



Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc.

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Eugene Dorman
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JAFP-11-0097
August 1, 2011

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

SUBJECT: 10 CFR 50.46 Annual Report – Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models

James A FitzPatrick Nuclear Power Plant
Docket No. 50-333
License No. DPR-059

REFERENCE: 1. Entergy Nuclear Operations, Inc. to USNRC, JAFP-10-0084, dated July 31, 2010, 10 CFR 50.46 Annual Report – Errors in Emergency Core Cooling System (ECCS) Evaluation Models.

Dear Sir or Madam:

The attached report summarizes changes and errors in emergency core cooling system (ECCS) evaluation models in accordance with 10 CFR 50.46(a)(3)(ii) for the period August 1, 2010 to July 31, 2011 for Entergy's James A. FitzPatrick Nuclear Power Plant (JAF). There have been two errors identified in the Loss of Coolant Accident (LOCA) Peak Cladding Temperatures (PCT) analysis since the publication of Reference 1. Those errors are summarized in Attachment 1, 10 CFR 50.46(a)(3)(ii) Annual Report on Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models for the Period from August 1, 2010, to July 31, 2011.

This letter contains no new commitments. Should you have any questions, please contact Mr. Eugene Dorman at (315) 349-6810.

Sincerely,

A handwritten signature in black ink that reads "E. W. Dorman".

Eugene W. Dorman
Acting Licensing Manager

ED/ed
cc: next page

Attachment 1: 10 CFR 50.46(a)(3)(ii) Annual Report on Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models for the period from August 1, 2010, to July 31, 2011

cc:

Mr. William Dean
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JAFP-11-0097

ATTACHMENT 1

10 CFR 50.46(a)(3)(ii) Annual Report on Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models for the period from August 1, 2010, to July 31, 2011

(7 Pages)

10 CFR 50.46(a)(3)(ii) Annual Report on Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models for the period from August 1, 2010 to July 31, 2011

INTRODUCTION

This report summarizes changes and errors in emergency core cooling system (ECCS) evaluation models in accordance with 10 CFR 50.46(a)(3)(ii) for the period August 1, 2010 to July 31, 2011 for Entergy's James A. FitzPatrick Nuclear Power Plant.

Two errors in the FitzPatrick models have been identified since the last annual report (Reference 24). FitzPatrick has been operating with the same models and analysis as reported in the last update, see Reference 24.

Table 1 summarizes the current FitzPatrick ECCS evaluation models.

TABLE 1 - ACCOUNTING OF LICENSING BASIS
PEAK CLAD TEMPERATURES FOR FITZPATRICK

Report Period	ECCS Evaluation	Estimated PCT Change			Updated PCT		
		GE11 Fuel ⁽¹⁾	GE12 Fuel ⁽²⁾	GE14 Fuel ⁽³⁾	GE11 Fuel	GE12 Fuel	GE14 Fuel
Baseline Evals.	1993 FitzPatrick LOCA Analysis (Ref. 2)	Baseline	N/A	N/A	1570° F	N/A	N/A
	FitzPatrick Reload 12 Supplemental Report (Ref. 3)	N/A	Base-line	N/A	N/A	1370° F	N/A
	FitzPatrick Reload 13 Supplemental Report (Ref. 4)	Baseline		N/A	1570° F	1370° F	N/A
Prior to July 1, 2000	10 CFR 50.46 Notification Regarding Sensitivity To Small Input Parameter Changes (Ref. 5)	+50°F		N/A	1620° F	1420° F	N/A
	10 CFR 50.46 Notification Regarding Minor Code Corrections (Ref. 5)	+5°F		N/A	1625° F	1425° F	N/A
	10 CFR 50.46 Notification Regarding Bottom Head Drain (Ref. 6)	+10°F		N/A	1635° F	1435° F	N/A
July 1, 2000 – June 30, 2001	10 CFR 50.46 Notification Regarding Time Step Size (Ref. 1)	-5F		N/A	1630° F	1430° F	N/A
	Estimated Effect Of Condensation Error On PCT (Ref. 7)	+90°F		N/A	1720° F	1520° F	N/A
	Estimated Effect Of Pressure Rate Inconsistency Error On PCT (Ref. 8)	+10°F		N/A	1730° F	1530F	N/A
	Estimated Effect Of Accounting Error On PCT (Ref. 9)	N/A	-5°F	N/A	1730° F	1525° F	N/A
July 1, 2001 – June 30, 2002	SAFER Core Spray Injection Elevation Error (Ref. 10)	+5°F		N/A	1735° F	1530° F	N/A
	Impact of SAFER Bulk Water Level Error on PCT (Ref. 11)	+10°F		N/A	1745° F	1540° F	N/A

TABLE 1 – ACCOUNTING OF LICENSING BASIS
PEAK CLAD TEMPERATURES FOR FITZPATRICK (Continued)

Report Period	ECCS Evaluation	Estimated PCT Change			Updated PCT		
		GE12 Fuel ⁽²⁾	GE14 Fuel ⁽³⁾	GNF2 Fuel ⁽⁴⁾	GE12 Fuel	GE14 Fuel	GNF2 Fuel
July 1, 2002 – June 30, 2003	Cycle 16 Core Load Using GE 14 Type Fuel (Ref. 12)	N/A	1700°F	N/A	N/A	1700°F	N/A
	Impact of SAFER Level/Volume Table Error on the PCT (Ref. 13)	0°F	0°F	N/A	1540°F	1700°F	N/A
	Impact of SAFER Initial Separator Pressure Drop Error on the PCT (Ref. 14)	0°F	N/A	N/A	1540°F	1700°F	N/A
July 1, 2003 – June 30, 2004	Impact of GESTR Input File Interpolation Error on the PCT (Ref. 15)	0°F	N/A	N/A	1540°F	1700°F	N/A
	Impact of SAFER04 Computer Platform Change on the PCT (Ref. 16)	0°F	N/A	N/A	1540°F	1700°F	N/A
	Impact of WEVOL S1 Volume Error on the PCT (Ref. 17)	0°F	N/A	N/A	1540°F	1700°F	N/A
	Impact of Postulated Hydrogen-Oxygen Recombination (Ref. 18)	0°F	0°F	N/A	1540°F	1700°F	N/A
July 1, 2004 – June 30, 2006	No Changes or Errors (Ref. 19, Ref. 21)	N/A	N/A	N/A	1540°F	1700°F	N/A
July 1, 2006 – June 30, 2008	Impact of Top Peaked Power Shape for Small Break LOCA Analysis (Ref. 20)	N/A	N/A	N/A	1540°F	1700°F	N/A
July 1, 2008 – December 30, 2008	Cycle 19 Core Load Using GNF2 Type Fuel (Ref. 20, Ref 22)	N/A	N/A	N/A	N/A	1700°F	1800°F
December 30, 2008 – July 31, 2009	No changes or errors (Ref. 23)	N/A	N/A	N/A	N/A	1700°F	1800°F

TABLE 1 – ACCOUNTING OF LICENSING BASIS
PEAK CLAD TEMPERATURES FOR FITZPATRICK (Continued)

Report Period	ECCS Evaluation	Estimated PCT Change		Updated PCT	
		GE14 Fuel ⁽³⁾	GNF2 Fuel ⁽⁴⁾	GE14 Fuel	GNF2 Fuel
August 1, 2009 – July 31 2010	No changes or errors (Ref. 24)	N/A	N/A	1700°F	1800°F
August 1, 2010 – July 31, 2011	Impact of Database Error for Heat Deposition on the Peak Cladding Temperature (PCT) for 10 X 10 Fuel Bundles (Ref. 25)	45°F	45°F	1745°F	1845°F
	Impact of Updated Formulation for Gamma Heat Deposition to Channel Wall for 9 X 9 and 10 X 10 Fuel Bundles (Ref. 26)	5°F	5°F	1750°F	1850°F

- (1) GE11 fuel was removed from the core at conclusion of Cycle 15, 10/2002
- (2) GE12 fuel was removed from the core at conclusion of Cycle 17, 10/2006
- (3) GE14 fuel was first installed during RF15, 10/2002
- (4) GNF2 fuel was first installed during RF18, 10/2008

REFERENCES:

1. Global Nuclear Fuel letter, A. Alzaben (GNF) to C. Franklin (NYPA), (AFA-00-N061 dated November 20, 2000) regarding 10 CFR 50.46 error report - impact of SAFER time step size on the peak clad temperature (PCT) for jet pump plant analyses. Includes General Electric/Global Nuclear Fuel 10 CFR 50.46 Notification Letter 2000-04 dated November 8, 2000 regarding "Impact of SAFER Time Step Size on the Peak Clad Temperature (PCT) for Jet Pump Plant Analyses." (Proprietary)
2. General Electric Nuclear Energy, "James A. FitzPatrick Nuclear Power Plant SAFER/GESTER-LOCA, Loss-of-Coolant Analysis," Licensing Topical Report NEDC-31317P, Class III (proprietary), Revision 2, April 1993.
3. General Electric Nuclear Energy Report, J11-02914SRL, Revision 0, August 1996, "Supplemental Reload Licensing Report for James A. FitzPatrick, Reload 12, Cycle 13."
4. General Electric Nuclear Energy Report, J11-03359SRL, Revision 1, Class I, October 1998, "Supplemental Reload Licensing Report for James A. FitzPatrick, Reload 13, Cycle 14."
5. General Electric Nuclear Energy, MFN-090-93, June 30, 1993, "Reporting of Changes and Errors in ECCS Evaluation Models."
6. General Electric Nuclear Energy, MFN-020-96, February 20, 1996, "Reporting of Changes and Errors in ECCS Evaluation Models."
7. General Electric/Global Nuclear Fuel 10 CFR 50.46 Notification Letter 2001-01 dated May 8, 2001 (via E-mail) regarding "Impact of SAFER Condensation Error on the Peak Clad Temperature (PCT)." (Proprietary)
8. General Electric/Global Nuclear Fuel 10 CFR 50.46 Notification Letter 2001-02 dated May 10, 2001 (via E-mail) regarding "Impact of SAFER Pressure Rate I inconsistency Error on the Peak Clad Temperature (PCT)." (Proprietary)
9. Global Nuclear Fuel letter, A. Alzaben (GNF) to J. Head (Entergy Nuclear Operations, Inc.), (AFA-01-E004, June 29, 2001) regarding GE12 Upper Bound PCT for FitzPatrick, (Proprietary).
10. General Electric/Global Nuclear Fuel 10 CFR 50.46 Notification Letter 2002-01 regarding "SAFER Core Spray Injection Elevation Error." (Proprietary)
11. General Electric/Global Nuclear Fuel 10 CFR 50.46 Notification Letter 2002-02 regarding "Impact of SAFER Bulk Water Level Error on the Peak Clad Temperature (PCT)." (Proprietary)
12. Entergy letter, T.A. Sullivan to USNRC, dated November 12, 2002 (JAFP-02-0210) regarding "10 CFR 50.46 Reporting of Changes In Emergency Core Cooling System (ECCS) Evaluation Model."

13. General Electric 10 CFR 50.46 Notification Letter 2003-01, dated May 6, 2003 regarding "Impact of SAFER Level/Volume Table Error on the Peak Cladding Temperature (PCT)." (Proprietary)
14. General Electric 10 CFR 50.46 Notification Letter 2003-03, dated May 6, 2003 regarding "Impact of SAFER Initial Separator Pressure Drop Error on the Peak Cladding Temperature (PCT)." (Proprietary)
15. General Electric 10 CFR 50.46 Notification Letter 2002-03, dated August 26, 2002 regarding "Impact of GESTR Input File Interpolation Error on the Peak Clad Temperature (PCT)." (Proprietary)
16. General Electric 10 CFR 50.46 Notification Letter 2002-04, dated August 26, 2002 regarding "Impact of SAFER04 Computer Platform Change on the Peak Clad Temperature (PCT)." (Proprietary)
17. General Electric 10 CFR 50.46 Notification Letter 2002-05, dated August 26, 2002 regarding "Impact of WEVOL S1 Volume Error on the Peak Clad Temperature (PCT)." (Proprietary)
18. General Electric 10 CFR 50.46 Notification Letter 2003-05, dated May 13, 2004 regarding "Impact of Postulated Hydrogen-Oxygen Recombination." (Proprietary)
19. Entergy letter, T.A. Sullivan to USNRC, dated August 17, 2005 (JAFP-05-0126) regarding "10 CFR 50.46 Annual Report – Errors in Emergency Core Cooling System (ECCS) Evaluation Models."
20. GE Report, Supplemental Reload Licensing Report for James A. FitzPatrick Reload 18 Cycle 19, 0000-0078-7492-SRLR Rev.0, September 2008.
21. Entergy letter, J. J. Costedio to USNRC, dated August 14, 2006 (JAFP-06-0127) regarding "10 CFR 50.46 Annual Report – Errors in Emergency Core Cooling System (ECCS) Evaluation Models."
22. Entergy Nuclear Operations, Inc. letter E. Dorman to USNRC, JAFP-08-0133, dated December 22, 2008, "10 CFR 50.46 Annual Report – Errors in Emergency Core Cooling System (ECCS) Evaluation Models."
23. Entergy Nuclear Operations, Inc. letter E. Dorman to USNRC, JAFP-09-0091, dated July 31, 2009, "10 CFR 50.46 Annual Report – Errors in Emergency Core Cooling System (ECCS) Evaluation Models."
24. Entergy Nuclear Operations, Inc. letter J. Pechacek to USNRC, JAFP-10-0084, dated July 31, 2010, "10 CFR 50.46 Annual Report – Errors in Emergency Core Cooling System (ECCS) Evaluation Models."
25. General Electric 10 CFR 50.46 Notification Letter 2011-02, dated July 20, 2011 regarding "Impact of Database Error for Heat Deposition on the Peak Cladding Temperature (PCT) for 10 X 10 Fuel Bundles." (Proprietary)

26. General Electric 10 CFR 50.46 Notification Letter 2011-03, dated July 20, 2011 regarding "Impact of Updated Formulation for Gamma Heat Deposition to Channel Wall for 9 X 9 and 10 X 10 Fuel Bundles." (Proprietary)