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SUBJECT: Submits response to NRC's second RAI dtd 980423,re GL 92-08, "Thermo-Lag 330-1 Fire Barriers."

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JUN 30 1998

L-98-150
10 CFR §50.48
10 CFR Part 50 Appendix R

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Response to Second Request for Additional Information - Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers"

By letter L-97-045, dated March 7, 1997, Florida Power and Light Company (FPL) submitted its response to the NRC Request for Additional Information dated January 29, 1997, related to Generic Letter (GL) 92-08 for Turkey Point Units 3 and 4. The NRC letter requested information needed to complete review of FPL's response to ampacity derating factor determinations.

By letter dated April 23, 1998, the NRC issued to FPL a second request for additional information needed to complete the review of FPL's response to GL 92-08 ampacity derating factor determinations. In accordance with the NRC request, the attachment to this letter provides the additional information requested.

Should there be any questions, please contact us.

Very truly yours,

R. J. Hovey
Vice President
Turkey Point Plant

OIH

Attachment

cc: L. A. Reyes, Regional Administrator, Region II, USNRC
T. P. Johnson, Senior Resident Inspector, USNRC, Turkey Point

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Response to NRC Second Request for Additional Information for Thermo-Lag at Turkey Point Units 3 and 4

Florida Power and Light (FPL) has prepared responses to the NRC Request for Additional Information, "Fire Barriers Exemption", Turkey Point Units 3 and 4, dated April 23, 1998. The specific questions and responses are itemized below.

2.1.a For the nominal 1-hour Thermo-Lag cladded conduit fire barriers, the licensee has assumed a fire barrier ampacity derating factor (ADF) of 11% (or an ampacity correction factor (ACF) of 0.89). This value apparently derives from the Texas Utilities Electric Company (TUEC) ampacity derating tests conducted for Comanche Peak Steam Electric Station, Unit 2. Similarly, for the nominal 3-hour Thermo-Lag cladded fire barriers, the licensee has assumed an ADF of 20% (or ACF of 0.80). This value also appears to be derived from a thermal extrapolation of the TUEC 1-hour conduit ampacity derating tests. However, the maximum 11% ADF value selected by the licensee is inconsistent and nonconservative with the staff findings regarding the subject TUEC 1-hour conduit barrier tests [reference NRC Letter from T. Polich to C. Lance Terry, FPL, dated June 14, 1995].

2.2.a The same issue as stated in Item 2.1.a above is also applicable for Calculation PTN-BFJM-96-005 and applicable conduit fire barriers installed at TPP.

In the referenced letter the NRC staff recommended that TUEC change the 11% ADF to 21% for cables in conduits to bound test protocol uncertainties. Although Turkey Point Calculation PTN-BFJM-96-005 was based on TUEC ampacity test data, the ACF values being used for 1-hour rated fire barrier upgrades on conduits are based on ACF values developed in Calculation PTN-BFJM-96-028 for 3-hour rated fire barrier configurations. Calculation PTN-BFJM-96-028 also compared calculated results with ampacity data developed through Tennessee Valley Authority (TVA) testing, and conservatively selected ACF values based on this comparison. Since ACF values for 3-hour barriers bound those for 1-hour barriers, the ACF values used for 1-hour fire rated conduit barriers are conservative. As such, the staff findings presented in the referenced letter need not be considered for Turkey Point.

In addition, the results of similar conduit testing performed by Underwriters Laboratories Inc. (UL) for Florida Power

Corporation were reviewed and compared with ACF values developed for Turkey Point based on the TUEC and TVA testing results. The Turkey Point ACF values were more conservative than the extrapolated values based on the UL test results, thus providing added assurance that the ACF values used for Turkey Point installations are reasonable, conservative, and consistent with tested configurations.

2.2.b **SNL made the following observations regarding the subject calculations:**

Calculation PTN-BFJM-96-028

1. **For the cable tray case, the licensee appears to have mistaken Tennessee Valley Authority (TVA) test Article 7.1 as a 3-hour barrier system with a nominal thickness of 1.25" when in fact TVA Test Article 7.1 involved a test of a 1-hour system of nominal 5/8" thickness. As a result, the licensee thermal model has understated the relative impact of the change in barrier thickness for the upgraded 3-hour barrier system in comparison to the tested 1-hour barrier system.**

   The calculation establishes that an ACF value of 0.52 is to be used for cable tray. This was the ACF value for a standard tray with 3-hour upgrade, as listed in Table 16 of the TVA paper attached to the calculation. The 0.52 value is based on a configuration using nominal 1-1/4" Thermo-Lag 330-1 plus two layers of Thermo-Lag 770-1 mat material, with each Thermo-Lag 770-1 layer being 3/8" nominal thickness. This is consistent with the TVA paper as stated in the paragraph under "Standard Three-Hour Tray" on Page 14, and as described under "Phase III Fire Tests", beginning at the bottom of Page 9 and continuing to Table 8 on Page 10.

   This interpretation was re-confirmed with respect to the test results. The calculation results appear reasonable based on comparative material thicknesses and are considered to be correct as presented. Therefore, no change is required in the barrier thickness or its relative impact on the calculation results.

2. **The licensee table cites a value of 0.75" for the assumed thickness of the 3-hour plus upgrade cable tray fire barrier system. This appears to be a simple typographical error and the calculation seems to have been performed using the correct 2" thickness.**

The subject 0.75" thickness is identified in a table format. The tabulated value of 0.75" shows the added thickness of Thermo-Lag 770-1 material. This, when added to the 1.25" thickness of Thermo-Lag 330-1 material, produces a 2" total thickness of the Thermo-Lag 330-1/770-1 composite assembly. The data presentation is similar to the presentation format of tabulated values for conduit, with the exception of the outside diameter (ODT) column not listing any data.

Calculation JPN-PTN-SEEP-96-011

1. The licensee assessment of the baseline ampacity limits for cable trays was not documented in the submittal; hence, a definitive review of these values was not possible. Based on a simple comparison of the licensee-cited values to those obtained by SNL using the ICEA P-54-440 methodology, SNL found that certain licensee-cited values appeared non-conservative. Although SNL re-analyzed each of the six licensee cable tray applications using accepted methods, and based on this re-analysis, all of the cable tray applications appear to have an adequate ampacity margin, the licensee should document their assessment of the baseline ampacity limits for cable tray applications.

   Evaluation JPN-PTN-SEEP-96-011 was prepared to review the ampacity margins available for safe shutdown cables installed at Turkey Point using ampacity derating factors determined by testing at Omega Point Laboratories. The baseline ampacity ratings for cables reviewed in the evaluation were taken from original design calculations prepared in 1985 and 1990, as referenced and documented in the evaluation. The baseline ampacity ratings calculated in earlier calculations were used as a basis for this evaluation. It is common practice to use prior calculation results as a basis for new calculations in lieu of performing duplicate calculations. As such, these values are consistent with the design basis for Turkey Point and are considered reasonable and conservative.

2. In one particular cable tray case study (tray 4AXT10), the licensee has applied the methodology of IPCEA P-46-426 for cables in trays without maintained spacing. This methodology has been superseded by the ICEA P-54-440 methodology; hence, its use in this study appears to be inappropriate. SNL also noted that the licensee application of this method had cited open air ampacity limits for a single conductor cable when, in fact, the values for a 3-conductor cable should have been used. SNL re-analyzed the case in question using the P-54-440

method and, as a result, it appears that the subject ampacity loads are acceptable. However, the licensee should re-examine the use of the IPCEA P-46-426 methodology in this case.

The original calculation to address the ampacity derating of the cables in the subject cable tray, Calculation 5177-304-E005, used the methodology of IPCEA P-46-426. The results of that calculation were used as a basis for the subsequent calculation prepared in 1985 to derate the cables' ampacity rating for the addition of Thermo-Lag. This evaluation used the same methodology as that used in the previous basis calculations to calculate the cables' ampacity rating using a revised tray fill value. The use of IPCEA P-46-426 in lieu of IPCEA P-54-440 is considered appropriate in order to remain consistent with the methodology used in the original calculation.

3. **In the assessment of conduit ampacity limits, the licensee has applied conduit conductor count correction factors that inherently credit 50% diversity without explicitly justifying that this level of diversity does in fact exist in the applicable conduits. This concern only impacts those few conduits with a conductor count of ten or more. Although SNL has re-analyzed the affected conduits, and it appears that even including the more conservative conductor count correction factor, the affected cables are operating within acceptable ampacity limits, there should be an explicit justification for the 50% diversity assumption.**

The conductor count correction factors used in the evaluation are those used in Calculation 5177-EF-15, presented as Attachment 5 to the evaluation. Calculation 5177-EF-15 established the level of diversity for the conductors. The table was reproduced in the evaluation but did not indicate that the values included the effects of load diversity. The table as it appears in Calculation 5177-EF-15 is shown below:

TOTAL NUMBER OF CONDUCTORS	AMPACITY CORRECTION FACTOR
3	1.00
4 - 6	0.80
7 - 9	0.70
10 - 24*	0.70
24 - 42*	0.60
43 & UP*	0.50

*Includes the effects of load diversity.

The conductor count correction factors used in the evaluation correspond to those in the table above. Therefore, justification for load diversity has been established in original design calculations.