



FEB 3 2012  
L-2012-049  
10 CFR 50.90

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

Re: Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251  
Response to NRC Request for Additional Information from the Nuclear Performance and Code Review Branch Regarding Extended Power Uprate License Amendment Request No. 205

References:

- (1) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request for Extended Power Uprate (LAR 205)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.
- (2) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-561), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Thermal Conductivity Degradation," Accession No. ML12009A113. December 31, 2011.
- (3) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2012-040), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Nuclear Fuel Design," January 25, 2012.
- (4) Email from J. Paige (NRC) to S. Hale (FPL), "TCD Question," January 26, 2012.
- (5) Email from J. Paige (NRC) to S. Hale (FPL), "FW: PAD4TCD Thermal Conductivity Model," January 31, 2012 (9:43 AM).
- (6) Email from J. Paige (NRC) to S. Hale (FPL), "FW: PAD4TCD Thermal Conductivity Model," January 31, 2012 (11:08 AM).
- (7) Email from J. Paige (NRC) to S. Hale (FPL), "DRAFT: Turkey Point EPU – Nuclear Performance and Code Review (SNPB) Request for Additional Information," January 27, 2012.
- (8) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-100), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Nuclear Performance and Code Review Issues," Accession No. ML11139A344, May 18, 2011.

By letter L-2010-113 dated October 21, 2010 [Reference 1], Florida Power and Light Company (FPL) requested to amend Renewed Facility Operating Licenses DPR-31 and DPR-41 and revise the Turkey Point Units 3 and 4 (PTN) Technical Specifications (TS). The proposed amendment will increase each unit's licensed core power level from 2300 megawatts thermal (MWt) to 2644 MWt and revise the Renewed Facility Operating Licenses and TS to support operation at this increased core thermal power level. This represents an approximate increase of 15% and is therefore considered an extended power uprate (EPU).

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As a result of information presented to the NRC on December 6, 2011, FPL was requested to address the impact of Thermal Conductivity Degradation (TCD) on the PTN EPU safety analyses. FPL provided a response to the NRC request for information (RAI) via letter L-2011-561 dated December 31, 2011 [Reference 2]. During an NRC Audit on January 19, 2012 FPL received a follow-up RAI question from the Nuclear Performance and Code Review Branch (SNPB) regarding the changes made to the Performance and Design (PAD) 4.0 code to explicitly account for TCD (PAD 4.0 TCD). FPL provided a response to the NRC follow-up RAI via letter L-2012-040 dated January 25, 2012 [Reference 3]. On January 26 and 31, 2012, FPL received additional RAI questions from SNPB regarding minimum fuel temperature modeling assumptions in the EPU analyses and analytical details associated with the STAV7.3 thermal conductivity model in the Performance and Design (PAD) 4.0 code with TCD [References 4, 5, and 6]. On January 27, 2012, FPL received additional RAI questions from the SNPB regarding predicted fuel grid crush locations, core loading configurations, and Reload Safety Analyses Checklist (RSAC) provisions [Reference 7]. Also, included in the RAI was a question involving a previous RAI response letter L-2011-100 dated May 18, 2011 [Reference 8] regarding high energy line breaks considered when generating hydraulic forcing functions. FPL's responses to these RAIs are provided in Attachment 1 to this letter.

This submittal does not alter the significant hazards consideration or environmental assessment previously submitted by FPL letter L-2010-113 [Reference 1].

This submittal contains no new commitments and no revisions to existing commitments.

In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

Should you have any questions regarding this submittal, please contact Mr. Robert J. Tomonto, Licensing Manager, at (305) 246-7327.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3, 2012.

Very truly yours,



Michael Kiley  
Site Vice President  
Turkey Point Nuclear Plant

#### Attachment

cc: USNRC Regional Administrator, Region II  
USNRC Project Manager, Turkey Point Nuclear Plant  
USNRC Resident Inspector, Turkey Point Nuclear Plant  
Mr. W. A. Passetti, Florida Department of Health

Turkey Point Units 3 and 4

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION  
FROM THE NUCLEAR PERFORMANCE AND CODE REVIEW BRANCH REGARDING  
EXTENDED POWER UPRATE LICENSE AMENDMENT REQUEST NO. 205

**ATTACHMENT 1**

**RAI RESPONSE**

### Response to Request for Additional Information

The following information is provided by Florida Power and Light Company (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support License Amendment Request (LAR) 205, Extended Power Uprate (EPU), for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL via letter (L-2010-113) dated October 21, 2010 [Reference 1].

As a result of information presented to the NRC on December 6, 2011, FPL was requested to address the impact of Thermal Conductivity Degradation (TCD) on the PTN EPU safety analyses. FPL provided a response to the NRC request for information (RAI) via letter L-2011-561 dated December 31, 2011 [Reference 2]. During an NRC Audit on January 19, 2012, FPL received a follow-up RAI question from the Nuclear Performance and Code Review Branch (SNPB) regarding the changes made to the Performance and Design (PAD) 4.0 code to explicitly account for TCD (PAD 4.0 TCD). FPL provided a response to the NRC follow-up RAI via letter L-2012-040 dated January 25, 2012 [Reference 3]. On January 26 and 31, 2012, FPL received additional RAI questions from SNPB regarding minimum fuel temperature modeling assumptions in the EPU analyses and analytical details associated with the STAV7.3 thermal conductivity model in the Performance and Design (PAD) 4.0 code with TCD [References 4, 5, and 6]. On January 27, 2012, FPL received additional RAI questions from the SNPB regarding predicted fuel grid crush locations, core loading configurations, and Reload Safety Analyses Checklist (RSAC) provisions [Reference 7]. Also, included in the RAI was a question involving a previous RAI response letter L-2011-100 dated May 18, 2011 [Reference 8] regarding high energy line breaks considered when generating hydraulic forcing functions.

FPL's responses to these RAIs are provided below.

#### RAI Response

**Question 1: L-2011-561 Att. 2 p. 8 states: "The following EPU analyses model minimum fuel temperatures as they have shown to be more conservative when modeling maximum fuel to reactor coolant heat transfer." The staff is trying to understand why using the minimum fuel temp is conservative since a higher fuel temperature would drive a higher heat transfer rate, due to it being proportional to the fuel to coolant temperature difference.**

In the LOFTRAN/RETRAN models used in the non-LOCA accident analyses, specifying minimum fuel temperatures produces higher heat transfer (UA) from fuel to coolant. The core power and initial reactor coolant system (RCS) temperatures are fixed. If the minimum fuel temperatures are specified that means the specified power (MWt) is being transferred from the fuel to the coolant with a lower fuel to coolant  $\Delta T$ . Therefore, the UA is higher.

Specifying maximum fuel temperatures produces a lower UA from fuel to coolant. The core power and initial RCS coolant temperatures are fixed. If the maximum fuel temperatures are specified that means the specified MWt is being transferred from the core to the coolant with a higher effective fuel to coolant  $\Delta T$  than the previous case. Therefore, the UA is lower.

**Question 2:** In order to ensure no grid crush occurs in RCCA locations, RSAC dictates that only DRFA fuel is loaded in core locations E2 and E14 when DRFA fuel is loaded in RCCA core locations F2 and F14. The staff interprets that the conclusion was based on Figure 5. However, Figure 8 also shows an acceptable core loading although E2 and E14 contain crushed fuel, which are not in RCCA locations.

**(a) How many core loading combinations were considered and how many were determined to be acceptable? Discuss the acceptance criteria used and why Figure 8 core loading cannot be accepted.**

Grid crush can only occur in fuel on the core periphery and only in columns 1, 2, 14, & 15 with 3 and 7 fuel assemblies in the z direction as shown in Figures 3 through 8 of L-2012-040 [Reference 3]. All combinations of DRFA and Upgrade fuel assemblies were considered in these locations.

The RSAC limitation only requires that a DRFA fuel assembly is loaded in core locations E2 and E14 when a DRFA fuel assembly is loaded in core locations F2 and F14. This prevents loading an Upgrade fuel assembly in core locations E2 and E14 when a DRFA fuel assembly is loaded in core locations F2 and F14 and thus prevents the configuration described in Figure 7 [Reference 3] from occurring. This RSAC limitation does allow the configuration described in Figure 8 [Reference 3] and allows all other combinations of DRFA and Upgrade fuel in locations E2 & E14 and F2 & F14 except the configuration described in Figure 7 [Reference 3].

**(b) What guarantee does RSAC provide to ensure no grid crush occurs in RCCA locations?**

Since only the configuration described in Figure 7 [Reference 3] results in grid deformation in an assembly in a RCCA location, the RSAC limitation described above is effective in preventing the sole configuration that can result in deformation in an assembly in a RCCA location while allowing all other configurations.

**Question 3:** In a previous response to the staff's RAI dated May 18, 2011 (L-2011-100), the licensee stated that the largest branch line breaks, either accumulator line (ACC) break, surge line break, or RHR line break, were considered when generating hydraulic forcing functions. Is this statement still valid to the current response? If so, please explain why only the ACC break is considered in the current response, and if not, which of these breaks is limiting and on which orientation.

The largest branch line breaks, either accumulator line (ACC) break, surge line break, or RHR line break, were considered when generating hydraulic forcing functions utilized for the EPU analyses. This remains valid for the January 25, 2012 response. The core plate motions based on the accumulator line break hydraulic forcing functions were utilized for the fuel structural evaluation since they were more limiting for the seismic/LOCA analysis both from a magnitude and orientation standpoint.

**Question 4: Please provide the full equation (including coefficients) for the STAV7.3 thermal conductivity model used in PAD4TCD. Include plots of conductivity versus temperature at 0, 20, 40, 65 GWd/MTU. Also, include an EXCEL spreadsheet with the data and plots.**

On February 2, 2012, Westinghouse submitted the requested information to the NRC via letter LTR-NRC-12-11, "Westinghouse Thermal Conductivity Model for Turkey Point Unit 3&4 Extended Power Uprate (EPU) License Amendment Request (LAR)(Proprietary)" [Reference 9].

#### References

1. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request for Extended Power Uprate (LAR 205)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.
2. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-561), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Thermal Conductivity Degradation," Accession No. ML12009A113. December 31, 2011.
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8. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-100), "Response to NRC Request for Additional Information Regarding Extended Power Uprate License Amendment Request No. 205 and Nuclear Performance and Code Review Issues," May 18, 2011.
9. J. Gresham (Westinghouse) to U.S. Nuclear Regulatory Commission (LTR-NRC-12-11), "Westinghouse Thermal Conductivity Model for Turkey Point Unit 3&4 Extended Power Uprate (EPU) License Amendment Request (LAR)(Proprietary)," February 2, 2012.