

10CFR50.46

December 1, 2006

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

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject 10 CFR 50.46 Annual Report

- Reference:
- 1) Letter from Pamela B. Cowan (Exelon Generation Company, LLC) to U. S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report," dated December 1, 2005
 - 2) GE Letter, 10 CFR 50.46 Notification Letter, 2006-01, July 28, 2006

The purpose of this letter is to submit the 10 CFR 50.46 reporting information for Limerick Generating Station (LGS), Units 1 and 2. The most recent annual 50.46 Report for Limerick Generating Station, Units 1 and 2 (Reference 1) provided the cumulative Peak Cladding Temperature (PCT) errors for the most recent fuel designs through November 30, 2005.

Since the Reference 1 report, GE has reported that for small break Loss-of-Coolant Accident (LOCA) cases, a top peak axial power shape can result in higher PCT (Reference 2). However, for Limerick Generating Station, the large break Design Basis Accident (DBA) LOCA remains limiting. Therefore, the impact on the licensing basis PCT was reported to be 0°F for GE14 fuel.

In summary, the previously reported peak clad temperatures have not changed. In addition, peak cladding temperature is no longer reported for the GE11/GE13 fuel design as it is no longer in service at Limerick Generating Station.

Two attachments are included with this letter that provide the current Limerick Generating Station, Units 1 and 2, 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 Limerick Generating Station, Units 1 and 2, 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,



David P. Helker
Manager, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments:

- 1) Peak Cladding Temperature Rack-Up Sheet (Limerick Generating Station, Unit 1)
- 2) Peak Cladding Temperature Rack-Up Sheet (Limerick Generating Station, Unit 2)
- 3) Assessment Notes (Limerick Generating Station, Units 1 and 2)

cc: S. J. Collins, USNRC Administrator, Region I
J. Kim, USNRC Project Manager, LGS
S. Hansell, USNRC Senior Resident Inspector, LGS

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, 2006

**Peak Cladding Temperature Rack-Up Sheet
Limerick Generating Station, Unit 1**

PLANT NAME: Limerick Generating Station, Unit 1
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA
REPORT REVISION DATE: 11/30/06
CURRENT OPERATING CYCLE: 12

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. "Limerick Generating Station, Units 1 and 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," NEDC-32170P, May 1995.
2. "Limerick Generating Station Units 1 and 2 ECCS-LOCA Evaluation for GE14," GE-NE-J1103793-09-01P, March 2001.
3. Letter from C. P. Bott to R. M. Butrovich, "Limerick Units 1 and 2 SAFER/GESTR Analysis with GE13 Fuel," July 20, 1995.

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

Limiting Fuel Type: GE14 (note: P8x8R, GE9 and GE11/13 are no longer in operation and are not considered for defining the limiting fuel type)

Limiting Single Failure: Div 2 DC Power Source

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

Reference Peak Cladding Temperature (PCT) - GE14

PCT = 1670°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 Report dated December 18, 2002 (See Note 1)	GE14 Δ PCT = 10°F
10 CFR 50.46 Report dated December 16, 2003 (See Note 2)	GE14 Δ PCT = -5°F
10 CFR 50.46 Report dated December 03, 2004 (See Note 3)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated December 01, 2005 (See Note 4)	GE14 Δ PCT = 0°F
Net PCT (GE14)	1675°F

B. CURRENT LOCA MODEL ASSESSMENTS

None	
10 CFR 50.46 Report dated July 28, 2006 (Impact of Top Peak Power Shape for Small Break LOCA) (See Note 5)	GE14 Δ PCT = 0°F
Total PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Cumulative PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Net PCT (GE14)	1675°F

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, 2006

**Peak Cladding Temperature Rack-Up Sheet
Limerick Generating Station, Unit 2**

PLANT NAME: Limerick Generating Station, Unit 2
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA
REPORT REVISION DATE: 11/30/06
CURRENT OPERATING CYCLE: 09

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. "Limerick Generating Station, Units 1 and 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," NEDC-32170P, May 1995.
2. "Limerick Generating Station Units 1 and 2 ECCS-LOCA Evaluation for GE14," GE-NE-J1103793-09-01P, March 2001.
3. Letter from C. P. Bott to R. M. Butrovich, "Limerick Units 1 and 2 SAFER/GESTR Analysis with GE13 Fuel," July 20, 1995.

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

Limiting Fuel Type: GE14 (note: P8x8R, GE9 and GE11/13 are no longer in operation and are not considered for defining the limiting fuel type)

Limiting Single Failure: Div 2 DC Power Source

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

Reference Peak Cladding Temperature (PCT) - GE14

PCT = 1670°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 Report dated December 18, 2002 (See Note 1)	GE14 Δ PCT = 10°F
10 CFR 50.46 Report dated December 16, 2003 (See Note 2)	GE14 Δ PCT = -5°F
10 CFR 50.46 Report dated December 03, 2004 (See Note 3)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated December 01, 2005 (See Note 4)	GE14 Δ PCT = 0°F
Net PCT (GE14)	1675°F

B. CURRENT LOCA MODEL ASSESSMENTS

None	
10 CFR 50.46 Report dated July 28, 2006 (Impact of Top Peak Power Shape for Small Break LOCA) (See Note 5)	GE14 Δ PCT = 0°F
Total PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Cumulative PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Net PCT (GE14)	1675°F

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

Limerick Generating Station, Units 1 and 2

1. Prior LOCA Assessment

The referenced letter provided an annual 50.46 report for Units 1 and 2. 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 15°F and -5°F, respectively, for GE14 fuel. The total PCT impact of these errors was determined to be 10°F for GE14 fuel.

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

2. Prior LOCA Assessment

The referenced letter provided an annual 50.46 report for Units 1 and 2. This letter reported a GE LOCA error related to a SAFER Level/Volume Table error. The PCT impact for the new error was determined to be -5°F for GE14 fuel.

[Reference: Letter from Michael P. Gallagher (Exelon) to U.S. NRC, "10 CFR 50.46 Reporting Requirements", dated December 16, 2003.]

3. 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 a GESTR file interpolation error, a SAFER computer platform change, a WEVOL S1 volume error, a SAFER separator pressure drop error and a new heat source. The PCT impact for the new errors was determined to be 0°F for each error. The total PCT impact of these errors on GE14 fuel was determined to be 0°F.

[Reference: Letter from Michael P. Gallagher (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report", dated December 03, 2004.]

4. Prior LOCA Assessment

The referenced letter provided the annual 50.46 report for Units 1 and 2. There were no errors reported for the 2005 reporting period.

[Reference: Letter from Pamela B. Cowan (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report", dated December 01, 2005.]

5. Current LOCA Assessment

GE reported that the past small break ECCS-LOCA analyses have assumed a mid-peaked power shape, consistent with DBA break LOCA analyses. Recently GE has determined that for small break cases, a top peak axial power shape can result in higher peak cladding temperature (PCT). Evaluations have been performed on representative plants spanning all BWR plant types. The impact on the Limerick licensing basis PCT was reported to be 0°F for GE14 fuel.

[Reference: GE 10 CFR 50.46 Notification Letter, 2006-01, "Impact of Top Peaked Power Shape for Small Break LOCA Analysis," {Limerick Generating Station (Unit 1 & 2)} July 28, 2006.]