperature, °F	2200	1626
Maximum Cladding Oxidation, %	<17	1.769
Maximum Core-Wide Cladding Oxidation, %	<1	0.015
Coolable Geometry	Yes	Yes

**SUMMARY**

The new LB LOCA and SB LOCA analyses constitute new licensing basis analyses (analyses-of-record) for Calvert Cliffs Unit 2. They will be used as the reference analyses to evaluate the impact on peak cladding temperature of future changes to or errors in the AREVA LB LOCA and SB LOCA evaluation models and their application to Calvert Cliffs.

**REFERENCE**

1. Letter from Mr. D. V. Pickett (NRC) to Mr. G. H. Gellrich (CCNPP), dated February 18, 2011, Amendment re: Transition from Westinghouse Nuclear Fuel to AREVA Nuclear Fuel (TAC Nos. ME2831 and ME2832)