

RS-15-074
March 6, 2015

10 CFR 50.46

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

LaSalle County Station, Units 1 and 2
Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Subject: Annual 10 CFR 50.46 Report of Emergency Core Cooling System Evaluation
Model Changes and Errors for LaSalle County Station

Reference: Letter from D. M. Gullott (Exelon Generation Company, LLC) to U. S. Nuclear
Regulatory Commission, "Annual 10 CFR 50.46 Report of Emergency Core
Cooling System Evaluation Model Changes and Errors for LaSalle County
Station," dated March 7, 2014

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 the attached information to fulfill the annual reporting requirements for LaSalle County Station (LSCS), Units 1 and 2. The attachments describe the changes in accumulated peak cladding temperature (PCT) since the previous annual report submitted in the referenced letter.

There are no regulatory commitments contained in this submittal. Should you have any questions concerning this letter, please contact Ms. Lisa A. Simpson at (630) 657-2815.

Respectfully,



David M. Gullott
Manager – Licensing
Exelon Generation Company, LLC

Attachments:

- 1) LaSalle County Station, Units 1 and 2 / 10 CFR 50.46 Report – GNF Fuel
- 2) LaSalle County Station, Units 1 and 2 / 10 CFR 50.46 Report – AREVA NP Fuel
- 3) LaSalle County Station, Units 1 and 2 / 10 CFR 50.46 Report – Assessment Notes

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cc: NRC Regional Administrator, Region III
NRC Senior Resident Inspector, LaSalle County Station
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT 1
LaSalle County Station, Units 1 and 2
10 CFR 50.46 Report – GNF Fuel

PLANT NAME: LaSalle County Station (LSCS), Units 1 & 2
ECCS EVALUATION MODEL: SAFER/PRIME LOCA
REPORT REVISION DATE: March 6, 2015
CURRENT OPERATING CYCLE: L1C16 and L2C16

ANALYSIS OF RECORD

Evaluation Model Methodology:

- 1) NEDE-23785-1-PA, Rev. 1, "GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident (Volume III), SAFER/GESTR Application Methodology," October 1984.
- 2) "The PRIME Model for Analysis of Fuel Rod Thermal-Mechanical Performance," Technical Bases - NEDC-33256P-A, Qualification - NEDC-33257P-A, and Application Methodology - NEDC-33258P-A, September 2010.
- 3) NEDO-33173 Supplement 4-A, "Implementation of PRIME Models and Data in Downstream Methods," September 2011.

Calculation:

- 1) NEDC-32258P, "LaSalle County Station Units 1 and 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," GE Nuclear Energy, October 1993.
- 2) GE Hitachi Calculation 0000-0121-8990-R0, "LaSalle County Station GNF2 ECCS-LOCA Evaluation," GE Hitachi Nuclear Energy, January 2012.
- 3) GNF Calculation 002N3086, "Technical Evaluation to Support Introduction of GNF3 Lead Use Assemblies (LUAs) in LaSalle County Station, Unit 2," Global Nuclear Fuel, November 2014.

Fuel:	GNF2, GNF3 LUAs
Limiting Single Failure:	High Pressure Core Spray Diesel Generator
Limiting Break Size and Location:	0.08 ft² Recirculation Pump Suction Line Break
Reference Peak Cladding Temperature (PCT):	GNF2: 1540°F GNF3 LUAs: 1550°F

ATTACHMENT 1
LaSalle County Station, Units 1 and 2
10 CFR 50.46 Report – GNF Fuel

MARGIN ALLOCATION

A. PRIOR LOSS-OF-COOLANT ACCIDENT (LOCA) MODEL ASSESSMENTS

10 CFR 50.46 report dated March 7, 2012 (Note 1)	GNF2: $\Delta PCT = 0^{\circ}F$ GNF3 LUAs: N/A
10 CFR 50.46 report dated March 7, 2013 (Note 2)	GNF2: $\Delta PCT = 0^{\circ}F$ GNF3 LUAs: N/A
10 CFR 50.46 report dated March 7, 2014 (Note 3)	GNF2: $\Delta PCT = 0^{\circ}F$ GNF3 LUAs: N/A
Net PCT	GNF2: 1540°F GNF3 LUAs: N/A

B. CURRENT LOCA MODEL ASSESSMENTS

Notification 2014-01 (See Note 4)	GNF2: $\Delta PCT = 0^{\circ}F$ GNF3 LUAs: N/A
Notification 2014-02 (See Note 4)	GNF2: $\Delta PCT = 0^{\circ}F$ GNF3 LUAs: N/A
Notification 2014-03 (See Note 4)	GNF2: $\Delta PCT = -10^{\circ}F$ GNF3 LUAs: N/A
Notification 2014-04 (See Note 4)	GNF2: $\Delta PCT = +5^{\circ}F$ GNF3 LUAs: N/A
Total PCT change from current assessments	GNF2: $\sum \Delta PCT = -5^{\circ}F$ GNF3 LUAs: $\sum \Delta PCT = 0^{\circ}F$
Cumulative PCT change from current assessments	GNF2: $\sum \Delta PCT = 15^{\circ}F$ GNF3 LUAs: $\sum \Delta PCT = 0^{\circ}F$
Net PCT	GNF2: 1535°F GNF3 LUAs: 1550°F

ATTACHMENT 2
LaSalle County Station, Units 1 and 2
10 CFR 50.46 Report – AREVA NP Fuel

PLANT NAME: LaSalle County Station (LSCS), Units 1& 2
ECCS EVALUATION MODEL: SAFER/PRIME LOCA
REPORT REVISION DATE: March 6, 2015
CURRENT OPERATING CYCLES: L1C16 and L2C16

ANALYSIS OF RECORD

Evaluation Model Methodology:

- 1) NEDE-23785-1-PA, Rev. 1, "GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident (Volume III), SAFER/GESTR Application Methodology," October 1984.
- 2) "The PRIME Model for Analysis of Fuel Rod Thermal-Mechanical Performance," Technical Bases - NEDC-33256P-A, Qualification - NEDC-33257P-A, and Application Methodology - NEDC-33258P-A, September 2010.
- 3) NEDO-33173 Supplement 4-A, "Implementation of PRIME Models and Data in Downstream Methods," September 2011.

Calculation:

- 1) NEDC-32258P, "LaSalle County Station Units 1 and 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," GE Nuclear Energy, October 1993.
- 2) GE Hitachi Calculation 0000-0142-8555-R0, "LaSalle County Station ECCS-LOCA Evaluation for ATRIUM-10 Fuel," GE Hitachi Nuclear Energy, April 2012.

Fuel: ATRIUM-10

Limiting Single Failure: High Pressure Core Spray Diesel Generator

Limiting Break Size and Location: 0.08 ft² Recirculation Pump Suction Line Break

Reference Peak Cladding Temperature (PCT): 1460°F

ATTACHMENT 2
LaSalle County Station, Units 1 and 2
10 CFR 50.46 Report – AREVA NP Fuel

MARGIN ALLOCATION

A. PRIOR LOSS-OF-COOLANT ACCIDENT (LOCA) MODEL ASSESSMENTS

10 CFR 50.46 report dated March 7, 2013 (Note 2)	$\Delta PCT = 0^{\circ}F$
10 CFR 50.46 report dated March 7, 2014 (Note 3)	$\Delta PCT = 0^{\circ}F$
Net PCT	1460°F

B. CURRENT LOCA MODEL ASSESSMENTS

Notification 2014-01 (See Note 4)	$\Delta PCT = 0^{\circ}F$
Notification 2014-02 (See Note 4)	$\Delta PCT = 0^{\circ}F$
Notification 2014-03 (See Note 4)	$\Delta PCT = -10^{\circ}F$
Notification 2014-04 (See Note 4)	$\Delta PCT = +5^{\circ}F$
Total PCT change from current assessments	$\sum \Delta PCT = -5^{\circ}F$
Cumulative PCT change from current assessments	$\sum \Delta PCT = 15^{\circ}F$
Net PCT	1455°F

ATTACHMENT 3
LaSalle County Station, Units 1 and 2
10 CFR 50.46 Report – Assessment Notes

1) Prior LOCA Model Assessment for AREVA NP Fuel and GNF Fuel

The referenced letter provided the annual 10 CFR 50.46 report for LSCS, Units 1 and 2, for the 2012 reporting period. The referenced letter reported the introduction of GNF2 fuel into the LSCS, Unit 1, core. A new LOCA analysis of record for GNF2 fuel was performed by GE Hitachi Nuclear Energy (GEH). No Emergency Core Cooling System (ECCS) related changes or modifications had occurred at LSCS that affected the assumptions in the GEH GNF2 LOCA analysis.

The LOCA analysis of record for the ATRIUM-10 fuel in LSCS, Units 1 and 2, for the 2012 reporting period was performed by AREVA. The AREVA analysis was replaced by the GEH analysis as discussed in Notes 2 and 3. The Assessment Notes for the AREVA analysis were removed from the LSCS 10 CFR 50.46 report starting in 2014.

[Reference: Letter from David M. Gullott (Exelon Generation Company, LLC) to U. S. Nuclear Regulatory Commission, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," dated March 7, 2012.]

2) Prior LOCA Model Assessment for AREVA NP Fuel and GNF Fuel

The referenced letter provided the annual 10 CFR 50.46 report for LSCS, Units 1 and 2, for the 2013 reporting period. The referenced letter reported the introduction of GNF2 fuel into the LSCS, Unit 2, core. The referenced letter also reported no vendor notifications of ECCS model errors/changes applicable to the GNF2 fuel in LSCS, Units 1 and 2, and reported that no ECCS related changes or modifications occurred at LSCS that affected the assumptions in the GEH GNF2 LOCA analysis for the GNF2 fuel in LSCS, Units 1 and 2.

The referenced letter reported a new LOCA analysis of record for the ATRIUM-10 fuel in LSCS, Units 1 and 2, was performed by GEH and implemented only at LSCS, Unit 2. The referenced letter reported that no ECCS related changes or modifications occurred at LSCS that affected the assumptions in the GEH LOCA analysis of record for the ATRIUM-10 fuel in LSCS, Unit 2.

The LOCA analysis of record for the ATRIUM-10 fuel in LSCS, Unit 1, for the 2013 reporting period was performed by AREVA. The AREVA analysis was replaced by the GEH analysis as previously discussed and in Note 3. The assessments for the AREVA analysis were removed from the LSCS 10 CFR 50.46 report starting in 2014.

[Reference: Letter from David M. Gullott (Exelon Generation Company, LLC) to U. S. Nuclear Regulatory Commission, "Annual 10 CFR 50.46 Report of Emergency Core Cooling System Evaluation Model Changes and Errors for LaSalle County Station," dated March 7, 2013.]

ATTACHMENT 3
LaSalle County Station, Units 1 and 2
10 CFR 50.46 Report – Assessment Notes

3) Prior LOCA Model Assessment for AREVA NP Fuel and GNF Fuel

The referenced letter provided the annual 10 CFR 50.46 report for LSCS, Units 1 and 2, for the 2014 reporting period. The referenced letter reported the GEH LOCA analysis of record for the ATRIUM-10 fuel in LSCS, Units 1 and 2, was implemented at LSCS, Unit 1, as part of L1C16. The referenced letter reported no ECCS related changes or modifications occurred at LSCS that affected the assumptions in the GEH ATRIUM-10 LOCA analysis for the ATRIUM-10 fuel in LSCS, Units 1 and 2.

The referenced letter also reported no vendor notifications of ECCS model errors/changes applicable to the GNF2 fuel in LSCS, Units 1 and 2, and reported that no ECCS related changes or modifications occurred at LSCS that affected the assumptions in the GEH GNF2 LOCA analysis for the GNF2 fuel in LSCS, Units 1 and 2.

[Reference: Letter from David M. Gullott (Exelon Generation Company, LLC) to U. S. Nuclear Regulatory Commission, "Annual 10 CFR 50.46 Report of Emergency Core Cooling System Evaluation Model Changes and Errors for LaSalle County Station," dated March 7, 2014.]

4) Current LOCA Model Assessment for AREVA NP Fuel and GNF Fuel

Since the last annual report (see Note 3), four vendor notifications were received:

- The first notification (Reference 1) addresses several accumulated updates to the SAFER04A model. These code maintenance changes result in a PCT change of 0°F for GNF2 and ATRIUM-10 fuel.
- The second notification (Reference 2) corrected a logic error that has been isolated, occurring with an indication that the expected system mass diverges from the calculated actual mass. This error affects the ECCS flow credited as reaching the core. Correction of this error results in a 0°F PCT change for GNF2 and ATRIUM-10 fuel.
- The third notification (Reference 3) addresses an error with the imposed minimum pressure differential (Δp) for droplet flow above a two-phase level in the core. This error can offer an inappropriate steam cooling benefit above the core two phase level. To correct this error, an explicit core Δp calculation is applied without regard to droplet condition resulting in a PCT change of -10°F for GNF2 and ATRIUM-10 fuel.
- The fourth notification (Reference 4) addresses an incorrect pressure head representation when defining the counter current flow limitation (CCFL). Correction of this error results in a +5°F PCT change for GNF2 and ATRIUM-10 fuel.

ATTACHMENT 3
LaSalle County Station, Units 1 and 2
10 CFR 50.46 Report – Assessment Notes

No ECCS related changes or modifications have occurred at LSCS that affect the assumptions in the GEH LOCA analyses for the ATRIUM-10 and GNF2 fuel in LSCS, Units 1 and 2.

Four (4) GNF3 Lead Use Assemblies (LUAs) were loaded into LSCS, Unit 2, during the LSCS Unit 2 spring 2015 refueling outage (L2R15). Reference 5 supports the introduction of the GNF3 LUAs and includes the licensing basis PCT. Notifications 2014-01 through 2014-04 (References 1 – 4) were included in the determination of the licensing basis PCT for the GNF3 LUAs in Reference 5.

[Reference 1: Letter from GE Hitachi Nuclear Energy (GEH) to Exelon Generation Company, LLC, "10 CFR 50.46 Notification Letter 2014-01, LaSalle County Station (Unit 1 & 2)," dated May 21, 2014.]

[Reference 2: Letter from GE Hitachi Nuclear Energy (GEH) to Exelon Generation Company, LLC, "10 CFR 50.46 Notification Letter 2014-02, LaSalle County Station (Unit 1 & 2)," dated May 21, 2014.]

[Reference 3: Letter from GE Hitachi Nuclear Energy (GEH) to Exelon Generation Company, LLC, "10 CFR 50.46 Notification Letter 2014-03, LaSalle County Station (Unit 1 & 2)," dated May 21, 2014.]

[Reference 4: Letter from GE Hitachi Nuclear Energy (GEH) to Exelon Generation Company, LLC, "10 CFR 50.46 Notification Letter 2014-04, LaSalle County Station (Unit 1 & 2)," dated May 21, 2014.]

[Reference 5: GNF Evaluation 002N3086.1 Rev. 0, "Technical Evaluation to Support Introduction of GNF3 Lead Use Assemblies (LUAs) in LaSalle County Station, Unit 2," December 2014.]

Bcc:

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