Florida Power & Light Company, 9760 SW 344 St., Fla City, FL 33035

FPL

L-2001-126
10 CFR 54

MAY 29 2001

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Supplemental Response to Request for Additional Information for the Review of the Turkey Point Units 3 and 4 License Renewal Application

By letter dated April 19, 2001, FPL provided responses to the Requests for Additional Information (RAIs) associated with Appendix B Aging Management Programs, Section 4.2 Reactor Vessel Irradiation Embrittlement, and Subsection 4.7.1, Bottom Mounted Instrumentation Thimble Tube Wear of the Turkey Point Units 3 and 4 License Renewal Application (LRA). During a telephone conversation with FPL on May 7, 2001, the NRC requested additional information to support their review of FPL's response to RAI 4.2.2-1 related to the Reactor Vessel Low Upper Shelf Toughness Fracture Mechanics Analysis. Accordingly, Attachment 1 to this letter contains the supplemental response to this RAI.

Should you have any further questions, please contact E. A. Thompson at (305)246-6921.

Very truly yours,

R. J. Hovey
Vice President - Turkey Point

RJH/EAT/hlo

Attachment

A001

cc: U.S. Nuclear Regulatory Commission, Washington, D.C.

Chief, License Renewal and Standardization Branch
Project Manager - Turkey Point License Renewal
Project Manager - Turkey Point

U.S. Nuclear Regulatory Commission, Region II
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant

Other

Mr. Robert Butterworth
Attorney General
Department of Legal Affairs
The Capitol
Tallahassee, FL 32399-1050

Mr. William A. Passetti, Chief
Department of Health
Bureau of Radiation Control
2020 Capital Circle, SE, Bin #C21
Tallahassee, FL 32399-1741

Mr. Joe Meyers, Director
Division of Emergency Management
2555 Shumard Oak Drive
Tallahassee, FL 32399-2100

County Manager
Miami-Dade County
111 NW 1 Street 29th Floor
Miami, FL 33128

Mr. Douglas J. Walters
Nuclear Energy Institute
1776 I Street NW
Suite 400
Washington, D.C. 20006

Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251

Response to Request for Additional Information for the Review of the Turkey Point Units 3 and 4, License Renewal Application

STATE OF FLORIDA)
) ss
COUNTY OF MIAMI-DADE)

R. J. Hovey being first duly sworn, deposes and says:

That he is Vice President - Turkey Point of Florida Power and Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

R. J. Hovey

Subscribed and sworn to before me this
29th day of May, 2001.
Cheryl A. Stevenson

Name of Notary Public (Type or Print)

CHERYL A. STEVENSON
NOTARY PUBLIC - STATE OF FLORIDA
COMMISSION # CC929876
EXPIRES 6/19/2004
BONDED THRU ASA 1-888-NOTARY1

R. J. Hovey is personally known to me.

ATTACHMENT 1
SUPPLEMENTAL RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION TURKEY POINT UNITS 3 AND 4, LICENSE RENEWAL APPLICATION

Section 4.2.2 UPPER SHELF ENERGY

RAI 4.2.2-1:

In section 4.2.2 of the LRA, the applicant cites reference 4.2-4, "BAW-2312, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of Reactor Vessels of Turkey Point Units 3 and 4 for Extended Life Through 48 Effective Full Power Years, B&W, November 1997" as a basis for extending their upper-shelf energy (USE) equivalent margins analysis (EMA) into the period of extended operation. The applicant also stated that Appendix K of ASME Section XI was used to demonstrate a continued, acceptable EMA. The staff was unable to find BAW-2312 document on the NRC docket. Since the LRA does not give sufficient detail of how the EMA was extended, provide BAW-2312, and a summary of the methodology used to extend the applicability of the EMA. In addition, evaluate the impact of the Charpy data from the integrated (Turkey Point Units 3 and 4) surveillance program on the assessment.

SUPPLEMENTAL QUESTIONS/RESPONSES

In accordance with telephone conversation of May 7, 2001 between the NRC and FPL, the following additional information is provided as requested by the NRC staff:

1. **NRC RAI:**
   In Section 4.1 of BAW-2312, "Procedure for Evaluating Levels A and B Service Loadings" (page 4-1), paragraph (2) defines the material coefficient $C_m = E\alpha/(1-v)d = 0.0051$ for SA-508 Class 2 steels. Since the analysis is for the Turkey Point beltline welds (Linde 80), why was the material coefficient for SA-508 forging material chosen? Do SA-508 and Linde 80 material have equivalent Cm values?

   FPL RESPONSE:
   Article K-4210 of Section XI of the ASME Code, 1995 Edition with Addenda through 1996, states that a C_m value of 0.0051 (ksi-hr)/(in^2-°F) can be used for SA-508, Class 2 steels and their associated weldments. The Linde 80 beltline weld material was considered to be an associated weldment of SA-508, Class 2 steel in selecting a value of C_m for use in the Turkey Point low upper shelf analysis.

2. **NRC RAI:**
In Section 4.2 of BAW-2312, "Procedure for Evaluating Levels C and D Service Loadings" (page 4-4), the first paragraph states that the steam line break (SLB) without offsite power transient bounds all Level C transients. What are the design Level C and D transients for Turkey Point and why does the SLB bound all of the other Level C and D transients?

FPL RESPONSE:
The original low upper-shelf analysis performed for B&W-designed reactor vessels (BAW-2178PA) which was approved by the NRC Staff (Reference 1), reviewed Level C and D transients for all participating plants. It was concluded in that document that the Turkey Point steam line break without offsite power transient was the most limiting of all Levels C and D transients, including LOCA transients. This conclusion remains valid for the period of extended operation.

1 Letter from B.W. Sheron, NRR, to G.L. Lehmann, B&WOG, entitled Acceptance for Referencing of Topical Report, BAW-2178P, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of Reactor Vessels of B&W Owners Reactor Vessel Working Group for Level C & D Service Loads", March 29, 1994

3. **NRC RAI:**
In Section 4.4 of BAW-2312, "Effect of Cladding Material" (page 4-5), the last sentence states, "Since the Zion and Turkey Point reactor vessels are similar in design, this value [9 ksi$\sqrt{in}$] for K_{Iclad} will also be used for the present flaw evaluation." K_{Iclad} is the stress intensity factor associated with the cladding. What is similar between the Zion and the Turkey Point vessels? What is the wall and clad thickness of the Zion vessel, and what is the wall and clad thickness of the Turkey Point vessels? Does K_{Iclad} vary with wall thickness and/or clad thickness? Do references 2 and 5 of this report apply to Zion and Turkey Point?

FPL RESPONSE:
The original low upper-shelf analysis (BAW-2178PA) considered a bounding vessel (Zion Unit 1) and a bounding transient (Turkey Point steam line break). Of all the B&W-designed reactor vessels considered in the analysis, the Zion vessel had the highest projected fluence and was as thick or thicker than any other vessel. The thickness of the reactor vessel for Turkey Pont and Zion is 7.75" and

8.44", respectively. The nominal cladding thickness is 3/16" for both vessels. From a thermal stress perspective, it is conservative to consider the thicker vessel. It is therefore appropriate to utilize the bounding value of 9 ksi√in as the stress intensity factor for K_{Iclad} in the Turkey Point low upper-shelf analysis reported in BAW-2312.

Regarding references 2 and 5 of BAW-2312, reference 2 (BAW-2118P) applies only to Turkey Point and reference 5 (BAW-2178P) applies to both Zion and Turkey Point.

4. **NRC RAI:**
In Section 7 of BAW-2312, "Evaluation for Levels C and D Service Loadings" (page 7-1), the first paragraph states that the computer code PCRIT calculates stress intensity factors to account for the effect of residual stresses in welds. Were the residual stresses that were used in the Turkey Point evaluation the same as those used in the Zion evaluation? Describe the Zion and Turkey Point weld processes, and address whether or not the processes will produce the same residual stresses. If there are differences in the weld processes, provide justification for the assumed residual stresses.

FPL RESPONSE:
The PCRIT code calculates a stress intensity factor to account for the residual stress in welds using through-wall stress distributions normalized by the yield strength. The calculated stress intensity factor used is therefore specific to the vessel being analyzed. The Turkey Point vessel contains single-V type circumferential welds which result in a compressive residual stress near the inside surface. A double-J type weld is specified as input to PCRIT code. Since the double-J type weld results in a less compressive residual stress at the inside surface, PCRIT generates a conservative value for the stress intensity factor.