

RS-11-171

10 CFR 50.46(a)(3)(ii)

October 28, 2011

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

Subject: Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report

In accordance with 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," paragraph (a)(3)(ii), Exelon Generation Company, LLC (EGC) is submitting this letter and its attachments to meet the annual reporting requirements of the Emergency Core Cooling System (ECCS) Evaluation Model changes and errors for Dresden Nuclear Power Station (DNPS), Units 2 and 3.

EGC received notification from Westinghouse which identified that incorrect R-factors have been used in the DNPS, Units 2 and 3 LOCA reload analyses. The impact due to this error was determined to be 18°F in the worst case and is applied conservatively to all of the Westinghouse fuel. The error resulted in an increase to the existing licensing peak cladding temperature (PCT) of 2164°F for DNPS, Units 2 and 3. The updated DNPS, Units 2 and 3 licensing basis PCT is 2182°F as shown in Attachments 2 and 3 for Westinghouse fuel. This value is within the 2200°F acceptance criterion of 10 CFR 50.46.

The attachments to this letter provide updated information regarding the PCT value for Westinghouse fuel in DNPS, Units 2 and 3. Note 12 of Attachment 4 provides details related to the error discussed above.

There are no regulatory commitments contained in this letter. If there are any questions concerning this letter, please contact Mr. Joseph A Bauer at (630) 657-2804.

Respectfully,

A handwritten signature in black ink, appearing to read 'D M Gullott', followed by a long horizontal line extending to the right.

David M. Gullott
Manager – Licensing and Regulatory Affairs

Attachments:

1. Dresden Nuclear Power Station Unit 2 – 10 CFR 50.46 Report (GE Fuel)
2. Dresden Nuclear Power Station Unit 2 – 10 CFR 50.46 Report (Westinghouse Fuel)
3. Dresden Nuclear Power Station Unit 3 – 10 CFR 50.46 Report (Westinghouse Fuel)
4. Dresden Nuclear Power Station Units 2 and 3 – 10 CFR 50.46 Report Assessment Notes

**Attachment 1
Dresden Nuclear Power Station Unit 2
10 CFR 50.46 Report (GE Fuel)**

PLANT NAME:	Dresden Nuclear Power Station, Unit 2
ECCS EVALUATION MODEL:	SAFER/GESTR-LOCA
REPORT REVISION DATE:	10/28/2011
CURRENT OPERATING CYCLE:	22

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.
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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.
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Fuel:	9x9-2, ATRIUM-9B and GE14
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Limiting Fuel Type:	GE14
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Limiting Single Failure:	Diesel Generator
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Limiting Break Size and Location:	1.0 Double-Ended Guillotine in a Recirculation Suction Pipe
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Reference Peak Cladding Temperature (PCT)	2110°F
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**Attachment 1
Dresden Nuclear Power Station Unit 2
10 CFR 50.46 Report (GE Fuel)**

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 report dated December 6, 2001 (See Note 1)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated November 25, 2002 (See Note 2)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated November 25, 2003 (See Note 3)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated November 24, 2004 (See Note 4)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated November 16, 2005 (See Note 5)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated November 9, 2006 (See Note 6)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated October 31, 2007 (See Note 7)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated October 31, 2008 (See Note 8)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated October 30, 2009 (See Note 9)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated October 29, 2010 (See Note 10)	$\Delta\text{PCT} = 0^\circ\text{F}$
10 CFR 50.46 report dated July 28, 2011 (See Note 11)	$\Delta\text{PCT} = 85^\circ\text{F}$
Net PCT	2195°F

B. CURRENT LOCA MODEL ASSESSMENTS

None	$\Delta\text{PCT} = 0^\circ\text{F}$
Total PCT change from current assessments	$\sum\Delta\text{PCT} = 0^\circ\text{F}$
Cumulative PCT change from current assessments	$\sum \Delta\text{PCT} = 0^\circ\text{F}$
Net PCT	2195°F

**Attachment 2
Dresden Nuclear Power Station Unit 2
10 CFR 50.46 Report (Westinghouse Fuel)**

PLANT NAME: Dresden Nuclear Power Station, Unit 2
ECCS EVALUATION MODEL: USA5
REPORT REVISION DATE: 10/28/2011
CURRENT OPERATING CYCLE: 22

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: "Dresden 2 & 3 LOCA Analysis for SVEA-96 Optima2 Fuel," OPTIMA2-TR021DR-LOCA, Revision 5, Westinghouse Electric Company LLC, October 2009.

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) 2150°F**

**Attachment 2
Dresden Nuclear Power Station Unit 2
10 CFR 50.46 Report (Westinghouse Fuel)**

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 report dated October 30, 2009 (See Note 9)	$\Delta\text{PCT} = 2^\circ\text{F}$
10 CFR 50.46 report dated October 29, 2010 (See Note 10)	$\Delta\text{PCT} = 12^\circ\text{F}$
Net PCT	2164°F

B. CURRENT LOCA MODEL ASSESSMENTS

R-factor error (see Note 12)	$\Delta\text{PCT} = 18^\circ\text{F}$
Total PCT change from current assessments	$\Sigma\Delta\text{PCT} = 18^\circ\text{F}$
Cumulative PCT change from current assessments	$\Sigma \Delta\text{PCT} = 18^\circ\text{F}$
Net PCT	2182°F

**Attachment 3
Dresden Nuclear Power Station Unit 3
10 CFR 50.46 Report (Westinghouse Fuel)**

PLANT NAME: Dresden Nuclear Power Station, Unit 3
ECCS EVALUATION MODEL: USA5
REPORT REVISION DATE: 10/28/2011
CURRENT OPERATING CYCLE: 22

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: "Dresden 2 & 3 LOCA Analysis for SVEA-96 Optima2 Fuel," OPTIMA2-TR021DR-LOCA, Revision 5, Westinghouse Electric Company LLC, October 2009.

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)** 2150°F

**Attachment 3
Dresden Nuclear Power Station Unit 3
10 CFR 50.46 Report (Westinghouse Fuel)**

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 report dated October 30, 2009 (See Note 9)	$\Delta\text{PCT} = 2^\circ\text{F}$
10 CFR 50.46 report dated October 29, 2010 (See Note 10)	$\Delta\text{PCT} = 12^\circ\text{F}$
Net PCT	2164°F

B. CURRENT LOCA MODEL ASSESSMENTS

R-factor error (see Note 12)	$\Delta\text{PCT} = 18^\circ\text{F}$
Total PCT change from current assessments	$\Sigma\Delta\text{PCT} = 18^\circ\text{F}$
Cumulative PCT change from current assessments	$\Sigma \Delta\text{PCT} = 18^\circ\text{F}$
Net PCT	2182°F

Attachment 4
Dresden Nuclear Power Station Units 2 and 3
10 CFR 50.46 Report Assessment Notes

1. Prior LOCA Model Assessment

The 10 CFR 50.46 letter dated December 6, 2001, reported a new LOCA analysis to support extended power uprate (EPU) and transition to GE14 fuel for Dresden Unit 2 Cycle 18. The same report assessed impact of errors in Framatome ANP LOCA analysis model for Dresden Unit 3 Cycle 17 at pre-EPU power level.

[Reference: Letter from Preston Swafford (PSLTR: #01-0122) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," December 6, 2001.]

2. Prior LOCA Model Assessment

Unit 3 implemented GE LOCA analysis and GE14 fuel with Dresden Unit 3 Cycle 18 startup on October 25, 2002. Therefore, both Dresden Units 2 and 3 are being maintained under the same LOCA analysis. In the referenced letter, the impact of GE LOCA error in the WEVOL code was reported for Dresden Units 2 and 3 and determined to be negligible.

[Reference: Letter from Robert J. Hovey (RHLTR: #02-0083) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," November 25, 2002.]

3. Prior LOCA Model Assessment

The annual 10 CFR 50.46 report provided information on the LOCA model assessments for SAFER Level/Volume table error and Steam Separator pressure drop error. In the referenced letter, the impact of these two GE LOCA errors was reported to be negligible.

[Reference: Letter from Robert J. Hovey (RHLTR: #03-0077) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," November 25, 2003.]

4. Prior LOCA Model Assessment

The referenced annual 10 CFR 50.46 report provided information on reload of GE14 fuel for Dresden Unit 2 Cycle 19 and impact of postulated hydrogen-oxygen recombination on PCT. GE determined that there is no PCT impacts due to the new reload of GE14 fuel or from the effect of the postulated hydrogen –oxygen recombination.

[Reference: Letter from Danny Bost (SVPLTR: #04-0075) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," November 24, 2004.]

Attachment 4
Dresden Nuclear Power Station Units 2 and 3
10 CFR 50.46 Report Assessment Notes

5. Prior LOCA Model Assessment

The referenced letter provided the annual 10 CFR 50.46 report for Units 2 and 3. The letter reported the PCT impact of reload of GE14 fuel for D3C19 starting on December 8, 2004. Also, the letter reported the GE LOCA evaluation for Unit 3, which implemented the lower sectional replacement and T-box clamp repairs. GE determined that there is no PCT impacts because of the change due to the new reload of GE14 fuel and the lower sectional replacement and T-box clamp repairs.

[Reference: Letter from Danny Bost (SVPLTR: #05-0044) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," November 16, 2005.]

6. Prior LOCA Model Assessment

The referenced letter provided the annual 10 CFR 50.46 report for Units 2 and 3. The letter reported the PCT impact of the reload of GE14 fuel for D2C20. The letter also reported an evaluation of increased leakage of less than 5 gpm at runout condition in core spray line flow due to crack growth identified during D2R19 outage. Additionally, a GE evaluation of the small break for impact due to top-peak axial power shape was reported in this letter. The impact due to these changes on the licensing basis PCT was reported as zero.

[Reference: Letter from Danny Bost (SVPLTR: #06-0054) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," November 9, 2006.]

7. Prior LOCA Model Assessment

The referenced letter provided the annual 10 CFR 50.46 report for Units 2 and 3. The letter reported D3C20 startup with the first reload of Westinghouse Optima2 fuel and implementation of the Westinghouse LOCA analysis. No error was reported for GE LOCA applicable to operation of GE14 fuel in the Unit 2 core and Unit 3 core.

[Reference: Letter from Danny Bost (SVPLTR: #07-0049) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," October 31, 2007.]

8. Prior LOCA Model Assessment

The referenced letter provided the annual 10 CFR 50.46 report for Units 2 and 3. No error was reported for GE LOCA applicable to operation of GE14 fuel in the Unit 2 core and Unit 3 core.

[Reference: Letter from David Wozniak (SVPLTR: #08-0059) (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," October 31, 2008.]

Attachment 4
Dresden Nuclear Power Station Units 2 and 3
10 CFR 50.46 Report Assessment Notes

9. Prior LOCA Model Assessment

The referenced letter provided the annual 10 CFR 50.46 report for Units 2 and 3. The letter updated the vessel leakage between the lower shroud and the downcomer. Westinghouse evaluated this change and demonstrated that all 10 CFR 50.46 criteria were satisfied. This evaluation resulted in maximum PCT impact due to the change in vessel leakage of 2°F for Optima2 fuel with the licensing basis PCT of 2152°F. The vessel leakage identified by GE to have an insignificant impact on the PCT transient portion of the LOCA event. Therefore, a PCT impact of 0°F is reported for GE14 fuel with the licensing basis PCT remaining at 2110°F. Note: The new analysis is documented in Revision 5 of the Dresden LOCA Report and contains the same information as stated above and transmitted to the NRC in the Reference.

[Reference: Letter from Timothy Hanley (SVPLTR: #09-0052 (Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," October 30, 2009.]

10. Prior LOCA Model Assessment

The referenced letter provided the annual 10 CFR 50.46 report for Units 2 and 3. The letter reported the replacement of core spray lower sectional piping in Dresden Unit 2 during D2R21. Both GEH and Westinghouse evaluated the core spray leakage due to this modification and concluded that the PCT impact was 0°F. The letter also identified a change in input for modeling bypass hole flow coefficient in the Westinghouse LOCA analysis. The impact on PCT due to this change was determined by Westinghouse to be 12°F. For D2C22 and D3C22, Westinghouse established a MAPLHGR limit for the fresh bundles to accommodate the change. For 10 CFR 50.46 reporting purposes, the PCT impact is conservatively applied to all bundle types including the fresh bundles. This PCT update will remain in effect only until the MAPLHGR limits for all bundles in future Dresden Unit 2 and Unit 3 cores are evaluated for the change in bypass hole flow coefficient. The latter issue pertains only to Westinghouse SVEA-96 Optima2 fuel.

[Reference: Letter from Jeffrey Hansen (RS-10-191, Exelon) to USNRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," October 29, 2010.]

Attachment 4
Dresden Nuclear Power Station Units 2 and 3
10 CFR 50.46 Report Assessment Notes

11. Prior LOCA Model Assessment

The referenced letter provided the 30-day 10 CFR 50.46 report for Dresden Unit 2 for fuel type GE14. The 30-day 10 CFR 50.46 report was submitted for Dresden unit 2 due to errors reported by GEH in the LOCA methodology associated with the GE14 fuel in Dresden Unit 2. Dresden Unit 3 is not affected because it does not have GNF fuel loaded in the core. GEH identified two errors. One error involves the way input coefficients are used to direct the deposition of gamma radiation energy produced by the fuel. Correcting this error results in a PCT increase of 75°F. The other error involves the contribution of heat from gamma ray absorption by the channel. The gamma ray absorption by the channel was found to have been minimized. Correcting this error results in a PCT increase of 10°F. The total impact of both errors is conservatively taken to be 85°F. The Dresden Unit 2 core has one batch of GNF fuel remaining in the core and is not the limiting fuel type. This fuel is scheduled to be discharged in the autumn of 2011 refueling outage (D2R22). These errors apply only to the GE14 fuel in the Dresden Unit 2 core. The LOCA analysis for the Westinghouse fuel in the Dresden Unit 2 core is not affected by the errors discussed in this note.

[Reference: Letter from Jeffrey Hansen (RS-11-124, Exelon) to the USNRC, "Plant Specific ECCS Evaluation Changes - 10 CFR 50.46 30-Day Report for Fuel Type GE14," July 28, 2011.]

12. Current LOCA Model Assessment

Westinghouse reported errors in the current Dresden LOCA analysis associated with the use of incorrect R-factors [Reference]. The impact due to this change was determined to be 18°F in PCT update. For 10 CFR 50.46 reporting purposes, the PCT update is conservatively applied to all bundle types including the fresh bundles. This PCT update will remain in effect only until the MAPLHGR limits for all bundles in future Dresden Unit 2 and Unit 3 cores are evaluated with the correct R-factors.

[Reference: Westinghouse letter LTR-LAM-11-63, Revision 0, "Dresden Units 2 & 3 and Quad Cities Units 1 & 2, 10 CFR 50.46 Notification and Report for R-Factor Error Evaluation," September 14, 2011.]