

RS-04-170

November 5, 2004

10 CFR 50.46

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

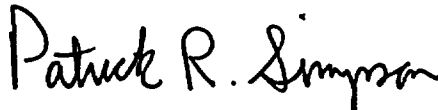
Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Annual Report of Emergency Core Cooling System Evaluation Model Changes
and Errors for Clinton Power Station

In accordance with 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," paragraph (a)(3)(ii), AmerGen Energy Company (AmerGen), LLC is submitting the annual report of the Emergency Core Cooling System (ECCS) Evaluation Model changes and errors for Clinton Power Station (CPS), Unit 1. This report covers the period from November 6, 2003 through November 5, 2004.

Should you have any questions concerning this letter, please contact Mr. Timothy A. Byam at (630) 657-2804.

Respectfully,



Patrick R. Simpson
Manager – Licensing

Attachments:

1. 10 CFR 50.46 Report
2. 10 CFR 50.46 Report Assessment Notes

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station

A001

**Attachment 1
Clinton Power Station Unit 1
10 CFR 50.46 Report
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PLANT NAME: Clinton Power Station, Unit 1
ECCS EVALUATION MODEL: SAFER/GESTR - LOCA
REPORT REVISION DATE: 11/05/04
CURRENT OPERATING CYCLE: 10

ANALYSIS OF RECORD

Evaluation Model Methodology: The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident; Volume III, SAFER/GESTR Application Methodology, NEDC-23785-1-PA, Revision 1, General Electric Company, October 1984.

Calculation: Clinton Power Station, SAFER/GESTR-LOCA Analysis Basis Documentation, NEDC-32974P, GE Nuclear Energy, October 2000.

Fuel: GE 10 and GE 14

Limiting Fuel: GE 14

Limiting Single Failure: High Pressure Core Spray (HPCS) Diesel Generator

Limiting Break Size and Location: 1.0 Double Ended Guillotine of Recirculation Pump Suction Piping

Reference Peak Cladding Temperature (PCT): 1550°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 report dated November 13, 2000 (See Note 1)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 08, 2001 (See Note 2)	$\Delta PCT = 5^{\circ}F$
10 CFR 50.46 report dated November 05, 2002 (See Note 3)	$\Delta PCT = 35^{\circ}F$
10 CFR 50.46 report dated November 05, 2003 (See Note 4)	$\Delta PCT = 5^{\circ}F$
Net PCT	1595°F

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B. CURRENT LOCA MODEL ASSESSMENTS

GE LOCA Model Change due to New Heat Source (See Note 5)	$\Delta PCT = 0^{\circ}F$
Reload and Equipment Out of Service Assessment (See Note 6)	$\Delta PCT = 0^{\circ}F$
Net PCT	1595°F

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Clinton Power Station Unit 1
10 CFR 50.46 Report Assessment Notes
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NOTES:

1. Prior LOCA Model Assessments

The referenced letter reported a new analysis of record for Clinton Power Station.

[Reference: Letter from M. A. Reandeau (AmerGen Energy Company) to U.S. NRC, "Report of a Change to the ECCS Evaluation Model Used for Clinton Power Station (CPS)," November 13, 2000.]

2. Prior LOCA Model Assessments

An inconsistent core exit steam flow was used in the pressure calculation in the SAFER code when there is a change in the two-phase level. The incorrect calculated pressure may result in premature termination of ECCS condensation and will impact the second PCT. GE evaluated the impact of this error and determined that the impact is an increase of 5°F in the PCT. This error was reported to the NRC in the referenced letter.

[Reference: Letter from K. A. Ainger (Exelon Generation Company) to U.S. NRC, "Annual Report of Emergency Core Cooling System Evaluation Model Changes and Errors for Clinton Power Station," November 8, 2001.]

3. Prior LOCA Model Assessments

In the referenced letter to the NRC, the impact of the Low Pressure Coolant Injection (LPCI) and Low Pressure Core Spray (LPCS) minimum flow valve flow diversion was reported and was found to have a 0°F impact. Also in the referenced letter GE LOCA errors were reported all of which had a 0°F PCT increase except for the SAFER Core Spray sparger injection elevation error that resulted in a 15°F increase in the PCT. The Extended Power Uprate (EPU) has resulted in an increase of 20°F in the PCT. The EPU was implemented in Cycle 9 Reload.

[Reference: Letter from Patrick R. Simpson (Exelon Generation Company) to U.S. NRC, "Annual Report of Emergency Core Cooling System Evaluation Model Changes and Errors for Clinton Power Station," November 5, 2002.]

4. Prior LOCA Assessment

In the referenced letter to the NRC, the impact of an error found in the initial level/volume table for SAFER was reported. This resulted in an incorrect volume split in the nodes above and below the water surface, and incorrect initial liquid mass. This error resulted in a 5°F increase in the PCT for all fuel types (i.e., GE 10 & GE14).

[Reference: Letter from Patrick R. Simpson (Exelon Generation Company) to U.S. NRC, "Annual Report of Emergency Core Cooling System Evaluation Model Changes and Errors for Clinton Power Station," November 5, 2003.]

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5. Current LOCA Model Assessment

GE has postulated a new heat source applicable to the LOCA event. This heat source is due to recombination of hydrogen and excess oxygen drawn into the vessel from containment during core heatup. The oxygen enters the vessel either as a dissolved gas in the ECCS water or through the break when the vessel fully depressurizes and draws the containment non-condensable gases back into the vessel. The current LOCA evaluation model does not account for the effect of this heat source, which has potential to raise the steam temperature while leading to an increase in PCT and local oxidation. GE has evaluated the effect of this additional heat source for the jet pump plants like CPS and determined that the impact is insignificant. This is because of the fact that oxygen from containment enters the vessel after the core is reflooded for the jet pump plants. Therefore, the PCT impact for all fuel types is zero and the effect on local oxidation is negligible.

[Reference: GE Letter 2003-05, "10 CFR 50.46 Notification Letter," dated May 13, 2004.]

6. Current LOCA Model Assessment

For Reload 9, 312 new GE14 fuel bundles were introduced into the CPS Unit 1 Cycle 10 Core. GE evaluated this change and determined that the impact on the licensing basis PCT is 0°F (Reference 1). Evaluation was also performed to support several equipment out-of-service options and this evaluation is documented in Reference 2. GE determined that the LOCA analyses are not impacted by these options.

[References:

(1) Supplemental Reload Licensing Report for Clinton Power Station, Unit 1, Reload 9 Cycle 10, 0000-0016-5277 SRLR, Revision 0, December 2003.

(2) Evaluation of Operation With Equipment Out-of-Service for the Clinton Power Station, GE-NE-0000-0026-1857-R1, June 2004.]