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September 22, 1995

Docket No. 50-423
B15376

Re: 10CFR50.46(a)

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

Millstone Nuclear Power Station, Unit No. 3
Reporting of Changes to, and Errors in,
Emergency Core Cooling System Models or Applications

In accordance with 10CFR50.46(a)(3)(ii), Northeast Nuclear Energy Company (NNECO) hereby submits changes to, and errors in, the emergency core cooling system (ECCS) evaluation model or application of the model for Millstone Unit No. 3.

The last update was submitted to the NRC Staff on March 20, 1995,[1] and provided the combined annual 10CFR50.46 report for Millstone Nuclear Power Station, Unit Nos. 1, 2, and 3 for the period from September 30, 1993, to December 31, 1994. Based on a notification received from Westinghouse Electric Corporation dated August 14, 1995, this report covers additional changes to or errors in the large break loss of coolant accident (LBLOCA) analysis performed for Millstone Unit No. 3, since December 31, 1994. The following is a synopsis of the information provided in Attachment 1.

1. LBLOCA analyses have been traditionally performed using a symmetric, chopped cosine, core axial power distribution. Under certain conditions, Westinghouse calculations have shown that there is a potential for top-skewed power distributions to result in Peak Cladding Temperatures (PCTs) greater than those calculated with chopped cosine axial power distributions. In 1991 Westinghouse developed a statistical methodology to evaluate and assure that the cosine distribution remains the limiting distribution. This methodology, Power Shape Sensitivity Model (PSSM), was submitted to the NRC for review and approval via WCAP-12909, "Westinghouse ECCS Evaluation Model: Revised Large Break LOCA

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(1) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit Nos. 1, 2, and 3 - Annual Reporting of Changes to, and Errors in, Emergency Core Cooling System Models or Applications," dated March 20, 1995.

A001

Power Distribution Methodology," May 1991. On August 7, 1995, Westinghouse issued a letter to the NRC withdrawing PSSM effective October 30, 1995. Prior to withdrawal, WCAP-12909 was still under review and had not been approved by the NRC. Based on discussions with the NRC, Westinghouse believed that PSSM would not be approved without significant modification. The potential penalties associated with these modifications outweighed the benefits derived from PSSM. Therefore, Westinghouse decided it would not be prudent to continue pursuing licensing of PSSM.

2. In order to minimize potential PCT penalties for all licensees that use the Westinghouse LBLOCA Evaluation Model, Westinghouse developed an alternate axial power shape methodology, ESHAPE (Explicit Shape Analysis for PCT Effects), to replace PSSM. The ESHAPE methodology is based on explicit analysis of a set of skewed axial power shapes. The explicit use of skewed power shapes has previously been approved by the NRC as part of the Westinghouse LBLOCA Evaluation Model. Westinghouse has performed evaluations using ESHAPE and has determined that the current Millstone Unit No. 3 LBLOCA analysis of record is impacted. Westinghouse has determined that the PCT penalty associated with the change from PSSM to ESHAPE is 108°F. This effect is considered significant with respect to 10CFR50.46(a)(3)(i) and, as such, is being reported as required by 10CFR50.46(a)(3)(ii).

3. Westinghouse, in support of the Westinghouse Owners Group, is currently pursuing a program to eliminate the requirement for post-LOCA hot leg recirculation by taking credit for the gaps that exist between the reactor vessel and core barrel at the hot leg nozzle locations (i.e., hot leg nozzle gaps). As an outgrowth of this effort, Westinghouse has also completed work on a methodology for modeling the hot leg nozzle gaps in Appendix K LBLOCA ECCS analyses using the BASH Evaluation Model (EM). This methodology was submitted as an EM change in accordance with 10CFR50.46 to the NRC for review and approval via WCAP-14404-P and WCAP-14405-NP, "Methodology for Incorporating Hot Leg Nozzle Gaps into BASH," on July 26, 1995. Westinghouse informed the NRC that use of the hot leg nozzle gap methodology is considered to be a permanent EM change and will be incorporated on a forward-fit basis for future LBLOCA evaluations. Although use of the hot leg nozzle gap methodology has not yet been approved by the NRC, Westinghouse believes that the NRC will ultimately approve use of this methodology since it is a relatively straight forward and simple change to the approved Westinghouse LBLOCA Evaluation Model. In addition, Westinghouse is maintaining substantial conservatism in this methodology by modeling only

single phase flow through the gap. As documented in WCAP-14404, Westinghouse has determined that single phase flow through the gap is conservative compared to two phase flow through the gap which is a more realistic assumption. Based on discussion with the NRC, no concerns have been expressed regarding the implementation of the hot leg nozzle gap model change for use on a forward-fit basis in conjunction with the approved Westinghouse LBLOCA Evaluation Model. Westinghouse has informed NNECO that use of the hot leg nozzle gap methodology results in a PCT benefit of 193°F for Millstone Unit No. 3. However, until the hot leg nozzle gap methodology has been reviewed and approved by the NRC, NNECO chooses to conservatively report this change as a PCT benefit of 0.0°F.

4. Attachment 1 provides both the small and large break ECCS Evaluation Model Margin Utilization sheets which account for (A) the analysis of record, (B) prior permanent 10CFR50.46 LOCA model assessments, (C) 1995 10CFR50.46 LOCA model assessments including those for which this notification is being performed, (D) margin utilization attributable to 10CFR50.59 evaluations up to the present, and (E) other margin allocations.

5. Considering the changes summarized in Attachment 1, the corrected PCT for the limiting LBLOCA remains below the 2200°F limit as defined by 10CFR50.46(b)(1). The PCT for the limiting small break LOCA is unaffected by the changes described above.

We believe that this information satisfies the reporting requirements of 10CFR50.46(a)(3)(ii). If you have any questions, please contact Mr. J. S. Duddy at (860) 440-2080.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: J. F. Opeka
Executive Vice President

BY: E. A. DeBarba
E. A. DeBarba
Vice President

cc: T. T. Martin, Region I Administrator
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3
P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3

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Attachment 1

Millstone Nuclear Power Station, Unit No. 3

Reporting of 10CFR50.46 Margin Utilization

September 1995

Reporting of 10CFR50.46 Margin Utilization
Small Break LOCA

PLANT NAME: Millstone Unit No. 3

		Clad Temperature	Notes
A.	Analysis of Record (8/90)	PCT = 1891°F	
	Eval. Model: NOTRUMP FQ = 2.6 Vendor: Westinghouse FΔH = 1.7 Fuel: VANTAGE 5H SGTP = 10%		
B.	Prior Permanent LOCA Model Assessment		
	1. Thru 12/1994	ΔPCT = 36°F	
C.	Current Permanent LOCA Model Assessments		
	1. None	ΔPCT = 0°F	
D.	10CFR50.59 Safety Evaluations (Permanent Assessment of PCT Margin)		
	1. Increased Pressurizer Pressure Uncertainty	ΔPCT = 14°F	
	2. Effect of ZIRLO Fuel Cladding	ΔPCT = 24°F	
	3. Fuel Rod Crud	ΔPCT = 2°F	
	4. Reduced Thermal Design Flow	ΔPCT = 12°F	
	5. Fuel Reconstitution	ΔPCT = 1°F	
	6. Revised T-hot Average Scaling	ΔPCT = 2°F	
E.	Other Margin Allocations		
	1. Burst and Blockage/Time in Life	ΔPCT = 30°F	(1)
	2. Axial Offset Decrease to 20%	ΔPCT = -135°F	

ANALYSIS OF RECORD PCT + MARGIN ALLOCATIONS PCT = 1877°F

Reporting of 10CFR50.46 Margin Utilization
Small Break LOCA (Continued)

Notes:

(1) The base PCT used for calculating this penalty includes the Fuel Rod Crud Safety Assessment performed to address the Cycle 4 axial offset anomaly. The Fuel Rod Crud Evaluation penalty is found in Item D, above.

Reporting of 10CFR50.46 Margin Utilization
Large Break LOCA

PLANT NAME: Millstone Unit No. 3

		Clad Temperature	Notes
A.	Analysis of Record (8/90)	PCT = 1974°F	(1)
	1. Transition Core Penalty	ΔPCT = 50°F	(2)
	Eval. Model: BASH Vendor: Westinghouse Fuel: VANTAGE 5H FQ = 2.6 FΔH = 1.7 SGTP = 10%		
B.	Prior Permanent LOCA Model Assessment		
	1. Thru 12/1994	ΔPCT = -121°F	
C.	Current Permanent LOCA Model Assessments		
	1. Skewed Power Shape Penalty	ΔPCT = 108°F	
	2. Hot Leg Nozzle Gap Benefit	ΔPCT = 0°F	(3)
D.	10CFR50.59 Safety Evaluations (Permanent Assessment of PCT Margin)		
	1. Increased Pressurizer Pressure Uncertainty	ΔPCT = 1°F	
	2. Effect of ZIRLO Fuel Cladding	ΔPCT = 6°F	
	3. Reactor Vessel Flange Radiation Shield	ΔPCT = 1°F	
	4. Reduced Thermal Design Flow	ΔPCT = 12°F	
	5. Fuel Reconstitution	ΔPCT = 1°F	
	6. Revised T-hot Average Scaling	ΔPCT = 7°F	
E.	Other Margin Allocations	ΔPCT = 0°F	

ANALYSIS OF RECORD PCT + MARGIN ALLOCATIONS PCT = 2039°F

Reporting of 10CFR50.46 Margin Utilization
Large Break LOCA (Continued)

Notes:

(1) Because the LOPAR fuel has achieved sufficient burnup to become non-limiting, the VH5 PCT of 1974°F will now be used instead of the LOPAR PCT of 2134°F.

(2) A transition core penalty must be added to the Vantage 5 results until all the LOPAR fuel is removed from the core.

(3) Westinghouse reported the hot leg nozzle gap benefit to be 193°F. NNECO chooses to conservatively report this effect as a PCT benefit of 0.0°F until the NRC reviews and approves the hot leg nozzle gap methodology (WCAP-14404-P).