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10 CFR 50.46

JAFP-18-0069

August 1, 2018

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

James A. FitzPatrick Nuclear Power Plant
Renewed Facility Operating License No. DPR-59
NRC Docket No. 50-333

Subject: 10 CFR 50.46 Annual Report

References:
1) Letter from James Barstow (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report", dated August 1, 2017 (ML17213A012, JAFP-17-0076,)
2) Letter from GE Hitachi Nuclear Energy (GEH) to Exelon, "10 CFR 50.46 Notification Letter 2017-02, Fitzpatrick Nuclear Power Plant", dated August 02, 2017

The purpose of this letter is to submit the 10 CFR 50.46 reporting information for James A. FitzPatrick Nuclear Power Plant (JAF). The most recent 10 CFR 50.46 Annual Report for JAF (Reference 1), was provided on August 1, 2017.

Two attachments are included in this letter that provide the current JAF 10 CFR 50.46 status. Attachment 1, "Peak Cladding Temperature (PCT) Rack-Up Sheets", provides updated information regarding the PCT for the limiting analysis and Attachment 2, "Assessment Notes", contains a detailed description of each change or error reported.

Since the Reference 1 annual report was submitted, one (1) new error, 2017-02, was reported. This new error is included in the current LOCA model assessments with a zero PCT impact.

During the development of this submittal, legacy editorial errors were identified in the 2017 10 CFR 50.46 Annual Report (Reference 1) which originally occurred in the 2011 submittal. In the Reference 1 submittal, the information regarding the references cited in notes 2 and 3 of Attachment 2 contained errors. Specifically, the referenced letter in note 2 was from J. Pechacek as opposed to E. Dorman. Additionally, the title of the referenced letters for notes 2 and 3 should have been "10 CFR 50.46 Annual Report – *Changes and*

Errors in Emergency Core Cooling System (ECCS) Evaluation Models," as opposed to "10 CFR 50.46 Annual Report – *Errors* in Emergency Core Cooling System (ECCS) Evaluation Models." These errors are editorial in nature, are corrected for this submittal, and do not affect the technical information of Reference 1.

No new regulatory commitments are established in this submittal.

If any additional information is needed, please contact Christian Williams at (610) 765-5729.

Respectfully,

James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments: 1) Peak Cladding Temperature Rack-Up Sheets
2) Assessment Notes

cc: USNRC Administrator, Region I
USNRC Project Manager, JAF, Unit 1
USNRC Senior Resident Inspector, JAF, Unit 1

ATTACHMENT 1

10 CFR 50.46
Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors

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

Assessments as of August 1, 2018

Peak Cladding Temperature Rack-Up Sheets

James A. FitzPatrick Nuclear Power Plant

PLANT NAME: James A. FitzPatrick
ECCS EVALUATION MODEL: SAFER/GESTR(PRIME)-LOCA
REPORT REVISION DATE: August 1, 2018
CURRENT OPERATING CYCLE: 23

ANALYSIS OF RECORD

Evaluation Model:

1. B. S. Shiralkar et al, The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident: Volume III – SAFER/GESTR Application Methodology, February 1985 (NEDE-23785-1-P-A and NEDO-23785-1-A)
2. Compilation of Improvements to GENE's SAFER ECCS-LOCA Evaluation Model, NEDC-32950P, January 2000 as reviewed by letter from S. A. Richards (NRC) to J. F. Klapproth (GE), General Electric Nuclear Energy (GENE) Topical Reports NEDC-32950P and NEDC-32084P Acceptability Review, May 24, 2000
3. GESTR-LOCA and SAFER Models for Evaluation of Loss-of-Coolant Accident Volume III, Supplement 1, Additional Information for Upper Bound PCT Calculation, NEDE-23785P-A, Supplement 1, Revision 1, March 2002
4. Implementation of PRIME Models and Data in Downstream Methods, NEDO-33173 Supplement 4-A, Revision 1, November 2012

Calculations:

1. 0000-0076-4111-R0 Rev 0, James A. Fitzpatrick Nuclear Power Plant GNF2 ECCS-LOCA Evaluation, August 2008 (JAF-RPT-08-00014 Rev 0)

Fuel: GNF2

Limiting Single Failure: Battery Failure

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

Reference Peak Cladding Temperature (PCT): GNF2 = 1800 °F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 Report dated December 22, 2008 (Note 1)	GNF2:	ΔPCT = 0
10 CFR 50.46 Report dated July 31, 2009 (Note 2)	GNF2:	ΔPCT = 0

10 CFR 50.46 Report dated July 31, 2010 (Note 3)	GNF2:	ΔPCT = 0
10 CFR 50.46 Report dated August 1, 2011 (Note 4)	GNF2:	ΔPCT = 50
10 CFR 50.46 Report dated August 1, 2012 (Note 5)	GNF2:	ΔPCT = 0
10 CFR 50.46 Report dated August 1, 2013 (Note 6)	GNF2:	ΔPCT = 40
10 CFR 50.46 Report dated August 1, 2014 (Note 7)	GNF2:	ΔPCT = 35
10 CFR 50.46 Report dated August 3, 2015 (Note 8)	GNF2:	ΔPCT = -25
10 CFR 50.46 Report dated August 1, 2016 (Note 9)	GNF2:	ΔPCT = 0
10 CFR 50.46 Report dated August 1, 2017 (Note 10)	GNF2:	ΔPCT = 0
NET PCT	**GNF2:**	**1900 °F**

B. CURRENT LOCA MODEL ASSESSMENTS

Total PCT change from current assessments (Note 11)	GNF2:	$\sum\Delta PCT = 0$
Cumulative PCT change from current assessments	GNF2:	$\sum\|\Delta PCT\| = 0$
NET PCT	**GNF2:**	**1900 °F**

ATTACHMENT 2

10 CFR 50.46
Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors

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

Assessments as of August 1, 2018

Assessment Notes

James A. FitzPatrick Nuclear Power Plant

1) Prior LOCA Model Assessment

GNF2 fuel was first installed during Refueling Outage 18, October 2008.

No changes or errors were reported against GNF2 during this reporting period.

[Reference: Letter from E. Dorman (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-08-0133, "10 CFR 50.46 Annual Report – Errors in Emergency Core Cooling System (ECCS) Evaluation Models," dated December 22, 2008.]

2) Prior LOCA Model Assessment

No changes or errors were reported against GNF2 during this reporting period.

[Reference: Letter from J. Pechacek (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-09-0091, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models," dated July 31, 2009.]

3) Prior LOCA Model Assessment

No changes or errors were reported against GNF2 during this reporting period.

[Reference: Letter from J. Pechacek (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-10-0084, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models," dated July 31, 2010.]

4) Prior LOCA Model Assessment

Two errors were reported against GNF2 fuel during this reporting period.

Error 2011-02 described the database error for heat deposition on peak cladding temperature (PCT) for 10x10 fuel bundles. The error was estimated to increase the GNF2 PCT by +45 °F.

Error 2011-03 described the updated formulation for gamma heat deposition to the channel wall for 10x10 fuel bundles. The error was estimated to increase the GNF2 PCT by +5 °F.

[Reference: Letter from Eugene W. Dorman (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-11-0097, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models," dated August 1, 2011.]

5) Prior LOCA Model Assessment

No changes or errors were reported against GNF2 during this reporting period.

[Reference: Letter from Jorge O'Farrill (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-12-0089, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System Evaluation Models," dated August 1, 2012.]

6) Prior LOCA Model Assessment

One change was reported against GNF2 during this reporting period.

Change 2012-01 described the impact from PRIME implementation to compute fuel properties. The error was estimated to increase the GNF2 PCT by +40 ^{0}F.

[Reference: Letter from Chris M. Adner (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-13-0096, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System Evaluation Models," dated August 1, 2013.]

7) Prior LOCA Model Assessment

Four changes and errors were reported against GNF2 fuel during this reporting period.

Change 2014-01 described code maintenance changes. These changes were estimated to have no impact upon the GNF2 PCT.

Error 2014-02 described a mass non-conservatism. The error was estimated to increase the GNF2 PCT by +10 ^{0}F.

Error 2014-03 described an error in the minimum core differential pressure model. The error was estimated to increase the GNF2 PCT by +20 ^{0}F.

Error 2014-04 Rev 0 described an error in the bundle / lower plenum counter-current flow-limited head model. The error was estimated to increase the GNF2 PCT by +5 ^{0}F.

[Reference: Letter from Chris M. Adner (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-14-0094, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System Evaluation Models," dated August 1, 2014.]

8) Prior LOCA Model Assessment

One error was reported against GNF2 fuel during this reporting period.

Error 2014-04 Rev 1 was issued as a revision to error notification 2014-04 Rev 0 (Note 7). The revision identified a change to the hot bundle pressure head used as input to the counter-current flow-limited head model that resulted in a benefit (PCT reduction). With this revised notice, the prior PCT change of +5 ^{0}F was replaced by a PCT change of -20 ^{0}F. Consequently, the error was estimated to have a net change upon GNF2 PCT of -25 ^{0}F.

[Reference: Letter from Chris M. Adner (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-15-0092, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System Evaluation Models," dated August 3, 2015.]

9) Prior LOCA Model Assessment

No changes or errors were reported against GNF2 during this reporting period.

[Reference: Letter from William C. Drews (Entergy Nuclear Operations) to the U.S. Nuclear Regulatory Commission, JAFP-16-0121, "10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System Evaluation Models," dated August 1, 2016.]

10) Prior LOCA Model Assessment

One error was reported against GNF2 during this reporting period.

Error 2017-01 identifies that the GNF2 leakage paths between the bundle and the bypass (lower tie plate flow hole and channel to lower tie plate interface) were incorrectly modeled. The error was estimated to have no impact upon the GNF2 PCT.

[Reference: Letter from James Barstow (Exelon Generation) to the U.S. Nuclear Regulatory Commission, JAFP-17-0076, "10 CFR 50.46 Annual Report," dated August 1, 2017.]

11) Current LOCA Model Assessment

One error was reported against GNF2 during this reporting period.

Change 2017-02 describes a change in the GNF2 upper plenum model. The generic upper plenum model was changed to more explicitly model the GNF2 fuel design. The change was estimated to have no impact upon the GNF2 PCT.