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L-2011-102
10 CFR 50.90

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

Re: Turkey Point Unit 3
Docket Nos. 50-250
Response to NRC Request for Additional Information (RAI) Regarding Extended Power Uprate (EPU) License Amendment Request (LAR) No. 205 and Unit 3 Mechanical/Civil Engineering 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 S. Franzone (FPL), "EMCB Acceptance Review Questions," Accession No. ML103500496, December 16, 2010

(3) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-004), "Response to NRC Request for Additional Information (RAI) Regarding Extended Power Uprate (EPU) License Amendment Request (LAR) No. 205 and Mechanical/Civil Engineering Issues," Accession No. ML110120234, January 7, 2011

By letter L-2010-113 dated October 21, 2010 [Reference 1], Florida Power and Light Company (FPL) requested to amend 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 their 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 December 16, 2010 [Reference 2], additional information regarding Mechanical and Civil Engineering issues was requested by the NRC staff in the Mechanical and Civil Engineering Branch (EMCB) to support their acceptance review of the EPU LAR. The RAI consisted of four (4) questions concerning the proposed piping design modifications and analyses for the Main Feedwater, Main Steam, and Component Cooling Water systems.

By letter L-2011-004 dated January 7, 2011 [Reference 3] FPL provided responses to four RAI questions. FPL's responses to RAIs 1, 3, and 4 included commitments to complete the associated design and analyses required to support each of the responses for Turkey Point Unit 3 by March 31, 2011. The Attachment to this letter satisfies FPL's commitment for Turkey Point Unit 3 by providing revised responses that supersede the responses previously submitted in FPL letter L-2011-004.

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NRR

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].

Should you have any questions regarding this submittal, please contact Ms Olga Hanek, Acting Licensing Manager, at (305) 246-6607.

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

Executed on March 25, 2011.

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 Unit 3

RESPONSE TO NRC RAI REGARDING EPU LAR NO. 205
AND UNIT 3 EMCB MECHANICAL/CIVIL ISSUES

ATTACHMENT

Response to Request for Additional Information

The following information is provided by Florida Power & Light Company (FPL) to satisfy commitments made in U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI) responses. This information was requested to support the review of License Amendment Request (LAR) No. 205, Extended Power Uprate (EPU), for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL letter L-2010-113 on October 21, 2010 [Reference 1].

In an email dated December 16, 2010 [Reference 2], the NRC staff requested additional information regarding FPL's request to implement the EPU. The RAI consisted of four (4) questions from the NRC Mechanical and Civil Engineering Branch (EMCB). By FPL letter L-2011-004 [Reference 7], FPL provided responses to the four RAI questions. The FPL responses to RAIs 1, 3, and 4 contained commitments to complete the design and analyses of the Main Feedwater (FW) piping for pipe rupture locations, the high energy line break (HELB) FW piping deflector shield, and the Component Cooling Water (CCW) and Main Steam (MS) systems piping supports by March 31, 2011 for Unit 3 and April 30, 2011 for Unit 4. The RAI questions and the FPL responses for Turkey Point Unit 3 are documented below.

1. **In Section 2.2.1.2.3 (Attachment 4, Licensing Report) the licensee notes that piping modifications related to the replacement of the number 5 and 6 feedwater heaters will be performed by the PTN design change process. Any impacts to existing pipe rupture locations and associated dynamic effects will be evaluated by the design change process. These statements indicate that the evaluations (design and analysis) of piping modifications and the impact on existing pipe rupture locations and associated dynamic effects required to support the EPU have not yet been performed. Therefore, the licensee has not provided sufficient technical information for staff's review to determine whether reasonable assurance exists to conclude that the integrity of the piping modifications are structurally adequate for the proposed EPU.**

   The following response supersedes the response provided in FPL letter L-2011-004 (ML110120234) for PTN Unit 3. In accordance with the FPL letter L-2011-004, the PTN Unit 4 response will be provided in separate correspondence by April 30, 2011.

   The design and analysis of the main feedwater (FW) piping modifications and their impact on existing high energy line break (HELB) pipe break locations and associated dynamic effects required to support the EPU have been completed for PTN Unit 3. The existing HELB pipe break locations are located downstream of the number 6 FW Heaters. No new or different break locations were postulated for the FW system. The analysis included modifications to the FW isolation and regulating valves and the bypass control valves.

   An assessment of the modifications to the FW recirculation piping configuration indicates that the connection points of the recirculation piping to the main FW line are in close proximity to the steam generator feed pumps and are well upstream of the inlet side of the number 6 FW Heaters. The steam generator feed pumps, as well as the adjacent restraints in axial, lateral and vertical directions downstream of the recirculation piping connection provide a substantial source of anchorage and restraint for the piping in this region. Furthermore, the number 6 FW Heaters serve as analytical anchors for the upstream and downstream FW

piping segments. Therefore, the modifications to the steam generator feed pump recirculation piping will not affect the existing HELB analyses, the postulated pipe break locations, or associated dynamic effects.

As identified in Licensing Report (LR) Section 2.2.1.1, the PTN criteria for identification of HELB locations outside containment and evaluation of their effects are derived from the Atomic Energy Commission (AEC) 1972 Giambusso letter [Reference 3] and subsequent AEC 'Errata Sheet' letter [Reference 6]. FPL responded to the NRC letter in References 4 and 5. In summary, for the FW system, break locations were postulated on the outlet piping of the number 6 FW Heater at:

1. The terminal ends, and
2. Two intermediate locations, which were chosen based on being the two points of highest stress.

There were no intermediate locations between the terminal ends that exceeded the threshold stress limits established by the original AEC criteria of 0.8 ($S_h + S_A$) under the loadings associated with seismic and operational plant conditions. Thus, no intermediate break locations were required to be postulated under this criterion in the current licensing basis.

The pipe stress evaluations for the replacement of the number 6 FW Heaters combined with their associated FW system piping modifications do not indicate any locations exceeding the threshold stress limits of 0.8 ($S_h + S_A$) which would necessitate defining any new intermediate break locations. The existing terminal pipe break locations remain unchanged, at the outlet of the number 6 FW Heaters and the containment penetrations, and there are no postulated pipe break locations associated with the number 5 FW Heaters.

Table 1 below provides the current and EPU calculated pipe stresses, intermediate break stress criteria, and stress margins related to pipe break locations based on the Unit 3 FW Heater replacements for the piping from the terminal ends at the number 6 FW Heaters up to the containment penetrations. Based on the methodology identified in FPL letter dated February 26, 1973 [Reference 5] (as updated by FPL letter dated June 21, 1973 [Reference 4]), the pipe stresses are associated with the combined loadings of pressure, deadweight, thermal, and operating basis earthquake (OBE) seismic for both the existing condition and the EPU condition. Although not part of the loadings defined in the current licensing basis [References 4 and 5], the calculated pipe stresses for the EPU condition also include water hammer (i.e., fluid transient) loading which is considered conservative. It is noted that the stresses in the FW system piping from the water hammer loading are relatively insignificant. The current licensing basis methodology defined in References 4 and 5 is unchanged.

Table 1

LOCATION	NODE No.	PIPE SIZE inch	EXISTING CONDITION			EPU CONDITION		
			STRESS LEVEL psi	INTERMEDIATE BREAK CRITERIA[1] psi	RATIO	STRESS LEVEL psi	INTERMEDIATE BREAK CRITERIA[1] psi	RATIO
Terminal								
Containment Penetration P-27A	595	14	16770	32400	0.518	19056	32400	0.588
Containment Penetration P-27B	750	14	20372	32400	0.629	22006	32400	0.679
Containment Penetration P-27C	890	14	21152	32400	0.653	24416	32400	0.754
Feedwater Heater 3E6A	400	18/24	17687	37800	0.422	5281	37800	0.140
Feedwater Heater 3E6B	355	18/24	15957	37800	0.468	4309	37800	0.114
Intermediate								
Elbow	780E	14	24633	37800	0.652	15627	37800	0.413
Elbow	625E	14	24494	37800	0.648	14899	37800	0.394

(1) Threshold limit of 0.8 ($S_h + S_A$)

The PTN current licensing basis does not require HELBs be postulated in those portions of the piping from the containment wall (penetrations) to and including the outboard isolation valves provided certain installation and in-service inspection examination criteria are met. These portions of the FW piping have been excluded from the table above. The analytical results presented above for EPU conditions include modifying the FW isolation and regulating valves and the bypass control valves. As stated previously, the steam generator feed pump recirculation piping re-configuration will not affect the current HELB analyses. FPL determined these FW system piping modifications do not indicate any required changes to the existing pipe break locations or unacceptable piping stresses resulting from any associated dynamic loadings.

The FW piping, which is being modified to support the EPU at PTN Unit 3, has been designed using the same design allowable stresses as those specified for Class I Structures, Systems, and Equipment defined in Appendix 5A of the PTN Updated Final Safety Analysis Report

(UFSAR). The main FW piping was designed to ensure that the stress limits found in Table 5A-1 of the PTN UFSAR are not exceeded due to the loadings imposed.

3. **In Section 2.5.1.3.2.3.4 (Attachment 4, Licensing Report) the licensee notes the replacement of the 6th feedwater heaters will result in resizing of the discharge piping from 18 inches to 24 inches. The jet impingement zones of influence are increasing due to EPU requiring modifications to shield equipment important to safety. These statements indicate that the evaluations (design and analysis) of 24 inch discharge piping, and shield equipment required to support the EPU have not been performed yet. Therefore, the licensee has not provided sufficient technical information for staff's review to determine whether reasonable assurance exists to conclude that the integrity of the required modifications are structurally adequate for the proposed EPU.**

   The following response supersedes the response provided in FPL letter L-2011-004 (ML110120234) for PTN Unit 3. In accordance with the FPL letter L-2011-004, the PTN Unit 4 response will be provided in separate correspondence by April 30, 2011.

   Two of the terminal end break locations for the main feedwater (FW) piping are at the outlet of the PTN Unit 3 E6A/B FW Heaters. Due to increase of the FW Heater outlet nozzle diameter to 24 inches from the current outlet nozzle diameter of 18 inches, there is an associated increase in the size of the pipe break zone of influence. The calculated zone of influence for EPU conditions is 18 ft. for the postulated break (increased from 13.5 ft.). The impact to components important to safety from the increased jet impingement zone of influence has been evaluated in the PTN design change process for the replacement of the number 6 FW Heater in PTN Unit 3. Walkdowns encompassing a 18 foot zone of influence around the number 6 FW Heater outlet pipe have been performed to identify equipment important to safety. Safety-related pressure transmitters PT-3-486, PT-3-464, and PT-3-476 were identified to fall within the zone of influence of a circumferential FW pipe rupture at the outlet nozzle terminal ends in Unit 3. These components are located within the main steam valve platform trestle area.

   To protect these components, new deflector shields will be installed on the FW outlet piping at the postulated circumferential break locations at each of the number 6 FW Heaters outlet nozzles. The shields are designed to redirect jet forces and guide streams in a direction away from the safety-related equipment. The design of the HELB deflector shield is shown in Figure 1.

   The design and analytical details for the HELB deflector shield for PTN Unit 3 were completed, and will be incorporated into the FW system modification package. The deflector shields are designed as Class III Structures, Systems, and Equipment, but using the same design allowable stresses as those used for Class I Structures, Systems, and Equipment defined in Appendix 5A of the PTN Updated Final Safety Analysis Report (UFSAR) since the criteria for Class III includes criteria (allowables) for faulted conditions.

Principal stresses were calculated using standard structural finite element method techniques, under various scenarios of applied loading, from the postulated terminal end break. The maximum principal stresses were determined to be less than the stress limits defined in Appendix 5A of the PTN UFSAR for hypothetical accident conditions. As such, no loss of function is assured.

4. **Tables 2.2.2.2-3 and 2.2.2.2-4 (Attachment 4, Licensing Report), provide Attributes of Concern for pipe support modifications for Component Cooling and Main Steam piping systems for PTN Units 3 and 4. It is not clear from these tables whether the design and analytical details of modifications for welds, structural members, integral welded attachments (IWA), base plate, anchor bolts, rods, U-bolts, and new snubbers are complete. The licensee is requested to clarify whether the designs for the above modifications are completed or still in progress.**

   The following response supersedes the response provided in FPL letter L-2011-004 (ML110120234) for PTN Unit 3. In accordance with the FPL letter L-2011-004, the PTN Unit 4 response will be provided in separate correspondence by April 30, 2011.

   The design and analytical details for pipe support modifications to support EPU implementation for the Component Cooling Water (CCW) and Main Steam (MS) piping systems for PTN Unit 3 have been completed. Walkdowns of the PTN Unit 3 CCW and MS systems piping were completed during the Fall 2010 Unit 3 refueling outage. Walkdown activities confirmed the feasibility of the modifications for the twenty (20) CCW pipe supports and two (2) MS pipe supports listed in LR Table 2.2.2.2-3 for Unit 3. Analytical details of the modifications for these pipe support components, such as welds, structural members, integral welded attachments, base plates, anchor bolts, rods, U-bolts and snubbers are complete. Design and modification of these components was performed in accordance with the PTN design change process. The list of piping supports and a description of the changes are provided in the table below.

TABLE 2.2.2.2-3 RAI Response

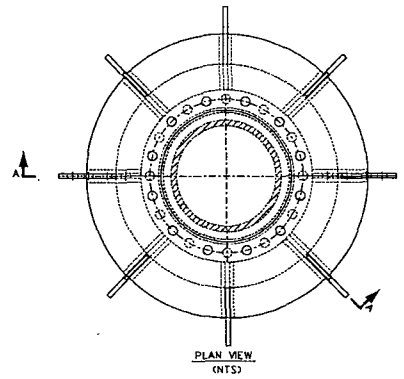
Piping System	Stress Problem No.	Pipe Support Mark No.	Support Attribute of Concern	Resolution
Component Cooling Water	SP-017	3-CCH-6	Weld stress; [Modify weld]	Redesigned the support by removing from existing gang support
	SP-020	3-CCH-19	Weld stress, [Modify welds]	Replaced existing L3x3x1/4 frame with TS 3x3x1/4
	SP-021	281A-A	Local pipe stress at IWA; trunnion stress; weld stress; [Modify welds and IWA]	Replaced 2 1/2" Ø trunnion with 4" Ø trunnion
	SP-038	3-SR-304	Surface mounted base plate stress; anchor bolt loads; [Anchor bolts/base plate modification]	Additional brace added
		3-SR-302	Weld stress; member stress; [Modify welds and members]	Added brace in east-west direction to eliminate stress concern
		MK-111	Local pipe stress at IWA; [Modify IWA]	Replaced 2 1/2" Ø pipe trunnion with 8" Ø trunnion
		3-SMH-14	Rod load; [Replace rod]	Replaced 7/8" rod support with 1 1/4" rod
		SR-313	Local pipe stress at IWA; [Modify IWA]	Trunnion modified from 8" Ø with 10" Ø
	CCW-08	DET C	U-bolt loads; [Replace U-bolt]	Added lateral component
		DET F	Surface mounted base plate stress; [Base plate modification]	Anchor bolts and base plate replaced
	CCW-09	3-ACH-68	Weld stress – IWA to pipe; [Modify weld]	Added a sliding plate at middle of trunnion
	CCW-12	J	Anchor bolt loads; [Anchor bolts modification]	Additional brace TS6x6x1/2 added
	CCW-13	3-BAH-20	Anchor bolt loads; [Anchor bolts modification]	Redesigned the entire support
	CCW-27	SR-292	Weld Stress; [Modify weld]	Replaced existing W4x13 & 2" Ø pipe with TS 4x4x3/8 & strut
		SR-142	Member stress; weld stress; [Modify welds and members]	Separated from existing gang support and replaced L3x3x5/16 with TS 3x3x1/4
		SR-140	Local pipe stress; weld stress; [Modify weld and IWA]	Redesigned the entire support
		SR-172	Member stress; weld stress and local pipe stress at IWA; [Modify weld, members and IWA]	Redesigned the entire support
		8074-H-327-01	Member stress; [Modify member]	Replaced existing S4x9.5 with TS 6x2x3/8
		SR-169	Local pipe stress at IWA; weld stress; [Modify weld and IWA]	Replaced 2" Ø pipe trunnion with 4" Ø
		8074-A-370-01	Local pipe stress at IWA; [Modify IWA]	Redesigned three way restraint in accordance with revised stress analysis

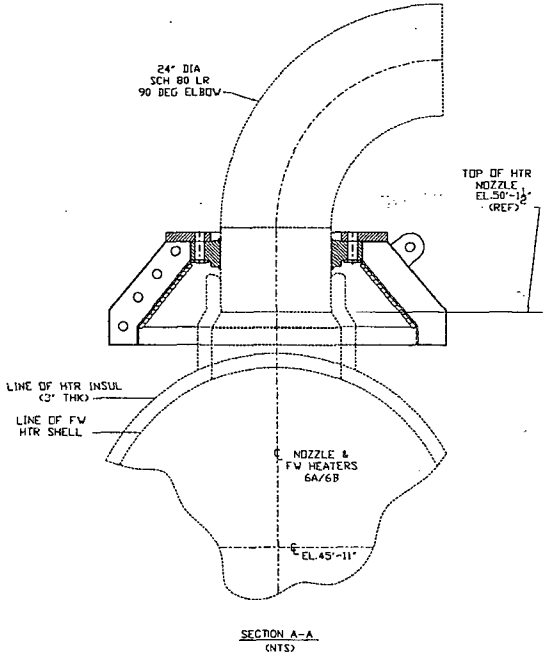
TABLE 2.2.2.2-3 RAI Response (continued)

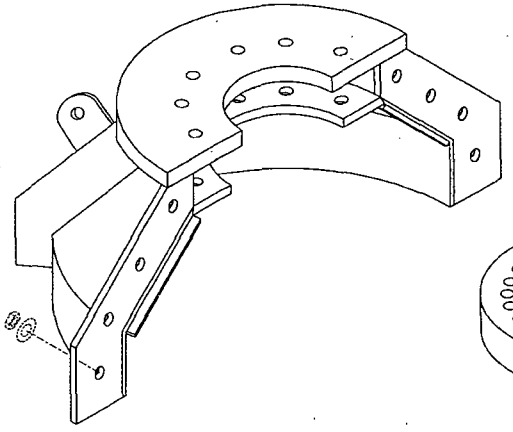
Piping System	Stress Problem No.	Pipe Support Mark No.	Support Attribute of Concern	Resolution
Main Steam	MS-3	New Vertical Snubber	Install new vertical snubber	New tandem snubber added
	MS-5	3-MSH-22B	Anchor bolts & plates; [Modify plate and bolts]	Modified base plate and used maxi bolts

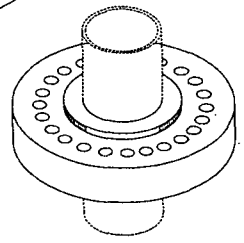
References

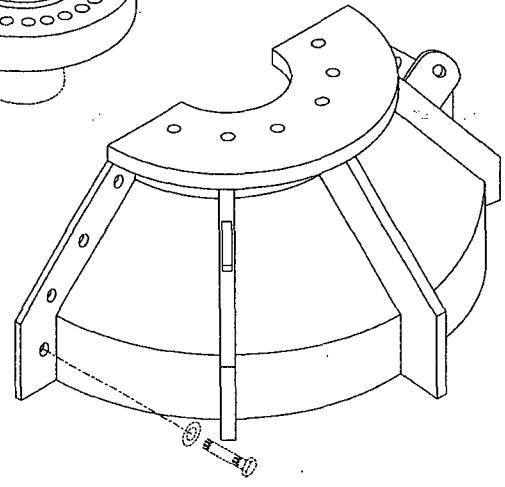
1. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.
2. NRC Email from Jason Paige (NRC) to Steve Franzone (FPL), "EMCB Acceptance Review Questions," December 16, 2010
3. NRC Letter from A. Giambusso (AEC) to Dr. J. Coughlin (FPL), December 18, 1972
4. FPL Letter from Dr. J. Coughlin (FPL) letter to A. Giambusso (AEC), "Analysis of Postulated Pipe Failures Outside of Containment Structures," June 21, 1973
5. FPL Letter from James Coughlin (FPL) letter to A. Giambusso (AEC), "Analysis of Postulated Pipe Failures Outside of Containment Structures", February 26, 1973
6. NRC Letter from Karl Kniel (AEC) to Dr. J. Coughlin (FPL), January 24, 1973, Errata Sheet
7. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2011-004), "Response to NRC Request for Additional Information (RAI) Regarding Extended Power Uprate (EPU) License Amendment Request (LAR) No. 205 and Mechanical/Civil Engineering Issues," Accession No. ML110120234, January 7, 2011











LEGEND		
GENERAL NOTES		

REV	DATE	REVISION	BY	CH	APP	APP
0		ISSUED FOR 90% REVIEW PER EC242476 (PCN 09-015)	AZ	RP	PY	

FPL

TURKEY POINT NUCLEAR UNIT 3

DETAIL

FW HEATERS 6A/B FEED WATER
NOZZLE DEFLECTOR SHIELD FOR
HIGH ENERGY LINE BREAK (HELB)

FIGURE 1