

September 7, 2006

Mr. David A. Christian  
Senior Vice President  
and Chief Nuclear Officer  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

SUBJECT: NORTH ANNA POWER STATION, UNIT NOS. 1 AND 2, MILLSTONE POWER STATION, UNIT NOS. 2 AND 3, AND SURRY POWER STATION, UNIT NOS. 1 AND 2 - REVIEW OF THE 2004 ANNUAL REPORT OF THE EMERGENCY CORE COOLING SYSTEM MODEL CHANGES (TAC NOS. MC7520, MC7521, MC7529, MC7530, MC7531, AND MC7532)

Dear Mr. Christian:

By letter dated June 30, 2005, Dominion Nuclear Connecticut, Inc., and Virginia Electric and Power Company (the licensees) submitted the "2004 Annual Report of Emergency Core Cooling System Model Changes Pursuant to the Requirements of 10 CFR 50.46," for North Anna Power Station, Unit Nos. 1 and 2, Millstone Power Station, Unit Nos. 2 and 3, and Surry Power Station, Unit Nos. 1 and 2. The licensees had submitted this report pursuant to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.46.

The U.S. Nuclear Regulatory Commission (NRC) staff completed its review and addressed several issues that pertain to this annual report. Accordingly, the licensees are requested to review the NRC staff's comments and incorporate these comments as part of the 10 CFR 50.46 program.

Sincerely,

**/RA/**

**/RA by GMiller for/**

Stephen Monarque, Project Manager  
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Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Victor Nerses, Sr. Project Manager  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-338, 50-339, 50-336,  
50-423, 50-280, and 50-281

Enclosure:  
NRC Staff's Evaluation of 2004 Annual Report  
of Emergency Core Cooling System Model Changes

cc w/encl: See next page

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\*Date of memo transmitting safety evaluation

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DATE	08/29/2006	08/28/2006	08/29/2006	03/30/2006*	09/01/2006

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STAFF EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE 2004 ANNUAL REPORT OF THE

EMERGENCY CORE COOLING SYSTEM MODEL CHANGES

PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.46 FOR

NORTH ANNA POWER STATION, UNIT NOS. 1 AND 2

MILLSTONE POWER STATION, UNIT NOS. 2 AND 3

SURRY POWER STATION, UNIT NOS. 1 AND 2

1.0 INTRODUCTION

By letter dated June 30, 2005, (Reference 1), Dominion Nuclear Connecticut, Inc., and Virginia Electric and Power Company (the licensees), submitted their annual report entitled "Emergency Core Cooling System (ECCS) Model Changes Pursuant to the Requirements of 10 CFR 50.46," for North Anna Power Station, Unit Nos. 1 and 2 (North Anna 1 and 2), Millstone Power Station, Unit Nos. 2 and 3 (Millstone 2 and 3), and Surry Power Station, Unit Nos. 1 and 2 (Surry 1 and 2).

The licensees provided 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 North Anna 1 and 2, Millstone 2 and 3, and Surry 1 and 2. North Anna 1 and 2 has Westinghouse and AREVA fuel, therefore both evaluation model results were provided for the North Anna units.

Specifically, the licensees submitted the results of the following evaluations for the SBLOCA and LBLOCA analyses. The calculated peak cladding temperature (PCT) is listed after the evaluation.

•	Millstone 2 - SBLOCA - AREVA Evaluation Model:	1808 EF
•	Millstone 2 - LBLOCA - AREVA Evaluation Model:	1823 EF
•	Millstone 3 - SBLOCA - Westinghouse Evaluation Model:	1009 EF
•	Millstone 3 - LBLOCA - Westinghouse Evaluation Model:	2004 EF
•	North Anna 1 - SBLOCA - Westinghouse Evaluation Model:	1724 EF
•	North Anna 1 - LBLOCA - Westinghouse Evaluation Model:	2086 EF
•	North Anna 1 - SBLOCA - AREVA Evaluation Model:	1380 EF
•	North Anna 1 - LBLOCA - AREVA Evaluation Model:	1925 EF
•	North Anna 2 - SBLOCA - Westinghouse Evaluation Model:	1724 EF
•	North Anna 2 - LBLOCA - Westinghouse Evaluation Model:	2086 EF
•	North Anna 2 - SBLOCA - Areva Evaluation Model:	1370 EF
•	North Anna 2 - LBLOCA - Areva Evaluation Model:	1861 EF
•	Surry 1 and 2 - SBLOCA - Westinghouse Evaluation Model:	1750 EF

- Surry 1 and 2 - LBLOCA - Westinghouse Evaluation Model: 2133 EF

The U.S. Nuclear Regulatory Commission (NRC) staff's evaluation examined the acceptability of the submitted annual report.

## 2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.46(a)(3)(ii), "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," the licensees submitted their annual report of the ECCS model changes.

Section 50.46(a)(3) has specific acceptance criteria pursuant to the content and composition of the licensees submitted annual reports of ECCS model changes.

## 3.0 TECHNICAL EVALUATION

The NRC staff has reviewed the licensees' annual report.

The results of the review are presented below for each reported evaluation.

### 3.1 North Anna 1 and 2 Evaluations

In general, previous to 2005, the licensees submitted annual and 30-day reports pertaining to the emergency core cooling system (ECCS) evaluation model changes.

It facilitates the NRC staff's evaluation when reports are not combined. Further, it would not be in accordance with the regulations to submit the reports as a combined report unless the significant change or error is discovered within 30 days of the date of the annual report. For reference see 10 CFR 50.46(a)(3)(ii).

As another general comment pertaining to the North Anna and Surry units, in many reports the licensees indicated that 10 CFR 50.46(a)(3)(ii) specifically requests that the 30-day report include a proposed schedule for providing a re-analysis or taking other action as may be needed to show compliance with 10 CFR 50.46 requirements. The pertinent part of this regulation reads "If the change or error is significant, the applicant or licensees shall provide this report within 30 days and include with the report a proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with Section 50.46 requirements."

It is emphasized here, however, that in either case the regulation requires a proposed schedule to be submitted with the 30-day report. There must be a proposed schedule that lays out the timeline for conducting a re-analysis or a proposed schedule that lays out the timeline for taking other action as may be needed to show compliance with Section 50.46 requirements.

### North Anna 1 - SBLOCA - Westinghouse Evaluation Model

It appears to the NRC staff that the current accumulation of changes or errors in the model amount to 49 EF and it appears that those changes are now being tracked correctly. However, any additional changes or errors would require the submission of a 30-day report.

#### North Anna 1 - LBLOCA - Westinghouse Evaluation Model

In Reference 5, the licensees stated "Re-analyses of the large break LOCA accident for Surry and North Anna are scheduled to be completed by April 30, 2001 and August 31, 2001, respectively." This statement was made because a significant change occurred in 1999 that necessitated the issuance of a 30-day report (Reference 5). In the 30-day report, the licensees committed to do a re-analysis of the LBLOCA accident for the North Anna units by August 31, 2001. In the annual report submitted for 2003 (Reference 6), the licensees reported the same value for the analysis of record (AOR) PCT, indicating that the re-analysis was never performed. However, the re-analysis was performed by July 14, 2004 (Reference 4). The new AOR PCT is 2036 EF.

#### North Anna 1 - SBLOCA - AREVA Evaluation Model

The NRC staff did not find any significant issues.

#### North Anna 1 - LBLOCA - AREVA Evaluation Model

The AOR reports a clad temperature of 1853 EF. There are two prior permanent ECCS model assessments that amount to an absolute magnitude of 72 EF. There were no 30-day reports submitted for either of these changes, both of which would require reports to be submitted per 10 CFR 50.46(a)(3)(ii) if this model was the one used to generate the AOR.

The 30-day report of July 14, 2004 (Reference 4), indicates in Attachment 2 of this report that the Westinghouse LBLOCA analysis is the AOR. This being the case, no 30-day report would be required. Should the licensees desire to substitute the AREVA analysis as the AOR, NRC staff approval would be required and documented for the application of the generically approved methodology to the unit-specific analysis.

#### North Anna 2 - SBLOCA - Westinghouse Evaluation Model

It appears to the NRC staff that the current accumulation of changes or errors in the model amount to 49 EF and it appears that those changes are now being tracked correctly. However, any additional changes or errors would require the submission of a 30-day report.

#### North Anna 2 - LBLOCA - Westinghouse Evaluation Model

In their November 18, 1999 (Reference 5) letter, the licensees stated "Re-analyses of the large break LOCA accident for Surry and North Anna are scheduled to be completed by April 30, 2001 and August 31, 2001, respectively." This statement was made because a significant change occurred in 1999 that necessitated the issuance of a 30-day report (Reference 5). In the 30-day report, the licensees committed to do a re-analysis of the LBLOCA accident for the North Anna units by August 31, 2001. In the annual report submitted for 2003 (Reference 6), the licensees reported the same value for the AOR PCT indicating that the re-analysis was never performed. However, the re-analysis was performed by July 14, 2004 (Reference 4). The new AOR PCT is 2036 EF.

#### North Anna 2 - SBLOCA - AREVA Evaluation Model

The NRC staff did not find any significant issues.

#### North Anna 2 - LBLOCA - AREVA Evaluation Model

The AOR reports a clad temperature of 1789 EF. There are two prior permanent ECCS model assessments that amount to an absolute magnitude of 72 EF. There were no 30-day reports submitted for either of these changes, both of which would require reports to be submitted per 10 CFR 50.46(a)(3)(i) if this model was the one used to generate the AOR.

The 30-day report of July 14, 2004 (Reference 4), indicates in Attachment 2 of this report that the Westinghouse LBLOCA analysis is the AOR. This being the case, no 30-day reports would be required. Should the licensees desire to substitute the AREVA analysis as the AOR, NRC staff approval would be required and documented for the application of the generically approved methodology to the unit specific analysis.

### 3.2 Millstone 2 and 3 Evaluations

#### Millstone 2 - SBLOCA - AREVA Evaluation Model

The report states that the sum of the absolute magnitudes of the changes to the model since the last 30-day report are not significant. An examination of that referenced 30-day report, made by letter dated September 5, 2002 (Reference 2), revealed that the licensees failed to include a proposed schedule for taking other action as may be needed to show compliance with 10 CFR 50.46 requirements as required by 10 CFR 50.46(a)(3)(ii).

Although the licensees stated that they intended to perform no re-analysis or take any other actions, 10 CFR 50.46(a)(3)(ii) clearly requires a schedule to be included with every 30-day report.

#### Millstone 2 - LBLOCA - AREVA Evaluation Model

The NRC staff did not find any significant issues.

#### Millstone 3 - SBLOCA - Westinghouse Evaluation Model

The NRC staff did not find any significant issues.

#### Millstone 3 - LBLOCA - Westinghouse Evaluation Model

The NRC staff did not find any significant issues.

### 3.3 Surry 1 and 2 Evaluations

#### Surry 1 - SBLOCA - Westinghouse Evaluation Model

The NRC staff did not find any significant issues.

#### Surry 1 - LBLOCA - Westinghouse Evaluation Model

In their January 3, 2006, letter (Reference 7), the licensees committed to perform an analysis of the Surry 1 LBLOCA by September 30, 2006. This is an extension from their original commitment contained in their May 21, 2003, letter (Reference 6) to perform an analysis of the Surry 1 LBLOCA by March 31, 2006.

Surry 2 - SBLOCA - Westinghouse Evaluation Model

The NRC staff did not find any significant issues.

Surry - LBLOCA - Westinghouse Evaluation Model

In their January 3, 2006, letter (Reference 7), the licensees committed to perform an analysis of the Surry 2 LBLOCA by September 30, 2006. This is an extension from their original commitment contained in their May 21, 2003, letter (Reference 6) to perform an analysis of the Surry 2 LBLOCA by March 31, 2006.

#### 4.0 REFERENCES

1. Letter from E.S. Grecheck, Dominion Nuclear Connecticut, Inc., Virginia Electric and Power Company, to U.S. Nuclear Regulatory Commission, "Millstone Power Station, Units 2 and 3 North Anna Power Station Units 1 and 2 Surry Power Station Units 1 and 2[,] 2004 Annual Report of Emergency Core Cooling System Model Changes Pursuant to the Requirements of 10 CFR 50.46," June 30, 2005, ADAMS Accession No. ML051860397.
2. Letter from J.A. Price, Dominion Nuclear Connecticut, Inc., to U.S. Nuclear Regulatory Commission, "Millstone Power Station, Unit No. 2[,] 30-Day Reporting of Changes to and Errors in Emergency Core Cooling System Models or Applications," September 5, 2002, ADAMS Accession No. ML022680036.
3. Letter from J.P. O'Hanlon, Virginia Electric and Power Company, to U.S. Nuclear Regulatory Commission, "North Anna and Surry Power Stations Units 1 and 2 Report of ECCS Evaluation Model Changes and 30-day Report of ECCS Evaluation Model Changes per Requirements of 10 CFR 50.46," August 1, 1996, ADAMS Accession No. 89262:351 - 362.
4. Letter from L.N. Hartz, Virginia Electric and Power Company, to U.S. Nuclear Regulatory Commission, "North Anna Power Station Units 1 and 2[,] 30-day Report of Emergency Core Cooling System (ECCS) Evaluation Model Changes Pursuant to the Requirements of 10 CFR 50.46," July 14, 2004, ADAMS Accession No. ML041960520.
5. Letter from L.N. Hartz, Virginia Electric and Power Company, to U.S. Nuclear Regulatory Commission, "Surry and North Anna Power Stations Units 1 and 2[,] 30-Day Report - Emergency Core Cooling System (ECCS) Evaluation Model Changes Pursuant to the Requirements of 10 CFR 50.46," November 18, 1999. ADAMS Accession No. ML993310055.
6. Letter from L.N. Hartz, Virginia Electric and Power Company, to U.S. Nuclear Regulatory Commission, "Surry Power Station Units 1 and 2 North Anna Power Station

Units 1 and 2[,] Annual Report and 30-Day Report of Emergency Core Cooling System (ECCS) Evaluation Model Changes Pursuant to the Requirements of 10 CFR 50.46," May 21, 2003, ADAMS Accession No. ML031490403.

7. Letter from L.N. Hartz, Virginia Electric and Power Company, to U.S. Nuclear Regulatory Commission, "Surry Power Station Units 1 and 2[,] 30-Day Report of Emergency Core Cooling System (ECCS) Model Changes Pursuant to the Requirements of 10 CFR 50.46," January 3, 2006, ADAMS Accession No. ML060040035.

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Date: September 7, 2006



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