

Exelon Generation Company, LLC  
Dresden Nuclear Power Station  
6500 North Dresden Road  
Morris, IL 60450-9765

www.exeloncorp.com

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

October 31, 2007

SVPLTR: #07-0049

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

Dresden 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

Reference: Letter from D. Bost (Exelon Generation Company, LLC) to U. S. NRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," dated November 9, 2006

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, is submitting this letter and its attachment to meet the annual reporting requirements.

Dresden Nuclear Power Station (DNPS) has maintained the same emergency core cooling (ECCS) model as reported in the referenced letter for Unit 2 and GE14 fuel in Unit 3. For Unit 3, the Westinghouse Loss of Coolant Accident (LOCA) model has been implemented to support the transition to Optima2 fuel. No vendor 10 CFR 50.46 LOCA model change/error notifications were received since the last annual report. The attachment provides the PCT value for each unit and the "rack-up" sheets for the LOCA analyses, along with assessment note summaries.

If there are any questions concerning this letter, please contact Mr. James Ellis at (815) 416-2800.

Respectfully,



Danny Bost  
Site Vice President  
Dresden Nuclear Power Station

Attachment: Dresden Nuclear Power Station Units 2 and 3 - 10 CFR 50.46 Report

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

A002

NRR

**DRESDEN NUCLEAR POWER STATION**

**UNITS 2 AND 3**

**10 CFR 50.46 REPORT**

# Dresden Nuclear Power Station Units 2 and 3 10 CFR 50.46 Report

## Unit 2

PLANT NAME:	Dresden Nuclear Power Station, Unit 2
ECCS EVALUATION MODEL:	SAFER/GESTR-LOCA
REPORT REVISION DATE:	09/26/2007
CURRENT OPERATING CYCLE:	20

### 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: 9x9-2, 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, 2001 (See Note 1)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 25, 2002 (See Note 2)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 25, 2003 (See Note 3)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 24, 2004 (See Note 4)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 16, 2005 (See Note 5)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 9, 2006 (See Note 6)	$\Delta PCT = 0^{\circ}F$
<b>Net PCT</b>	<b>2110 °F</b>

#### B. CURRENT LOCA MODEL ASSESSMENTS

None	$\Delta PCT = 0^{\circ}F$
Total PCT change from current assessments	$\Sigma \Delta PCT = 0^{\circ}F$
Cumulative PCT change from current assessments	$\Sigma  \Delta PCT  = 0^{\circ}F$
<b>Net PCT</b>	<b>2110 °F</b>

# Dresden Nuclear Power Station Units 2 and 3 10 CFR 50.46 Report

## Unit 3 GE Fuel

PLANT NAME: Dresden Nuclear Power Station, Unit 3  
 ECCS EVALUATION MODEL: SAFER/GESTR-LOCA  
 REPORT REVISION DATE: 09/26/2007  
 CURRENT OPERATING CYCLE: 20

### 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: 9x9-2, 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 November 25, 2002 (See Note 2)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 25, 2003 (See Note 3)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 24, 2004 (See Note 4)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 16, 2005 (See Note 5)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated November 9, 2006 (See Note 6)	$\Delta PCT = 0^{\circ}F$
<b>Net PCT</b>	<b>2110 °F</b>

#### B. CURRENT LOCA MODEL ASSESSMENTS

None	$\Delta PCT = 0^{\circ}F$
Total PCT change from current assessments	$\Sigma \Delta PCT = 0^{\circ}F$
Cumulative PCT change from current assessments	$\Sigma  \Delta PCT  = 0^{\circ}F$
<b>Net PCT</b>	<b>2110 °F</b>

# Dresden Nuclear Power Station Units 2 and 3 10 CFR 50.46 Report

## Unit 3 Westinghouse Fuel

PLANT NAME: Dresden Nuclear Power Station, Unit 3  
ECCS EVALUATION MODEL: USA5  
REPORT REVISION DATE: 09/26/2007  
CURRENT OPERATING CYCLE: 20

### 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 2, Westinghouse Electric Company LLC, June 2007.

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 LOCA analysis	$\Delta PCT = 0^{\circ}F$
PCT	2150°F

#### B. CURRENT LOCA MODEL ASSESSMENTS

None – new analysis (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	$\Sigma  \Delta PCT  = 0^{\circ}F$
PCT	2150°F

# **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 were 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 impact because of the change due to the new reload of GE14 fuel and 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.]

# **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 impact 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. Current LOCA Model Assessment**

With Dresden Power Station Unit 3 Cycle 20 startup in November 2006, Unit 3 implemented a Westinghouse LOCA analysis supporting the transition to Optima2 fuel. A common LOCA analysis was first performed to apply to four units of Dresden and Quad Cities plants. Subsequently, Westinghouse performed a new plant-specific LOCA Analysis for Dresden Nuclear Power Station. This new analysis applies to operation of the Westinghouse Optima2 fuel in the Dresden reactor. This analysis applies specific inputs and assumptions in the LOCA calculation approved in the licensed Westinghouse methodology. Included are:

- a. Containment back pressure – the amount of containment overpressure credited in accordance with acceptance letter issued by the NRC,
- b. Proportional ECCS leakage,
- c. ECCS temperature reduction,
- d. Plant-specific ECCS parameters including the ECCS flow and leakages specific to Dresden,
- e. Emergency Diesel Generator load sequencing time delays specific to Dresden,
- f. Two channel model,
- g. Improved definition of end of lower plenum flashing used to terminate non-zero heat transfer coefficient.

## **Dresden Nuclear Power Station Units 2 and 3 10 CFR 50.46 Report**

### **Assessment Notes**

The above changes as implemented in the Dresden specific LOCA analysis are in compliance with the Westinghouse LOCA methodology. These changes result in the same PCT at less restrictive MAPLHGR limits compared to the original common LOCA analysis. There is no prior or current assessment penalty for the Dresden specific LOCA analysis. With the introduction of Optima2 fuel, the limiting PCT for Optima2 as analyzed under the Westinghouse LOCA method is 2150 °F whereas the limiting PCT for GE14 as analyzed under GE LOCA method is 2110 °F.

#### **[References:**

- (1) "Dresden 2 & 3 and Quad Cities 1 & 2 LOCA Analysis for SVEA-96 Optima2 Fuel," OPTIMA2-TR021DR-LOCA, Revision 1, September 2006.
- (2) "Dresden 2 & 3 LOCA Analysis for SVEA-96 Optima2 Fuel," OPTIMA2-TR021DR-LOCA, Revision 2, Westinghouse Electric Company LLC, June 2007.]