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a joint venture of



NINE MILE POINT
NUCLEAR STATION

P.O. Box 63
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January 31, 2012

U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Document Control Desk

Subject: Nine Mile Point Nuclear Station, LLC
Unit Nos. 1 and 2; Docket Nos. 50-220 and 50-410

10 CFR 50.46 ECCS Evaluation Model Annual Reports for 2011

Pursuant to the reporting requirements of 10 CFR 50.46(a)(3)(ii), Nine Mile Point Nuclear Station, LLC (NMPNS) is submitting the Emergency Core Cooling System (ECCS) evaluation model annual reports for Nine Mile Point Unit 1 (NMP1) and Nine Mile Point Unit 2 (NMP2).

These annual reports, provided in Attachments 1 and 2, summarize the nature of and estimated effect of any changes or errors in the ECCS models for NMP1 and NMP2 for the period January 1, 2011 through December 31, 2011.

Should you have any questions regarding this submittal, please contact John J. Dosa, Licensing Director, at (315) 349-5219.

Very truly yours,

A handwritten signature in black ink, appearing to read "Paul M. Swift".

Paul M. Swift
Manager, Engineering Services

PMS/MHS

A002
MHS

Document Control Desk
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Attachments: 1. Nine Mile Point Unit 1 10 CFR 50.46 ECCS Evaluation Model Annual Report for 2011
2. Nine Mile Point Unit 2 10 CFR 50.46 ECCS Evaluation Model Annual Report for 2011

cc: NRC Regional Administrator, Region I
NRC Resident Inspector
NRC Project Manager

ATTACHMENT 1

NINE MILE POINT UNIT 1
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011

Nine Mile Point Nuclear Station, LLC
January 31, 2012

ATTACHMENT 1
NINE MILE POINT UNIT 1
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011

BACKGROUND

In accordance with 10 CFR 50.46(a)(3)(ii), this annual report summarizes the nature of and estimated effect of any changes or errors in the Emergency Core Cooling System (ECCS) model for the period January 1, 2011 through December 31, 2011 for Nine Mile Point Unit 1 (NMP1).

DISCUSSION

On May 3, 2011, Nine Mile Point Nuclear Station, LLC (NMPNS) was informed by its fuel vendor (GE Hitachi (GEH)) of a change in its ECCS evaluation model peak clad temperature (PCT) calculation that could affect NMP1. This change was required to address three individual errors and a model change identified by GEH for the previous calculation of record. On May 6, 2011, based on the information provided by GEH, NMPNS determined that correction of one of the identified errors resulted in a greater than 50 °F increase in calculated PCT. Also, the sum of the absolute magnitudes of the respective temperature changes due to the three individual errors and the model change was greater than 50 °F. Therefore, the errors and model change met the 30-day reporting requirements delineated in 10 CFR 50.46(a)(3)(ii). A report was submitted on June 6, 2011. A description of the four individual notifications regarding the ECCS evaluation model follows:

GEH Notification Letter 2011-01, Impact of CORCL Bundle Power Correction – Part-length Rods:

An option in the CORCL code distributes power in a manner considering part-length rods in the bundle. This modeling technique has been found to be non-conservative in that it slightly under predicts the total power generated in the hot bundle. As such, the PCT results in calculations using this option would be non-conservative.

This error impacted the NMP1 GE11 fuel with a PCT effect of +60 °F.

GEH Notification Letter 2011-03, Impact of Updated Formulation for Gamma Heat Deposition to Channel Wall for 9x9 and 10x10 Fuel Bundles:

In the input formulation for SAFER, input coefficients are used to direct the deposition of gamma and neutron radiation energy produced by fuel fissions and decay heat, determining whether it would heat the fuel rod, cladding, channel, or control rod structural materials. The contribution of heat from gamma ray absorption by the channel was found to have been minimized. The method had been simplified such that initially all the energy was assumed to be deposited in the fuel rods prior to the Loss of Coolant Accident (LOCA) and then adjusted such that the correct heat deposition was applied after the scram. This modeling was determined to be potentially non-conservative, as not accounting for this small fraction of total power generation outside the fuel rod would tend to suppress the hot bundle power required to meet the initial operating Planar Linear Heat Generation Rate (PLHGR) was found to have minimized the gamma heat deposition to the channel wall. Also, there is a small effect on the initial conditions for the balance of the core as these are set in relation to the hot bundle condition.

This error impacted the NMP1 GE11 fuel with a PCT effect of -25 °F.

ATTACHMENT 1
NINE MILE POINT UNIT 1
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011

GEH Notification Letter 2011-04, Impact of Droplet Flow Distribution Array Alignment to Rod Groupings Error:

Programmed enhancements to the CORCL code allowed for an increased number of rod groupings to be defined so as to more accurately represent bundle configuration in the ECCS-LOCA analysis. It was noted that an array in the model, which describes distribution of droplets and film cooling from core spray across the several groupings of rods and the channel, was not populated with corresponding additional elements. This had the effect of denying the channel and peripheral groupings of this core spray distribution, preferentially distributing liquid film and droplets with cooling effect to represented rod groupings. This condition is potentially non-conservative for calculating temperatures in those groupings where the PCT may occur.

This error impacted the NMP1 GE11 fuel with a PCT effect of -30 °F.

GEH Notification Letter 2011-05, Impact of Update in CORCL Code Version:

The CORCL code has been updated to Version CORCL07E3. The update provided added functionality of the code with respect to power distribution, increased the number of rod groups that can be modeled, included PRIME-based properties on fuel, corrected film cooling that was credited and provided other updates by way of code maintenance. The effect of these changes on Licensing Basis PCT has been seen to have minor sensitivity according to the fuel analyzed, as would be expected.

This model change impacted the NMP1 GE11 fuel with a PCT effect of +35 °F.

The combined impact of the errors and model change described above is a +40 °F increase in the calculated NMP1 fuel PCT from 2150 °F to 2190 °F (i.e., below the 10 CFR 50.46 acceptance criterion of 2200 °F).

IMPACT

The NMP1 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits were adjusted prior to the startup from the Spring 2011 refueling outage through a plant monitoring system (i.e., 3D Monicore) update. These adjustments will maintain the desired PCT margins with the errors and change applied to the accepted evaluation model. The updated MAPLHGR limits have also been included in the NMP1 Core Operating Limits Report (COLR) for the current operating cycle (Cycle 20) which commenced following the 2011 outage. As such, NMP1 was and will remain in full compliance with 10 CFR50.46 PCT requirements during Cycle 20. Note that although Global Nuclear Fuels (GNF2) fuel was installed during the refueling outage, NMP1 did not operate with GNF2 fuel prior to the MAPLGHR adjustments being made.

CONCLUSION

As documented in Table 1, the NMP1 Loss of Coolant Accident analysis PCT remains in compliance with 10 CFR 50.46(b)(1), which requires that the PCT shall not exceed 2200 °F.

**ATTACHMENT 1
NINE MILE POINT UNIT 1
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011**

Table 1

**LOCA Margin Summary Sheet
Nine Mile Point Nuclear Station, LLC
Nine Mile Point Unit 1**

Evaluation Model: General Electric SAFER / CORCL / GESTR methodology

	<u>Net PCT Effect</u>	<u>Absolute PCT Effect</u>
A. Prior 10 CFR 50.46 Changes or Error Corrections - Previous Years	$\Delta PCT = 0\text{ }^{\circ}\text{F}$	$0\text{ }^{\circ}\text{F}$
B. Prior 10 CFR 50.46 Changes or Error Corrections - This Year		
1. Notification 2011-01 (GE11)	$\Delta PCT = 60\text{ }^{\circ}\text{F}$	$60\text{ }^{\circ}\text{F}$
2. Notification 2011-03 (GE11)	$\Delta PCT = -25\text{ }^{\circ}\text{F}$	$25\text{ }^{\circ}\text{F}$
3. Notification 2011-04 (GE11)	$\Delta PCT = -30\text{ }^{\circ}\text{F}$	$30\text{ }^{\circ}\text{F}$
4. Notification 2011-05 (GE11)	$\Delta PCT = 35\text{ }^{\circ}\text{F}$	$35\text{ }^{\circ}\text{F}$
 Absolute Sum of 10 CFR 50.46 Changes	 $\Delta PCT =$	 $150\text{ }^{\circ}\text{F}$

The sum of the PCT from the most recent analysis using an acceptable evaluation model and the estimates of PCT impact for changes and errors identified since this analysis is less than 2200 °F.

ATTACHMENT 2

NINE MILE POINT UNIT 2
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011

Nine Mile Point Nuclear Station, LLC
January 31, 2012

ATTACHMENT 2
NINE MILE POINT UNIT 2
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011

BACKGROUND

In accordance with 10 CFR 50.46(a)(3)(ii), this annual report summarizes the nature of and estimated effect of any changes or errors in the Emergency Core Cooling System (ECCS) model for the period January 1, 2011 through December 31, 2011 for Nine Mile Point Unit 2 (NMP2).

DISCUSSION

On July 20, 2011, Nine Mile Point Nuclear Station, LLC (NMPNS) was informed by its fuel vendor (GE Hitachi (GEH)) of an error in its ECCS evaluation model peak clad temperature (PCT) calculation that could affect NMP2. Based on the information provided by GEH, NMPNS determined that correction of the identified errors resulted in a less than 50 °F increase in calculated PCT. Also, the sum of the absolute magnitudes of the respective temperature changes due to the two individual errors was less than 50 °F. Therefore, the errors did not meet the 30-day reporting requirements delineated in 10 CFR 50.46(a)(3)(ii). A description of the two individual notifications regarding the ECCS evaluation model follows:

GEH Notification Letter 2011-02, Impact of Database Error for Heat Deposition on the Peak Cladding Temperature (PCT) for 10x10 Fuel Bundles:

The input coefficients used to direct the deposition of gamma radiation energy produced by fuel were determined to be over predicting the heat to the fuel channel (post scram) and under predicting the heat to the fuel. This has been found to be non-conservative. As such, PCT results are considered non-conservative.

The error impacted the NMP2 GE14 fuel with a PCT effect of +30°F.

GEH Notification Letter 2011-03, Impact of Updated Formulation for Gamma Heat Deposition to Channel Wall for 9x9 and 10x10 Fuel Bundles:

Within the ECCS/Loss of Coolant Accident model, the input formulation for the SAFER code was found to have minimized the gamma heat deposition to the channel wall. As such, PCT results are considered non-conservative.

The error impacted the NMP2 GE14 fuel with a PCT effect of -5°F.

The sum of the absolute values of the effects on PCT of these errors is 35°F.

IMPACT

The current ECCS/LOCA analysis of record for NMP2 has a calculated PCT of 1480°F. The combined impact of the errors described above is a +25 °F increase in the calculated NMP2 fuel PCT from 1480 °F to 1505 °F (i.e., below the 10 CFR 50.46 acceptance criterion of 2200 °F). As such, no Maximum Average Planar Linear Heat Generation Rate adjustments were required to maintain the desired PCT margins with the errors in the accepted evaluation model.

**ATTACHMENT 2
NINE MILE POINT UNIT 2
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011**

CONCLUSION

As documented in Table 1, the NMP2 Loss of Coolant Accident analysis PCT remains in compliance with 10 CFR 50.46(b)(1), which requires that the PCT shall not exceed 2200 °F.

**ATTACHMENT 2
NINE MILE POINT UNIT 2
10 CFR 50.46 ECCS EVALUATION MODEL ANNUAL REPORT FOR 2011**

Table 1

**LOCA Margin Summary Sheet
Nine Mile Point Nuclear Station
Nine Mile Point Unit 2**

Evaluation Model: General Electric SAFER / GESTR - LOCA methodology

	<u>Net PCT Effect</u>	<u>Absolute PCT Effect</u>
A. Prior 10 CFR 50.46 Changes or Error Corrections - Previous Years	$\Delta PCT = 0\text{ }^{\circ}\text{F}$	0 °F
B. Prior 10 CFR 50.46 Changes or Error Corrections - This Year		
1. Notification 2011-02 (GE14)	$\Delta PCT = 30\text{ }^{\circ}\text{F}$	30 °F
2. Notification 2011-03 (GE14)	$\Delta PCT = -5\text{ }^{\circ}\text{F}$	5 °F
Absolute Sum of 10 CFR 50.46 Changes	$\Delta PCT =$	35 °F

The sum of the PCT from the most recent analysis using an acceptable evaluation model and the estimates of PCT impact for changes and errors identified since this analysis is less than 2200 °F.