

November 24, 2009

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 David P. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report," dated November 24, 2008

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 LGS, Units 1 and 2 (Reference 1) provided the cumulative Peak Cladding Temperature (PCT) errors for the most recent fuel designs through November 24, 2008.

Since the Reference 1 report was issued, no vendor notifications of Emergency Core Cooling System (ECCS) model error/changes that are applicable to LGS, Units 1 and 2 have been issued. Also, no ECCS-related changes or modifications have occurred at LGS, Units 1 and 2 that affect the assumptions of the ECCS system.

Three attachments are included with this letter that provide the current LGS, Units 1 and 2, 10 CFR 50.46 status. Attachments 1 and 2 ("Peak Cladding Temperature Rack-Up Sheet") provide

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updated information regarding the PCT for the limiting Loss of Coolant Accident (LOCA) analysis evaluations for LGS, 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: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, LGS
USNRC Project Manager, LGS
R. R. Janati, Bureau of Radiation Protection

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 24, 2009

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

PLANT NAME: Limerick Unit 1
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA
REPORT REVISION DATE: 11/24/09
CURRENT OPERATING CYCLE: 13

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, Rev. 2, 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 3, 2004 (See Note 3)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated December 1, 2005 (See Note 4)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated December 1, 2006 (See Note 5)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated November 30, 2007 (See Note 6)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated November 24, 2008 (See Note 7)	GE14 Δ PCT = 0°F
<u>Net PCT (GE14)</u>	1675°F

B. CURRENT LOCA MODEL ASSESSMENTS

None (See note 8)	
Total PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Cumulative PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
<u>Net PCT (GE14)</u>	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 24, 2009

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

PLANT NAME: Limerick Unit 2
ECCS EVALUATION MODEL: SAFER/GESTR-LOCA
REPORT REVISION DATE: 11/24/09
CURRENT OPERATING CYCLE: 11

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, Rev. 2, 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)

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10 CFR 50.46 Report dated December 1, 2005 (See Note 4)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated December 1, 2006 (See Note 5)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated November 30, 2007 (See Note 6)	GE14 Δ PCT = 0°F
10 CFR 50.46 Report dated November 24, 2008 (See Note 7)	GE14 Δ PCT = 0°F
<u>Net PCT (GE14)</u>	1675°F

B. CURRENT LOCA MODEL ASSESSMENTS

None (See Note 8)	
Total PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
Cumulative PCT change from current assessments (GE14)	$\Sigma \Delta$ PCT = 0°F
<u>Net PCT (GE14)</u>	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 Generation Company, LLC) 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 Generation Company, LLC) to U.S. NRC, "10 CFR 50.46 Reporting Requirements," dated December 16, 2003.]

3. 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 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 3, 2004.]

4. Prior LOCA Assessment

The referenced letter provided an 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 1, 2005.]

5. Prior LOCA Assessment

The referenced letter provided an annual 50.46 report for Units 1 and 2. This letter reported a newly discovered sensitivity to the assumed axial power shape for small break LOCA cases. This sensitivity may result in higher calculated PCT values for top-peaked axial power shapes. Due to this sensitivity, the calculated small break PCT for Limerick was higher than the previously calculated value. However, the Licensing Basis PCT (based on large break) remained the same. Therefore the licensing basis PCT impact of the new power shape sensitivity was determined to be 0°F for GE14 fuel.

[Reference: Letter from David P. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report," dated December 1, 2006.]

6. Prior LOCA Assessment

The referenced letter provided an annual 50.46 report for Units 1 and 2. There were no errors reported for the 2007 reporting period.

[Reference: Letter from David P. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report," dated November 30, 2007.]

7. Prior LOCA Assessment

The referenced letter provided an annual 50.46 report for Units 1 and 2. There were no errors reported for the 2008 reporting period.

[Reference: Letter from David P. Helker (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report," dated November 24, 2008.]

8. Current LOCA Assessment

Since the last annual report (see Note 7), no vendor notifications of Emergency Core Cooling System (ECCS) model error/changes that are applicable to Limerick have been issued. Also, no ECCS-related changes or modifications have occurred at Limerick that would affect the assumptions of the ECCS analyses.