

10 CFR 50.46

RS-06-064

May 5, 2006

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

Quad 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: 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," Annual Report


- References: 1. 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," dated May 5, 2005
2. Letter from U. S. NRC to Christopher M. Crane (Exelon Generation Company, LLC), "Dresden Nuclear Power Station, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2 – Issuance of Amendments Re: Transition to Westinghouse Fuel and Minimum Critical Power Ratio Safety Limits," dated April 4, 2006

This letter provides 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 (QCNPS), Units 1 and 2. The attachments describe the changes in accumulated Peak Cladding Temperature (PCT) since the previous annual submittal (Reference 1).

QCNPS Unit 2 has been reanalyzed using the Westinghouse evaluation model methodology. This reanalysis was performed to support operation using Westinghouse SVEA-96 Optima2 fuel in Unit 2 during cycle 19. The NRC approved the Westinghouse model methodology in Reference 2.

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

Respectfully,



Patrick R. Simpson
Manager – Licensing

May 5, 2006
U. S. Nuclear Regulatory Commission
Page 2

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
(GE Fuel)
Attachment C: Quad Cities Nuclear Power Station Unit 2, 10 CFR 50.46 Report
(Westinghouse Fuel)
Attachment D: 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

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

PLANT NAME: Quad Cities Unit 1
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA
REPORT REVISION DATE: 05/05/06
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, SAFER/GESTR Application Methodology, NEDE-23785-1-PA, General Electric Company, Revision 1, October 1984.

Calculations:

"SAFER/GESTR-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)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 Report dated May 5, 2005 (See Note 6)	$\Delta PCT = 0^{\circ}F$
Net PCT	2110 °F

B. CURRENT LOCA MODEL ASSESSMENTS

Installation of new steam dryer (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 (GE Fuel)

PLANT NAME: Quad Cities Unit 2
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA
REPORT REVISION DATE: 05/05/06
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, SAFER/GESTR Application Methodology, NEDE-23785-1-PA, General Electric Company, Revision 1, October 1984.

Calculations:

"SAFER/GESTR-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 March 28, 2002 (See Note 1)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 Report dated May 9, 2002 (See Note 3)	$\Delta PCT = 0^{\circ}F$
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)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 Report dated May 5, 2005 (See Note 6)	$\Delta PCT = 0^{\circ}F$
Net PCT	2110°F

B. CURRENT LOCA MODEL ASSESSMENTS

Installation of new steam dryer (See Note 7)	$\Delta PCT = 0^{\circ}F$
Acoustical Side Branch (See Note 8)	$\Delta PCT = 0^{\circ}F$
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 C
Quad Cities Nuclear Power Station Unit 2
10 CFR 50.46 Report (Westinghouse Fuel)

PLANT NAME: Quad Cities Unit 2
ECCS EVALUATION MODEL: USA5
REPORT REVISION DATE: 05/05/06
CURRENT OPERATING CYCLE: 19

ANALYSIS OF RECORD

Evaluation Model:

"Westinghouse BWR ECCS Evaluation Model: Supplement 3 to Code Description, Qualification and Application to SVEA-96 Optima2 Fuel," WCAP-16078-P-A, November 2004.

Calculations:

"Task Report for TSD DQW04-21 Final LOCA Analysis for Quad Cities 1 & 2 and Dresden 2 & 3," NF-BEX-06-44-P, Westinghouse Electric Company, LLC. April 2006.

Fuel Analyzed in Calculation: SVEA-96 Optima2
Limiting Fuel Type: SVEA-96 Optima2
Limiting Single Failure: LPCI injection valve
Limiting Break Size and Location: 1.0 double-ended guillotine break in the recirculation pump suction line

Reference Peak Cladding Temperature (PCT) PCT = 2150°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

None – new analysis for Optima2 fuel transition	$\Delta PCT = 0^{\circ}F$
Net PCT	2150°F

B. CURRENT LOCA MODEL ASSESSMENTS

New analysis for Optima2 fuel transition (See Note 9)	$\Sigma \Delta PCT = 0^{\circ}F$
Acoustical Side Branch (See Note 8)	$\Delta PCT = 0^{\circ}F$
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	2150°F

Attachment D
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. Tulong (Exelon) to U.S. NRC, "10 CFR 50.46, 30-Day Report for Quad Cities Unit 2," SVP-02-025, dated March 28, 2002.]

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. Tulong (Exelon) to U.S. 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. Tulong (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. Tulong (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.]

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 Separator pressure drop and mid-cycle reload of GE14 fuel for Unit 1 (Cycle

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

18A). For Unit 2, this letter reported the same GE LOCA errors and second reload of GE14 fuel in the 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.]

6. Prior LOCA Assessment

The referenced letter provided the annual 50.46 report for Units 1 and 2. This letter reported a GE LOCA error due to a new heat source of Units 1 and 2, and Quad Cities Unit 1 Cycle 19 with a new reload of GE14 fuel.

[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-05-056, dated May 5, 2005.]

7. Current LOCA Assessment

Quad Cities Units 1 and 2 installed a new steam dryer during mid-cycle outages for Q1C19 and Q2C18, respectively. GE performed an evaluation of the new dryer for impact on the LOCA analysis. The GE evaluation concluded that the current LOCA analysis remained bounding, thus PCT impact is zero.

[Reference: "Safety Evaluation in Support of the New Steam Dryer for Quad Cities Units 1 and 2," NEDC-33187P, May 2005.]

8. Current LOCA Assessment

Quad Cities Unit 2 installed a modification to the inlet configuration of the 6" inlet standpipe of eight main steam safety valves and four Electromatic relief valves. The modification replaces the current inlet pipe and flange with a 6" Tee, flange and an Acoustic Side Branch (ASB). The ASB consists of a 6" pipe filled with metal screen material. GE performed an evaluation of the effects of this modification; the results show that the licensing basis PCT is unaffected, thus the PCT impact is zero. Westinghouse also performed an evaluation on the effects of this modification; the results show that the licensing basis PCT is unaffected, thus the PCT impact is zero.

[Reference: "Quad Cities Acoustical Side Branch Modification Evaluation of Current GE Tasks," GE-NE-0000-0050-6728-01, March 2006.]

[Reference: "Evaluation of the ASB Modification to the Steamlines for Quad Cities Unit 2 Cycle 19," USBWR-06-12 Rev 1, April 2006.]

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

9. New LOCA Analysis for Quad Cities Nuclear Power Station Unit 2

Unit 2 implemented Westinghouse LOCA analysis with the transition to Optima2 fuel with Quad Cities Nuclear Power Station Unit 2 Cycle 19 startup in April 2006. Therefore, there is no prior or current assessment penalty for this LOCA analysis. With the introduction of Optima2 fuel, the limiting PCT for Optima2 as analyzed under Westinghouse LOCA is 2150°F whereas the limiting PCT for GE14 as analyzed under GE LOCA is 2110 °F.

[Reference: "Task Report for TSD DQW04-21 Final LOCA Analysis for Quad Cities 1 & 2 and Dresden 2 & 3," NF-BEX-06-44-P, Westinghouse Electric Company, LLC. April 2006.]