Florida Power & Light, 9760 S.W. 344 St. Homestead, FL 33035

FPL.

JUN 21 2011

L-2011-190
10 CFR 50.90
10 CFR 2.390

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 Regarding Extended Power Uprate License Amendment Request No. 205 and Instrumentation and Controls Issues

References:

(1) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.

(2) Email from J. Paige (NRC) to T. Abbatiello (FPL), "Turkey Point EPU – Instrumentation and Controls (EICB) Request for Additional Information - Round 1.2 (Part 2)", Accession No. ML11147A056, May 27, 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 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).

By email from the U.S. Nuclear Regulatory Commission (NRC) Project Manager (PM) dated May 27, 2011 [Reference 2], additional information regarding instrumentation and controls issues was requested by the NRC staff in the Instrumentation and Controls Branch (EICB) to support the review of the EPU License Amendment Request (LAR) [Reference 1]. The Request for Additional information (RAI) consisted of one question regarding the methodology in WCAP-17070-P used to calculate OTΔT and OPΔT protection values and additional information regarding the power range neutron flux high setpoint. Note that the RAI response involves a proposed change to TS Table 2.2-1, Function 2a, Power Range Neutron Flux High Setpoint. The RAI question and the FPL response are documented in the Attachments 1-6 to this letter.

Attachments 4 and 6 contain the applications for withholding the proprietary information contained in Attachments 3 and 5, respectively, from public disclosure. As Attachments 3 and 5 contain information proprietary to Westinghouse Electric Company, LLC (Westinghouse), they are each supported by an affidavit signed by Westinghouse, the owner of the information. The affidavits set forth the basis for which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of §2.390 of the Commission's' regulations. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390 of the Commission's regulations.

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NRR

Correspondence with respect to the copyright or proprietary aspects of items in the response to the RAI question in Attachment 3 and in WCAP-17070-P in Attachment 5 of this letter or the supporting Westinghouse affidavits should reference CAW-11-3173 and CAW-11-3194, respectively, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, Suite 428, 1000 Westinghouse Drive, Cranberry Township, PA 16066.

The Turkey Point Plant Nuclear Safety Committee (PNSC) has reviewed the proposed license amendments. In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

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.

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 June 21, 2011.

Very truly yours,

Michael Kiley
Site Vice President
Turkey Point Nuclear Plant

Attachments

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 (w/o Attachments 3 and 5)

Turkey Point Units 3 and 4

RESPONSE TO NRC RAI REGARDING EPU LAR NO. 205
AND EICB INSTRUMENTATION AND CONTROLS ISSUES
(NON-PROPRIETARY)

ATTACHMENT 1

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].

By email from the NRC Project Manager (PM) dated May 27, 2011 [Reference 2], additional information regarding instrumentation and controls issues was requested by the NRC staff in the Instrumentation and Controls Branch (EICB) to support the review of the EPU LAR [Reference 1]. The RAI consisted of one question with two parts, the first part involving OTΔT and OPΔT calculations and the second part involving the setpoint safety margin calculation per the WCAP-17070-P methodology. The RAI question and the FPL response are documented below.

EICB-1.2.1 TSTF-493, Option A "with changes to setpoint values" requires the licensee to provide summary calculations for each type of setpoint being revised, including Limiting Trip Setpoint (LTSP), Nominal Trip Setpoint (NTSP), Allowable Value (AV), As-Found Tolerance (AFT), and As-Left Tolerance (ALT). It is not clear to the NRC staff how the following two setpoint calculations, as explained in your letter dated April 22, 2011, are performed.

- **item 2 Overtemperature ΔT**
- **item 3 Overpower ΔT**

a. Provide the analytical limit (AL) values with units, sample setpoint calculations and/or diagrams for the above two setpoints.

The convention for the Overtemperature (OTΔT) and Overpower (OPΔT) setpoints and safety analysis limits in the Westinghouse analysis and setpoint methodology are unit-less values. They are a ratio of Rated Thermal Power (RTP) because these are not discrete value trip functions, but are variable trip functions (as noted in Chapter 14 of the UFSAR) and are normalized to 100 % RTP conditions. However if units were to be assigned they would be percent RTP units. The following example calculations are shown using information provided in WCAP -17070-P Rev. 0.

Overtemperature ΔT:

From Table 3-2:
Page 23, channel statistical allowance (CSA) = [ ]^{a,c}
Page 21, ΔT span = 159.4 % RTP

From Table 3-12:
Page 45, K1 (nominal) = 1.31
Page 45, K1 (safety analysis limit)[1] = [ ]^{a,c}
Page 46, Total Allowance (TA) = 8.8 % ΔT span

From Table 3-11:
Margin = [ ]^{a,c}

- Example: Calculations similar to the examples found on page 16 of the WCAP assuming the values above were presented in percent RTP:

K1 Nominal = 131 % RTP
K1 safety analysis limit = [ ]^{a,c}
TA = [ ]^{a,c}

CSA = [ ]^{a,c}

Margin = [ ]^{a,c}
[...
..................................]^{a,c}

Overpower ΔT:

From Table 3-3:
Page 26, channel statistical allowance (CSA) = [ ]^{a,c}
Page 25, ΔT span = 159.4 % RTP

From Table 3-13:
Page 47, K4 (nominal) = 1.10
Page 47, K4 (safety analysis limit)[1] = [ ]^{a,c}
Page 47, Total Allowance = 3.8 % ΔT span

From Table 3-11:
Margin = [ ]^{a,c}

- Example: Calculation similar to the examples found on page 16 of the WCAP assuming the values above were presented in percent RTP:

K4 Nominal = 110 % RTP
K4 safety analysis limit = [ ]^{a,c}
TA = [ ]^{a,c}

CSA = [ ]^{a,c}

Margin = [ ]^{a,c}
[...
..................................]^{a,c}

As shown here, the calculations provide the same results - only the units change. These results are consistent with the TSTF-493 requirements and NRC expectations regarding its implementation.

Notes:
[1] The safety analysis limits are shown in L 2010-113 Attachment 4, Section 2.4.1.2.3.2.3, Pages 2.4.1-15 and 2.4.1-16.

b. **While calculating the setpoint safety margin, the licensee did not include the ALT value in the calculation. For example, item 1 "Power Range Neutron Flux – High" in Table 3-12:**

AL = 115% RTP
NTS = 109% RTP
CSA = 5.52% RTP (4.6% Span with Span = 120%RTP)
ALT = 0.6% RTP (0.5% Span with Span = 120%RTP)

NTS + ALT + CSA = 109%RTP + 0.6%RTP + 5.52%RTP = 115.12%RTP, which is greater than AL (115%RTP). Therefore, the actual trip can result in the potential for the instrument channel to be operated beyond its analytical limit (AL) and there is no safety margin. Explain why the ALT is not included in your safety margin calculation for each proposed setpoint change.

The basic Westinghouse methodology uses a Square Root Sum of the Squares (SRSS) approach, as defined by equation 2.1 on page 3 of WCAP-17070-P, Rev. 0. With this approach the various uncertainty terms are determined to be either two-sided, random terms that are combined into sets of independent terms within the SRSS or are treated as bias terms outside of the SRSS. In the Westinghouse methodology, the Rack Calibration Accuracy (RCA) term is defined as the two-sided, random as left calibration tolerance (ALT), defined in the plant surveillance procedures. Therefore, the RCA term is the ALT. For calculation purposes, the RCA/ALT term is defined as the maximum permitted procedure tolerance value. However, in actual practice the magnitude is typically much less, 1/4th to 1/3rd the allowed tolerance on a 95/95 basis and demonstrates the characteristics of a truncated Logistic or Laplace distribution (very centralized). The magnitude and the random characteristics of this term are confirmed by evaluations of plant data.

The following should be noted about the check equation defined in the part b question above; NTS + ALT + CSA.

1. CSA is a 95/95 statistical combination of the uncertainties, as identified in equation 2.1 of WCAP-17070-P.
2. Equation 2.1 includes the independent, two-sided, random quantity $(RMTE + RCA)^2$.
3. RCA is summed with RMTE due to the inherent dependent nature of the two terms.
4. ALT = RCA, thus the check equation, NTS + ALT + CSA = NTS + RCA + CSA. Thus, the check equation treats RCA twice:
   a. Once, as a two-sided, random term within CSA.
   b. Once, as a one-sided, systematic term, a presumption of the summation.

Thus the check equation is overly conservative for the following reasons:

1. It treats the RCA term twice.
2. It presumes the RCA term is systematic and one-sided, contrary to supporting plant data.

3. It does not recognize the conservative treatment in equation 2.1 (dependent with RMTE).
4. It does not recognize the conservative nature of the typical RCA probability distribution function characteristics, supported by typical plant data.
5. Treatment of the check equation is deterministic rather than statistical in nature.

In addition, to presume a simple deterministic evaluation ignores the basic SRSS assumption that other terms may be in the opposite direction or at lower than assumed magnitudes that can offset the presumed RCA/ALT magnitude and direction. For example, RCA/ALT could be at its maximum allowed value, but the temperature effect for the process racks could be in the opposite direction at the same time, or the calorimetric normalization uncertainty is less than 2 % RTP, an extremely likely occurrence with plants utilizing ultrasonic feedwater flow measurements and a very likely occurrence with plants utilizing a venturi for feedwater flow measurement. It should be recognized that anytime a deterministic evaluation is compared to an SRSS statistical evaluation, the magnitude of margin determined for each evaluation will be different, with the deterministic margin always less than the statistical margin. Thus, it would be expected that there would be instances where positive margin is demonstrated with a statistical evaluation, but not for a deterministic evaluation.

Relative to the probability of exceeding a safety analysis limit (SAL), the Westinghouse uncertainty calculations are performed in a manner such that the overall result is determined at a 95 % probability, at a 95 % confidence level. However, it is again noted that Westinghouse evaluations of RCA (ALT) and RD (AFT) data for multiple plants, has demonstrated the conservative nature of the uncertainty calculation assumptions for these terms. Therefore, it is suggested that the Westinghouse calculations do result in a very low probability that the SAL will be exceeded and do meet the intent of RIS 2006-17 to provide ALT and AFT values that result in meaningful criteria by which to judge equipment operability based on expected performance.

The example provided for Power Range Neutron Flux – High is the only case where the RCA/ALT term when added as a deterministic value will result in the presumption that the safety analysis limit could be exceeded. All other functions in WCAP-17070-P have sufficient margin to pass the NRC check calculation. This is demonstrated by the margin as noted by Table 3-11 being larger than the RCA term. To alleviate any concern regarding the check calculation margin for the Power Range Neutron Flux-High trip, FPL has elected to change the nominal trip setpoint from 109 % RTP to 108 % RTP. Therefore using the check calculation approach the result of the nominal trip setpoint change would be 108 % RTP + [
]^{a,c} which is less than the safety analysis limit of 115 % RTP.

With the change to the nominal trip setpoint, the following values in WCAP-17070-P, Rev. 0 and responses to previous NRC RAIs provided via FPL letter L-2011-005 [Reference 3] will also change.

- From letter L-2011-005 [Reference 3]:

Table 3-12 Nominal Trip Setpoint will change from 109 % RTP to 108 % RTP.
Table 3-12 Total Allowance will change from 5.0 % span to 5.8 % span.
Table 3-12 Allowable Value will change from 109.6 % RTP to 108.6 % RTP.
Table 3-12 Margin will change from [ ][a,c]

- Example: Calculation for TA found on page 16 of WCAP – 17070-P Rev. 0:

SAL	115 % RTP
NTS	-108 % RTP
TA	| 7 % RTP |

If the instrument span = 120 % RTP, then:

$$TA = \frac{(7 \% RTP) * (100 \% span)}{(120 \% RTP)} = 5.8 \% span$$

- Example: Calculation from FPL letter L-2011-005 [Reference 3] for Power Range Neutron Flux - High will change to:

Allowable Value Determination

NTS = 108 % RTP
SPAN = 120 % RTP
RCA = 0.6 % RTP (0.5% span)
SAL = 115 % RTP

AV = NTS + RCA
AV = 108 % RTP + 0.6 % RTP
AV = 108.6 % RTP

ALT/AFT Determination

NTS = 108 % RTP
SPAN = 120 % RTP
RCA = 0.6 % RTP (0.5% span)

ALT = ± RCA
ALT = 108.6% RTP (+ 0.5% span)
ALT = 107.4% RTP (- 0.5% span)

AFT = ± RCA
AFT = 108.6% RTP (+ 0.5% span)
AFT = 107.4% RTP (- 0.5% span)

Revision 1 of WCAP-17070-NP is provided in Attachment 2.

A discussion of the proposed TS changes for this parameter (Power Range Neutron Flux High Setpoint) is provided on the following page.

Technical Specification Table 2.2-1 RTS Instrumentation Trip Setpoints
Function 2a, Power Range Neutron Flux - High

Current TS

	ALLOWABLE VALUE	TRIP SETPOINT
2. Power Range, Neutron Flux a. High Setpoint	≤ 112.0% RTP**	≤ 109.0% RTP**

Proposed TS

	ALLOWABLE VALUE	TRIP SETPOINT
2. Power Range, Neutron Flux a. High Setpoint	≤ **108.6%** RTP **	**108.0%(a),(b)** of RTP**

Basis for the Change: The EPU accident and transient analyses determined that for some accidents the Safety Analysis Limit (SAL) for the Power Range Neutron Flux – High reactor trip would need to be reduced from the current 118% to 115% Rated Thermal Power (RTP). Accordingly, the current Nominal Trip Setpoint (NTS) of 109% RTP will decrease to 108% RTP in order to accommodate the new SAL limit and still maintain sufficient margin. Similarly, the Allowable Value (AV) will decrease from 112.0% RTP to 108.6% RTP in order to comply with the methodology as described in WCAP-17070-P. The trip setpoint is considered a nominal value (i.e., expressed as a value without inequalities) for purposes of Channel Operability Test (COT) and Channel Calibration. Notes (a) and (b) are inserted here as well as in Table 4.3-1 to enhance the ability of the operator to readily recognize the trip functions affected by TSTF-493.

See Figure 1 for TS Table 2.2-1 indicated changes. Associated TS Bases remain unchanged.

References

1. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.
2. Email from J. Paige (NRC) to T. Abbatiello (FPL), "Turkey Point EPU – Instrumentation and Controls (EICB) Request for Additional Information - Round 1.2 (Part 2)", Accession No. ML11147A056, May 27, 2011.
3. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-005), "Response to NRC Request for Additional Information (RAI) Regarding Extended Power Uprate (EPU) License Amendment Request (LAR) No. 205 and Instrumentation and Control (I&C) Issues – Round 1," Accession No. ML110330190, January 28, 2011.

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWABLE VALUE	TRIP SETPOINT
1. Manual Reactor Trip	N.A.	N.A.
2. Power Range, Neutron Flux		
a. High Setpoint	~~109.6~~ 108.6 ≤ ~~112.0~~% of RTP**	108.0 ≤ ~~109.0~~% of RTP** (a),(b)
b. Low Setpoint	≤ 28.0% of RTP**	≤ 25% of RTP**
3. Intermediate Range, Neutron Flux	≤ 31.0% of RTP**	≤ 25% of RTP**
4. Source Range, Neutron Flux	≤ 1.4 X 10^5 cps	≤ 10^5 cps
5. Overtemperature ΔT	See Note 2	See Note 1 (a), (b) for K_1
6. Overpower ΔT	See Note 4	See Note 3 (a), (b) for K_4
7. Pressurizer Pressure-Low	≥ 1817 psig	≥ 1835 psig
8. Pressurizer Pressure-High	≤ 2403 psig	≤ 2385 psig
9. Pressurizer Water Level-High	≤ 92.2% of instrument span	≤ 92% of instrument span
10. Reactor Coolant Flow-Low	89.6 ≥ ~~88.8~~% of loop design flow*	≥ 90% of loop design flow* (a),(b)
11. Steam Generator Water Level Low-Low	15.5 ≥ ~~8.15~~% of narrow range instrument span	16 ≥ ~~10~~% of narrow range instrument span

* Loop design flow = ~~85,000~~ 86,900 gpm
** RTP = Rated Thermal Power

Figure 1