

10 CFR 50.46

RS-05-056

May 5, 2005

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Transmittal of 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," Annual Report for Quad Cities Nuclear Power Station, Units 1 and 2

Reference: Letter from Patrick R. Simpson (Exelon Generation Company, LLC) to U. S. NRC, "Transmittal of 10 CFR 50.46, 'Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors,' Annual Report for Quad Cities Nuclear Power Station, Units 1 and 2," RS-04-066, dated May 5, 2004

The purpose of this letter is to provide the annual report required by 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," for Quad Cities Nuclear Power Station, Units 1 and 2. The attachments describe the changes in accumulated Peak Cladding Temperature (PCT) since the previous annual submittal (Reference).

Should you have any questions concerning this letter, please contact Mr. Dave Gullott at (630) 657-2819.

Respectfully,



For
Patrick R. Simpson
Manager – Licensing

Attachments: Attachment A: Quad Cities Nuclear Power Station Unit 1, 10 CFR 50.46 Report
Attachment B: Quad Cities Nuclear Power Station Unit 2, 10 CFR 50.46 Report
Attachment C: Quad Cities Nuclear Power Station Units 1 and 2, 10 CFR 50.46
Report Assessment Notes

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station
Illinois Emergency Management Agency – Division of Nuclear Safety

Attachment A
Quad Cities Nuclear Power Station Unit 1
10 CFR 50.46 Report

PLANT NAME: Quad Cities Unit 1
 ECCS EVALUATION MODEL: SAFEWGESTR-LOCA
 REPORT REVISION DATE: 05/05/05
 CURRENT OPERATING CYCLE: 19

ANALYSIS OF RECORD

Evaluation Model:

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

Calculations:

"SAFEWGESTR-LOCA Loss-of-Coolant Accident Analysis for Dresden Nuclear Station 2 and 3 and Quad Cities Nuclear Station Units 1 and 2," NEDC-32990P, Revision 2, GE Nuclear Energy, September 2003.

Fuel Analyzed in Calculation: GE9/10, ATRIUM-9B and GE14
 Limiting Fuel Type: GE14
 Limiting Single Failure: Diesel Generator
 Limiting Break Size and Location: 1.0 Double-Ended Guillotine in a Recirculation Suction Pipe

Reference Peak Cladding Temperature (PCT) PCT = 2110°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 Report dated December 6, 2002 (See Note 2)	$\Delta PCT = 0^\circ F$
10 CFR 50.46 Report dated May 8, 2003 (See Note 4)	$\Delta PCT = 0^\circ F$
10 CFR 50.46 Report dated May 5, 2004 (See Note 5)	$\Delta PCT = 0^\circ F$
Net PCT	2110 °F

B. CURRENT LOCA MODEL ASSESSMENTS

GE LOCA Model Change due to New Heat Source (See Note 6)	$\Delta PCT = 0^\circ F$
GE14 Fuel Reload (See Note 7)	$\Delta PCT = 0^\circ F$
Total PCT change from current assessments	$\Sigma \Delta PCT = 0^\circ F$
Cumulative PCT change from current assessments	$\Sigma \Delta PCT = 0^\circ F$
Net PCT	2110 °F

Attachment B
Quad Cities Nuclear Power Station Unit 2
10 CFR 50.46 Report

PLANT NAME: Quad Cities Unit 2
 ECCS EVALUATION MODEL: SAFEWGESTR-LOCA
 REPORT REVISION DATE: 05/05/05
 CURRENT OPERATING CYCLE: 18

ANALYSIS OF RECORD

Evaluation Model:

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

Calculations:

"SAFEWGESTR-LOCA Loss-of-Coolant Accident Analysis for Dresden Nuclear Station 2 and 3 and Quad Cities Nuclear Station Units 1 and 2," NEDC-32990P, Revision 2, GE Nuclear Energy, September 2003.

Fuel Analyzed in Calculation: GE9/10, ATRIUM-96 and GE14

Limiting Fuel Type: GE14

Limiting Single Failure: Diesel Generator

Limiting Break Size and Location: 1.0 Double-Ended Guillotine in a Recirculation Suction Pipe

Reference Peak Cladding Temperature (PCT) PCT = 2110°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 Report dated May 9, 2002 (See Note 3)	APCT = 0°F
10 CFR 50.46 Report dated May 8, 2003 (See Note 4)	APCT = 0°F
10 CFR 50.46 Report dated May 5, 2004 (See Note 5)	APCT = 0°F
Net PCT	2110°F

B. CURRENT LOCA MODEL ASSESSMENTS

GE LOCA Model Change due to New Heat Source (See Note 6)	APCT = 0°F
Total PCT change from current assessments	$\sum \Delta PCT = 0^\circ F$
Cumulative PCT change from current assessments	$\sum \Delta PCT = 0^\circ F$
Net PCT	2110°F

Attachment C
Quad Cities Nuclear Power Station Units 1 and 2
10 CFR 50.46 Report Assessment Notes

1. Prior LOCA Model Assessment

The 50.46 letter dated March 28, 2002 reported a new LOCA analysis to support extended power uprate (EPU) and transition to GE14 fuel for Quad Cities Unit 2.

[Reference: Letter from Timothy J. Tulon (Exelon) to US. NRC, "10 CFR 50.46, 30-Day Report for Quad Cities Unit 2," SVP-02-025, dated March 28, 2002.1

2. Prior LOCA Assessment

A new LOCA analysis was performed to support EPU and transition to GE14 fuel for Quad Cities Unit 1. In the referenced letter, the impact of CS and LPCI leakage, GE LOCA error in the WEVOL code and change in DG start time requirement were reported. There is no assessment penalty.

[Reference: Letter from Timothy J. Tulon (Exelon) to US. NRC, "10 CFR 50.46, 30-Day Report for Quad Cities Nuclear Power Station, Unit 1," SVP-02-104, dated December 6, 2002.]

3. Prior LOCA Assessment

In the referenced letter, no LOCA model assessment was reported for Unit 2 PCT.

[Reference: Letter from Timothy J. Tulon (Exelon) to U.S. NRC, "Transmittal of 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light water nuclear power reactors," Annual Report for Quad Cities Units 1 and 2," SVP-02-039, dated May 9, 2002.]

4. Prior LOCA Assessment

The referenced letter provided the annual 50.46 report for Units 1 and 2. This letter reported no LOCA model assessment for Unit 1 whereas it reported the impact of GE LOCA error in the WEVOL code and change in DG start time requirement for Unit 2. The PCT impact for these errors was determined to be 0°F.

[Reference: Letter from Timothy J. Tulon (Exelon) to U.S. NRC, "Transmittal of 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light water nuclear power reactors," Annual Report for Quad Cities Nuclear Power Station, Units 1 and 2," SVP-03-063, dated May 8, 2003.1

5. Prior LOCA Assessment

The referenced letter provided the annual 50.46 report for Units 1 and 2. This letter reported GE LOCA errors related to SAFER level/volume table and Steam

Attachment C
Quad Cities Nuclear Power Station Units 1 and 2
10 CFR 50.46 Report Assessment Notes

Separator pressure drop and mid-cycle reload of GE14 fuel for Unit 1 (Cycle 18A). For Unit 2, this letter reported the same GE LOCA errors and second reload of GE14 fuel in Cycle 18 core. The PCT impact for these errors and reloads of GE14 fuel was determined to be 0°F.

[Reference: Letter from Patrick R. Simpson (Exelon) to U.S. NRC, "Transmittal of 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," Annual Report for Quad Cities Nuclear Power Station, Units 1 and 2," RS-04-066, dated May 5, 2004.1

6. Current LOCA 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 Quad Cities 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: General Electric 10 CFR 50.46 Notification Letter 2003-05, May 13, 2004.1

7. Current LOCA Assessment

Quad Cities Unit 1 Cycle 19 is to start up in April 2005 with a new reload of GE14 fuel. The impact of this reload was evaluated by GE and reported to be negligible. GE determined that there is no PCT impact because of the change due to the new reload of GE14 fuel.

[Reference: Supplemental Reload Licensing Report for Quad Cities 1 Reload 18 Cycle 19, 0000-0028-1626-SRLR, Revision 0, January 2005.1