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10CFR50.46

December 1, 2005

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

Peach Bottom Atomic Power Station, Units 2 and 3  
Facility Operating License Nos. DPR-44 and DPR-56  
NRC Docket Nos. 50-277 and 50-278

Subject: 10 CFR 50.46 Annual Report

References: Letter from Michael P. Gallagher (Exelon Generation Company, LLC) to U. S.  
Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report," dated  
December 3, 2004

The purpose of this letter is to submit the 10 CFR 50.46 reporting information for Peach Bottom Atomic Power Station, Units 2 and 3. The most recent annual 50.46 report for Peach Bottom Atomic Power Station (Reference 1) provided the cumulative PCT errors for the most recent fuel designs through November 4, 2004.

In summary, the previously reported peak clad temperatures have not changed. No vendor 50.46 change/error notifications have been received since the last annual report.

Two attachments are included with this letter that provide the current Peach Bottom Atomic Power Station, Units 2 and 3, 10 CFR 50.46 status. Attachments 1 and 2 ("Peak Cladding Temperature Rack-Up Sheet") provide updated information regarding the PCT for the limiting Large Break Loss of Coolant Accident (LOCA) analysis evaluations for Peach Bottom Atomic Power Station, Units 2 and 3, respectively. Attachment 3, "Assessment Notes," contains a detailed description for each change or error reported.

If you have any questions, please contact Tom Loomis at 610-765-5510.

Respectfully,



Pamela B. Cowan  
Director, Licensing & Regulatory Affairs  
Exelon Generation Company, LLC

Attachments: 1) Peak Cladding Temperature Rack-Up Sheet (Peach Bottom Atomic Power Station, Unit 2)  
2) Peak Cladding Temperature Rack-Up Sheet (Peach Bottom Atomic Power Station, Unit 3)  
3) Assessment Notes (Peach Bottom Atomic Power Station, Units 2 and 3)

cc: S. J. Collins, USNRC Administrator, Region I  
G. Wunder, USNRC Project Manager, PBAPS  
F. L. Bower, USNRC Senior Resident Inspector, PBAPS

**ATTACHMENT 1**

**10 CFR 50.46**

**“Acceptance Criteria For Emergency Core Cooling Systems  
For Light-Water Nuclear Power Reactors”**

**Report of the Emergency Core Cooling System  
Evaluation Model Changes and Errors**

**Assessments as of November 30, 2005**

**Peak Cladding Temperature Rack-Up Sheet  
Peach Bottom Atomic Power Station, Unit 2**

PLANT NAME: Peach Bottom Atomic Power Station, Unit 2  
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA  
REPORT REVISION DATE: 11/30/05  
CURRENT OPERATING CYCLE: 16

## ANALYSIS OF RECORD

### Evaluation Model:

1. NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident Volume II, SAFER – Long Term Inventory Model for BWR Loss-Of-Coolant Analysis," October 1984.
2. NEDC-30996P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-jet Pump Plants, Volume I, SAFER – Long Term Inventory Model for BWR Loss-of-Coolant Analysis," October 1987.
3. NEDC-32950P, "Compilation of Improvements to GENE's SAFER ECCS-LOCA Evaluation Model," January 2000.
4. NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident Volume III, SAFER/GESTR Application Methodology," October 1984.  
(Jet Pump Plant – SAFER)

### Calculations:

1. "Peach Bottom Atomic Power Station, Units 2 and 3 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," NEDC-32163P, January 1993.
2. "Peach Bottom Atomic Power Station ECCS-LOCA Evaluation for GE14," General Electric Company, GENE-J11-03716-09-02P, July 2000.

Fuel Analyzed in Calculations: P8x8R, GE9, GE11/13 and GE14

Limiting Fuel Type: GE11/13 (note: P8x8R and GE9 are no longer in operation and are not considered for defining the limiting fuel type)

Limiting Single Failure: Battery Failure

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

Reference Peak Cladding Temperature (PCT) – GE11/13

PCT = 1645°F

Reference Peak Cladding Temperature (PCT) – GE14

PCT = 1450°F

## MARGIN ALLOCATION

### A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 Report dated January 30, 1997 (See Note 1) (GE11/13 only)	GE11/13 $\Delta$ PCT = 45°F
10 CFR 50.46 Report dated November 4, 1998 (See Note 2) (GE11/13 only)	GE11/13 $\Delta$ PCT = 50°F
10 CFR 50.46 Report dated July 22, 1999 (See Note 3) (GE11/13 only)	GE11/13 $\Delta$ PCT = 0°F
10 CFR 50.46 Report dated November 6, 2000 (See Note 4) (GE11/13 only)	GE11/13 $\Delta$ PCT = 0°F
10 CFR 50.46 Report dated December 18, 2000 (See Note 5) (GE11/13 only)	GE11/13 $\Delta$ PCT = -5°F
10 CFR 50.46 Report dated June 4, 2001 (See Note 6)	GE11/13 $\Delta$ PCT = 55°F GE14 $\Delta$ PCT = 55°F
10 CFR 50.46 Report dated December 18, 2002 (See Note 7)	GE11/13 $\Delta$ PCT = 45°F GE14 $\Delta$ PCT = 45°F
10 CFR 50.46 Report dated December 3, 2004 (See Note 8)	GE11/13 $\Delta$ PCT = 0°F GE14 $\Delta$ PCT = 0°F
Net PCT (GE11/13)	1835 °F
Net PCT (GE14)	1550 °F

### B. CURRENT LOCA MODEL ASSESSMENTS

None	
Total PCT change from current assessments (GE11/13)*	$\Sigma \Delta$ PCT = 0°F
Total PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Cumulative PCT change from current assessments (GE11/13)*	$\Sigma  \Delta$ PCT  = 0°F
Cumulative PCT change from current assessments (GE14)	$\Sigma  \Delta$ PCT  = 0°F
Net PCT (GE11/13)*	1835 °F
Net PCT (GE14)	1550 °F

\* Peach Bottom Atomic Power Station, Unit 2 Cycle 16 core contains no GE11 or GE13 fuel. These fuel designs are tracked for purposes of potential re-insert in future cycles.

**ATTACHMENT 2**

**10 CFR 50.46**

**“Acceptance Criteria For Emergency Core Cooling Systems  
For Light-Water Nuclear Power Reactors”**

**Report of the Emergency Core Cooling System  
Evaluation Model Changes and Errors**

**Assessments as of November 30, 2005**

**Peak Cladding Temperature Rack-Up Sheet  
Peach Bottom Atomic Power Station, Unit 3**

PLANT NAME: Peach Bottom Atomic Power Station, Unit 3  
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA  
REPORT REVISION DATE: 11/30/05  
CURRENT OPERATING CYCLE: 16

## ANALYSIS OF RECORD

### Evaluation Model:

1. NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident Volume II, SAFER – Long Term Inventory Model for BWR Loss-Of-Coolant Analysis," October 1984.
2. NEDC-30996P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-jet Pump Plants, Volume I, SAFER – Long Term Inventory Model for BWR Loss-of-Coolant Analysis," October 1987.
3. NEDC-32950P, "Compilation of Improvements to GENE's SAFER ECCS-LOCA Evaluation Model," January 2000.
4. NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident Volume III, SAFER/GESTR Application Methodology," October 1984.  
(Jet Pump Plant – SAFER)

### Calculations:

1. "Peach Bottom Atomic Power Station, Units 2 and 3 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," NEDC-32163P, January 1993.
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Fuel Analyzed in Calculations: P8x8R, GE9, GE11/13 and GE14

Limiting Fuel Type: GE11/13 (note: P8x8R and GE9 are no longer in operation and are not considered for defining the limiting fuel type)

Limiting Single Failure: Battery Failure

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

Reference Peak Cladding Temperature (PCT) – GE11/13

PCT = 1645°F

Reference Peak Cladding Temperature (PCT) – GE14

PCT = 1450°F

## MARGIN ALLOCATION

### A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 Report dated January 30, 1997 (See Note 1) (GE11/13 only)	GE11/13 $\Delta$ PCT = 45°F
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10 CFR 50.46 Report dated July 22, 1999 (See Note 3) (GE11/13 only)	GE11/13 $\Delta$ PCT = 0°F
10 CFR 50.46 Report dated November 6, 2000 (See Note 4) (GE11/13 only)	GE11/13 $\Delta$ PCT = 0°F
10 CFR 50.46 Report dated December 18, 2000 (See Note 5) (GE11/13 only)	GE11/13 $\Delta$ PCT = -5°F
10 CFR 50.46 Report dated June 4, 2001 (See Note 6)	GE11/13 $\Delta$ PCT = 55°F GE14 $\Delta$ PCT = 55°F
10 CFR 50.46 Report dated December 18, 2002 (See Note 7)	GE11/13 $\Delta$ PCT = 45°F GE14 $\Delta$ PCT = 45°F
10 CFR 50.46 Report dated December 3, 2004 (See Note 8)	GE11/13 $\Delta$ PCT = 0°F GE14 $\Delta$ PCT = 0°F
Net PCT (GE11/13)	1835 °F
Net PCT (GE14)	1550 °F

### B. CURRENT LOCA MODEL ASSESSMENTS

None	
Total PCT change from current assessments (GE11/13)*	$\Sigma \Delta$ PCT = 0°F
Total PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Cumulative PCT change from current assessments (GE11/13)*	$\Sigma  \Delta$ PCT  = 0°F
Cumulative PCT change from current assessments (GE14)	$\Sigma  \Delta$ PCT  = 0°F
Net PCT (GE11/13)*	1835 °F
Net PCT (GE14)	1550 °F

\* Peach Bottom Atomic Power Station, Unit 3 Cycle 16 core contains no GE11 or GE13 fuel. These fuel designs are tracked for purposes of potential re-insert in future cycles.

**ATTACHMENT 3**

**10 CFR 50.46**

**“Acceptance Criteria For Emergency Core Cooling Systems  
For Light-Water Nuclear Power Reactors”**

**Report of the Emergency Core Cooling System  
Evaluation Model Changes and Errors**

**Assessment Notes  
Peach Bottom Atomic Power Station, Units 2 and 3**



#### 1. Prior LOCA Model Assessment

The referenced letter provided the total accumulation of peak clad temperature (PCT) changes or errors determined since the original 1993 SAFER analysis for Peach Bottom Atomic Power Station, Units 2 and 3. This letter reported that, since 1988, GE had been compiling changes and errors and provided that information to the NRC and licensees on an annual basis. The PCT impact for these errors for GE11/13 fuel was determined to be 45°F

[Reference: Letter from G. A. Hunger (PECO Nuclear) to U.S. NRC, "Peach Bottom Atomic Power Station, Units 2 and 3 10 CFR 50.46 Reporting Requirements," dated January 30, 1997.]

#### 2. Prior LOCA Assessment

The referenced letter provided clarification of the previous Peach Bottom 50.46 report (see Note 1). This letter reported the previous GE LOCA errors to be related to SAFER flow initialization/sign error, omission of the bottom head drain and incorrect number of fuel rods error. This letter also reported a new GE LOCA error related to an input parameter sensitivity study. This letter constituted a 30 day report. The PCT impact for the new error for GE11/13 fuel was determined to be 50°F.

[Reference: Letter from G. D. Edwards (PECO Nuclear) to U.S. NRC, "Peach Bottom Atomic Power Station, Units 2 and 3 10 CFR 50.46 Reporting Requirements," dated November 4, 1998.]

#### 3. Prior LOCA Assessment

The referenced letter reported a GE LOCA error related to SAFER CCFL at the upper spacer. This error was reported to be not applicable to GE11 and later fuel types. This letter constituted a 30 day report. The PCT impact for the new error for GE11/13 fuel was determined to be 0°F.

[Reference: Letter from J. A. Hutton (PECO Nuclear) to U.S. NRC, "Limerick Generating Station, Units 1 and 2 - Peach Bottom Atomic Power Station, Units 2 and 3 10 CFR 50.46 Reporting Requirements," dated July 22, 1999.]

#### 4. Prior LOCA Assessment

The referenced letter reported the introduction of GE14 fuel at Peach Bottom and the associated GE14 baseline PCT. The GE14 PCT is bounded by the limiting GE11/13 fuel. There was no reported PCT impact for GE11/13 fuel.

[Reference: Letter from J. A. Hutton (PECO Nuclear) to U.S. NRC, "Peach Bottom Atomic Power Station, Units 2 and 3 Licensing Basis Peak Clad Temperature Values," dated November 6, 2000.]

5. Prior LOCA Assessment

The referenced letter reported a GE LOCA error related to SAFER time steps. The PCT impact for the new error was determined to be  $-5^{\circ}\text{F}$  for GE11/13 fuel and not applicable for GE14 fuel.

[Reference: Letter from J. A. Hutton (PECO Nuclear) to U.S. NRC, "Limerick Generating Station, Units 1 and 2 - Peach Bottom Atomic Power Station, Units 2 and 3 10 CFR 50.46 Reporting Requirements," dated December 18, 2000.]

6. Prior LOCA Assessment

The referenced letter reported two GE LOCA errors related to a SAFER condensation error and a SAFER pressure rate error. The PCT impact for the new errors was determined to be  $45^{\circ}\text{F}$  and  $10^{\circ}\text{F}$ , respectively. These PCT errors applied to all fuel types. This letter constituted a 30 day report. The total PCT impact of these errors on GE11/13 and GE14 fuel was determined to be  $55^{\circ}\text{F}$ .

[Reference: Letter from J. A. Hutton (PECO Nuclear) to U.S. NRC, "Peach Bottom Atomic Power Station, Units 2 and 3 10 CFR 50.46 Reporting Requirements," dated June 4, 2001.]

7. Prior LOCA Assessment

The referenced letter provided the annual 50.46 report for Units 2 and 3. This letter reported GE LOCA errors related to a SAFER core spray sparger elevation error and a SAFER bulk water level error. The PCT impact for the new errors was determined to be  $40^{\circ}\text{F}$  and  $5^{\circ}\text{F}$ , respectively. These PCT errors applied to all fuel types. The total PCT impact of these errors on GE11/13 fuel was determined to be  $45^{\circ}\text{F}$ .

[Reference: Letter from Michael P. Gallagher (Exelon) to U.S. NRC, "10 CFR 50.46 Reporting Requirements," dated December 18, 2002.]

8. Prior LOCA Assessment

The referenced letter provided the annual 50.46 report for Units 2 and 3. This letter reported GE LOCA errors related to a GESTR file interpolation error, a SAFER computer platform change, a WEVOL S1 volume error, a SAFER level/volume table error, a SAFER separator pressure drop error and a new heat source. The PCT impact for the new errors was determined to be  $0^{\circ}\text{F}$  for each error. The total PCT impact of these errors on GE11/13 fuel and GE14 fuel was determined to be  $0^{\circ}\text{F}$ .

[Reference: Letter from Michael P. Gallagher (Exelon Generation Company, LLC) to U.S. NRC, "10 CFR 50.46 Annual Report," dated December 3, 2004.]

9. Current LOCA Assessment

None