NORTHEAST UTILITIES
THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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February 26, 1993

Docket No. 50-423
B14379

Re: 10CFR50.46(a)

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

Gentlemen:

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), transmitted herewith are the changes to, and errors in, the Emergency Core Cooling System (ECCS) evaluation model or application of the model for Millstone Unit No. 3.

The Millstone Unit No. 3 ECCS evaluation models are based on the Westinghouse methodology which has been undergoing an evaluation of safety issues identified in the models. The resolution of these issues has required the vendor to implement changes in the ECCS methodology. The changes reported in this submittal encompass the time period from January 1992 to December 1992, and include both the small break and large break loss-of-coolant accident (LOCA) evaluation models.

The changes have resulted in revised peak clad temperatures (PCT) mostly as a result of permanent PCT margin allocations and 10CFR50.59 evaluations. These allocations have resulted in a significant change to the PCT for both the small break and large break LOCA models and, as such, are being reported within 30 days based on the criteria established in 10CFR50.46.

In neither case have the licensing limits of 10CFR50.46 been exceeded. An adequate margin in the PCT remains, and no reanalysis is required.

The attachment to this letter describes the changes to the Westinghouse ECCS evaluation models and provides an ECCS Evaluation Model Margin Assessment which accounts for the permanent assessments and the 10CFR50.59 evaluations. The assessment does not include temporary margin allocations since the issues involved are still under evaluation and need not be reported.

A021

We trust that this information satisfies the reporting requirements of 10CFR50.46.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: J. F. Opeka
Executive Vice President

BY: _____
W. D. Romberg
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
D. H. Jaffe, NRC Project Manager, Millstone Station

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Attachment 1

Millstone Nuclear Power Station, Unit No. 3

Changes to, and Errors in,
Emergency Core Cooling System Evaluation
Models or Applications

February 1993

Millstone Nuclear Power Station, Unit No. 3

LOCA Evaluation Model Changes for 1992

Structural Metal Heat Modeling

Background

A discrepancy was discovered during review of the finite element heat conduction model used in the WREFLOOD-INTERIM code to calculate heat transfer from structural metal in the vessel during the reflood phase. It was noted that the material properties available in the code corresponded to those of stainless steel. While this is correct for the internal structures, it is inappropriate for the vessel wall which consists of carbon steel with a thin stainless internal clad. This was defined as a nondiscretionary change per Section 4.1.2 of WCAP-13451, since there was thought to be potential for increased PCT with a more sophisticated composite model. The model was revised by replacing it with a more flexible one that allows detailed specification of structures.

Affected Evaluation Models

1981 ECCS Evaluation Model with BART
1981 ECCS Evaluation Model with BASH

Affected Codes

WREFLOOD-INTERIM

Estimated Effects

The estimated effect of this correction is a 25°F PCT benefit.

Millstone Nuclear Power Station, Unit No. 3

LOCA Evaluation Model Changes for 1992

Spacer Grid Heat Transfer Error in BART

Background

During investigations into anomalous wetting and dry-out behavior demonstrated by the BART grid model, a programming logic error was discovered in the grid heat transfer model. The error caused the solution to be performed twice for each time step. The error was traced back to the original coding used in all of the BART and LOCBART codes. This was defined as a nondiscretionary change per Section 4.1.2 of WCAP-13451. The error was corrected, and a complete reverification of the grid model was conducted and transmitted to the NRC (WCAP-10484, Addendum 1).

Affected Evaluation Models

1981 ECCS Evaluation Model with BART
1981 ECCS Evaluation Model with BASH

Affected Codes

BART
LOCBART

Estimated Effects

Calculations performed with the affected code have consistently demonstrated significantly better grid wetting and lower clad temperatures. A plant-specific calculation was performed to assess the effect of this issue. The results of this calculation yielded a PCT benefit of 107°F as indicated in the margin assessment.

Reporting of 10CFR50.46 Margin Utilization
Small Break LOCA

PLANT NAME: Millstone Unit No. 3

		Clad Temperature	Notes
A.	Analysis of Record (6/90)		
	Eval. Model: NOTRUMP Fuel: VANTAGE 5H FQ=2.6 FΔH=1.7 SGTP=10%	PCT = 1891°F	
B.	Prior Permanent LOCA Model Assessment	ΔPCT = 0°F	1
C.	10 CFR 50.59 Safety Evaluations		
	1. Increased Pressurizer Pressure Uncertainty	ΔPCT = 14°F	
	2. Effect of ZIRLO Fuel Cladding	ΔPCT = 24°F	3
	Total 10 CFR 50.59 Small Break Assessments	ΔPCT = 38°F	
D.	1992 10 CFR 50.46 Model Assessments (Permanent Assessment of PCT Margin) ECCS Evaluation Model Changes	ΔPCT = 27°F	2
	LICENSING BASIS PCT + MARGIN ALLOCATIONS	**PCT = 1956°F**	

Notes:

1. The prior permanent assessment for Fuel Rod Initial Condition Inconsistency no longer applies. This issue has been incorporated into the Analysis of Record.
2. Consists of changes to clad heat-up code between the time of the Analysis of Record and the time of the reanalysis (done in support of the Safety Assessment for the Millstone Unit 3 Fuel Assemblies with ZIRLO cladding), including the Basis Change for Hot Assembly Rod Gap Pressure.
3. Included for completeness. ZIRLO clad fuel will be utilized in Cycle 5.

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 Fuel: VANTAGE 5H FQ=2.6 FΔH=1.7 SGTP=10%		
B.	Prior Permanent LOCA Model Assessments	ΔPCT = 17°F	3
C.	10 CFR 50.59 Safety Evaluations		
	1. Increased Pressurizer Pressure Uncertainty	ΔPCT = 1°F	
	2. Effect of ZIRLO Fuel Cladding	ΔPCT = 6°F	5
	Total 10 CFR 50.59 Large Break Assessments	ΔPCT = 7°F	
D.	1992 10CFR 50.46 Model Assessments (Permanent Assessment of PCT Margin)		
	1. Structural Metal Heat Modeling	ΔPCT = -25°F	
	2. Spacer Grid Heat Transfer Error in BART	ΔPCT = -107°F	4
	LICENSING BASIS PCT + MARGIN ALLOCATIONS	**PCT = 1916°F**	

Notes:

1. Because the LOPAR fuel has achieved sufficient burnup to become nonlimiting, the V5H 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 LOPAR fuel is removed from the core.
3. Consists of Assessment for Fuel Rod Initial Condition Inconsistency, and Combined SSE and LOCA events.
4. The Safety Assessment for the Millstone Unit No. 3 Fuel Assemblies with ZIRLO Cladding indicates that the limiting large break case was reanalyzed for Zircaloy—4 cladding as well as ZIRLO in order to determine the direct effect on PCT of ZIRLO cladding. Because the grid error had been corrected, the new Zircaloy—4 PCT was lower than the Analysis of Record PCT. Consequently, a benefit is assessed for this model change.
5. Included for completeness. ZIRLO clad fuel will be utilized in Cycle 5.