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SUBJECT: Forwards response to request for addl info re GL 92-08,  
"Thermo-Lag 330-1 Fire Barriers."

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March 28, 1995

L-95-101  
10 CFR 50.4  
10 CFR 50.54 (f)

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

RE: St. Lucie Units 1 and 2  
Docket No. 50-335 and 50-389  
Request for Additional Information  
Generic Letter 92-08 Response


A response to the additional information you requested from Florida Power and Light Company (FPL) on the material properties and attributes of the Thermo-Lag 330-1 used at St. Lucie is attached. The original St. Lucie response to Generic Letter (GL) 92-08, *Thermo-Lag 330-1 Fire Barriers*, was submitted by FPL letter, L-93-96 on April 16, 1993, and supplemented in response to your requests for additional information (RAI) dated December 20, 1993, and August 9, 1994, by FPL letters, L-94-33 dated February 11, 1994, L-94-104 dated April 29, 94, and L-94-275 dated November 4, 1994.

Your letter to J. H. Goldberg, dated December 28, 1994, requested additional information on the material properties and attributes of Thermo-Lag fire barriers installed at St. Lucie Plant. In addition, your letter requested plans and schedules for resolving the technical issues identified for those material properties and attributes identified in the request. The information was requested to be provided within 90 days of December 28, 1994, the date of the NRC request. This letter replaces previous schedules and plans for the resolution of the Thermo-Lag fire barrier issues based on the use of the *NEI Application Guide for Evaluation of Thermo-Lag 330 Fire Barrier Systems* issued July 7, 1994, and plant specific fire barrier testing.

The attached information is provided pursuant to the requirements of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f).

Please contact us if there are any questions about this submittal.

Very truly yours,

  
D. A. Sager  
Vice President  
St. Lucie Plant

DAS/GRM

cc: Stewart D. Ebnetter, Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, St. Lucie Plant

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L-95-101  
St. Lucie Units 1 and 2  
Docket No. 50-335 and 50-389

STATE OF FLORIDA     )  
                                  )  
COUNTY OF ST. LUCIE    )     ss.

D. A. Sager being first duly sworn, deposes and says:


That he is Vice President, St. Lucie Plant for the Nuclear Division of Florida Power & 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.

  
\_\_\_\_\_  
D. A. Sager

STATE OF FLORIDA  
COUNTY OF ST. LUCIE

The foregoing instrument was acknowledged before  
me this 28<sup>th</sup> day of MARCH, 1995  
by D. A. Sager, who is personally known to me  
and who did take an oath.

  
\_\_\_\_\_  
KAREN WEST  
Name of Notary Public

My Commission expires 4-18-98

Commission No. CC 359926



KAREN WEST  
MY COMMISSION # CC359926 EXPIRES  
April 18, 1998  
BONDED THRU TROY FARM INSURANCE, INC.

ATTACHMENT A

**Response to NRC RAI dated December 28, 1994**

**NRC REQUEST 1: Thermo-Lag Materials**

- a. *Describe the specific tests and analyses that will be performed to verify that the Thermo-Lag fire barrier materials that are currently installed at St. Lucie 1 and 2, or that will be installed in the future, are representative of the materials that were used to address the technical issues associated with Thermo-Lag barriers and to construct the fire endurance and ampacity derating test specimens. The tests and analyses shall address the material properties and attributes that were determined or controlled by TSI during the manufacturing process and the quality assurance program. The tests and analyses shall also address the material properties and attributes that contribute to conclusions that the Thermo-Lag materials and barriers conform to NRC regulations. These include:*

- (1) *chemical composition*
- (2) *material thickness*
- (3) *material weight and density*
- (4) *the presence of voids, cracks, and delaminations*
- (5) *fire endurance capabilities*
- (6) *combustibility*
- (7) *flame spread rating*
- (8) *ampacity derating*
- (9) *mechanical properties such as tensile strength, compressive strength, shear strength, and flexural strength.*

FPL Response 1.a

(1) Chemical Composition

FPL is currently participating in the effort initiated and sponsored by Nuclear Energy Institute (NEI) to verify the chemical composition of Thermo-Lag materials (NEI letter, Rasin to Russell, dated 2/21/95). The NEI effort includes testing a number of samples (here after called NEI Testing Program) from various participating plants, including St Lucie Units 1 & 2. The results of the chemical composition test will provide a basis for comparisons to the industry fire test data.

FPL concurs with NEI's position that all chemical testing should be performed to the same protocol as the previous NEI chemical testing method (i.e., pyrolysis gas chromatography) so as to provide a consistent generic basis for comparison. NEI's approach, by use of a generic pool, will cover a larger population of lot numbers and

provide greater assurance of material consistency. NEI has agreed to function as a clearinghouse for the chemical test data and will provide the results to the NRC in a generic fashion.

The NEI Thermo-Lag fire test program has evaluated the chemical composition of various lots of materials provided by Thermal Science, Incorporated (TSI) and some utilities early in 1994. The conclusions of the chemical test lab was that no significant variation in composition existed for any of the tested samples. Inspection of samples provided by TSI and the various utilities following performance of the fire testing indicated no observed differences thus validating the results of the chemical composition tests. Based on this, NEI's position is that only chemical analysis of a small number of samples from each plant would be necessary. If the chemical composition testing shows no significant variations then the material properties and attributes, such as, fire endurance capability, flame spread, combustibility, etc. would be based on the generic test data collected by NEI.

(2) Material Thickness

Material thickness is addressed below in the FPL response to NRC Request 2.

(3) Material Weight and Density

The properties of material weight and density will be addressed as part of the NEI Testing Program. Results of this NEI testing are expected to be consistent with previous chemical composition data for those specimens used to support fire endurance testing.

(4) The Presence of Voids, Cracks, and Delaminations

The Thermo-Lag samples inspected after the destructive examinations at St. Lucie 1 and 2 showed no signs of voids, cracks or delaminations.

(5) Fire Endurance Capabilities

The fire endurance capability for various Thermo-Lag configurations have been extensively tested through previous NEI sponsored programs. The NEI Testing Program established to help the industry respond to this RAI is expected to verify that the test specimens used for rating fire barriers for fire endurance, fire spread, etc., are consistent with the chemical composition of the latest industry samples. See response 1.a (1).



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(6) Combustibility

On March 13, 1995, the NRC (C.E. McCracken) issued a letter to NEI (A. Marion) which provided the results of the Staff review of NEI guide, *Thermo-Lag 330-1 Combustibility Evaluation Methodology Plant Screening Guide*. The NRC has determined that the NEI Guide is not an acceptable method to justify the use of Thermo-Lag material where noncombustible materials are specified by the NRC fire protection requirements or to assess the combustibility hazards presented by Thermo-Lag materials. Currently FPL endorses the NEI methodology to address Combustibility. FPL has not had sufficient time to evaluate any alternatives to the NEI guide or to review the position presented by the Staff in the referenced letter. Therefore, FPL can not address this issue in this response. A response to this issue will be provided as part of item 2.d.5.

(7) Flame Spread Rating

The flame spread ratings for various Thermo-Lag configurations have been extensively tested through previous NEI sponsored programs. The NEI Testing Program established to help the industry respond to this RAI is expected to verify that the test specimens used for rating fire barriers for fire endurance, flame spread, etc., are consistent with the chemical composition of the latest industry samples.

(8) Ampacity Derating

Ampacity derating has been addressed by FPL in existing calculations. FPL believes that there is sufficient margin in these calculations with regards to ampacity derating to bound any testing which may be performed. After an acceptable approach and test methodology has been agreed upon and testing has been performed, FPL will review these test results to determine if there is any impact on these calculations.

(9) Mechanical Properties such as Tensile Strength, Compressive Strength, Shear Strength, and Flexural Strength.

FPL designs fire barriers to meet seismic 2 over 1 criteria, such that in a seismic event, fire barriers will not damage seismic category 1 equipment that may be installed in the proximity of the barrier. Mechanical properties of Thermo-Lag are not considered significant in terms of seismic category 2 adequacy as opposed to the devices for attachment (i.e., tie wires, banding and other attachment methods). As such these devices have been designed to ensure that Thermo-Lag materials do not damage safety related equipment during a postulated seismic event.

- b. *Describe the methodology that will be used to determine the sample size and demonstrate that the sample size will be large enough to ensure that the*



*information and data obtained will be sufficient to assess the total population of in-plant Thermo-Lag barriers and the materials that will be installed in the future. In determining the sample size, consider the time of installation and manufacture of the various in-plant materials and barrier installations. Give the number and types (e.g., panels, conduit preshapes, trowel-grade material, stress skin) of samples that will be tested or analyzed.*

FPL Response

As discussed above, FPL is participating in the NEI Testing Program (NEI letter, Rasin to Russell, dated 2/21/95). The NEI effort includes testing a number of samples from various participating plants, including St. Lucie Units 1 & 2. FPL concurs with NEI's position, that based on the testing that has been performed, only chemical analysis of a small number of plant specific samples would be necessary. Material properties and attributes such as fire endurance capability, flame spread, combustibility, etc. would be based on the generic test data collected by NEI. Inspection of samples from TSI and utilities following performance of fire testing indicated no variations in material fire endurance capability as a function of manufacture date. FPL provided 9 samples of Thermo-Lag from St. Lucie Units 1 & 2 in accordance with NEI's test program.

- c. *Submit the schedule for verifying the Thermo-Lag materials.*

FPL Response

FPL's has submitted samples to NEI for testing consistent with NEI's schedule for plant specific testing. Samples from St. Lucie Plant were mailed to the NEI selected testing laboratory (NUCON) on March 13, 1995.

- d. *After the analyses and tests have been completed, submit a written supplemental report that confirms that this effort has been completed and provide the results of the tests and analyses. Describe any changes to previously submitted plans or schedules that result from the tests or analyses.*

FPL Response

FPL will submit a letter which will confirm that the analyses and testing have been completed. Test data and results from the Chemical Composition test will be provided from NEI in a generic fashion. Issues specific to St. Lucie will be discussed within the supplemental letter.

**NRC REQUEST 2: Important Barrier Parameters**

- a. *Describe the examinations and inspections that will be performed to obtain the important barrier parameters given in Section II of the RAI of December 1993 for the Thermo-Lag fire barrier configurations installed at St. Lucie 1 and 2.*

FPL Response

FPL has performed field walkdowns and destructive examinations of Thermo-Lag fire barriers for conduits and box type configurations (including pull, junction and conduit support) to verify installations and important barrier parameters. The results of these field walkdowns and destructive examinations are summarized in FPL's response (L-94-275), dated November 4, 1994, to the NRC's August 9, 1994 RAI. As shown in the FPL response, the "as found" thickness of Thermo-Lag material meets or exceeds the minimum specified value for the application.

In addition, FPL reviewed plant records and conducted non-destructive examinations of Thermo-Lag fire barriers by physically measuring the thickness of the Thermo-Lag walls at St. Lucie Plant (i.e., walls, floors and ceilings).

- b. *Describe the methodology that will be applied to determine the number and type of representative in-plant fire barrier configurations that will be examined in detail and demonstrate that the sample size is adequate to ensure that the information and data that will be obtained are adequate to assess the total population of in-plant Thermo-Lag barriers. A large enough sample of the total population of configurations should be examined to provide reasonable assurance that the materials and important barrier parameters used to construct the in-plant barriers and any future barrier installations or modifications, are representative of the parameters used to construct the fire endurance test specimens.*

FPL Response

The Thermo-Lag installations selected for destructive examination were those evaluated as not required for either fire protection or electrical separation. This includes ten cylindrical and box type configurations on Unit 1 and thirteen on Unit 2.

The destructive examination results show that the Thermo-Lag is properly installed for Unit 1 and Unit 2 conduits, and Unit 1 box type configurations. The results from Unit 2 show the box type configurations were not installed to minimum standards and consequently are not considered qualified installations. As discussed in FPL's response to the NRC's RAI dated 8/9/94, options for upgrade and/or replacement of the fire barrier material for Unit 2 box type configurations are currently being explored.

The examination scope for these installations (except for Unit 2 box type configurations) is considered adequate for the purposes of providing reasonable assurance that the

materials and important barrier parameters used to construct the barriers are representative of the parameters used in NEI fire endurance tests. This consideration is based in part on the scope of the NEI testing program which provides for sufficient variance in the tested parameters to help assure conservative judgements regarding the fire rating of each Thermo-Lag barrier. This consideration is also based on records which show that construction of Thermo-Lag was performed under the plant's quality control program using trained installers. Expanding the scope of inspections using the same destructive examination techniques will not substantially improve the assurance of either consistency in materials or proper construction of installations, and thus, would not be expected to change our stated conclusions.

- c. *Submit the schedule for obtaining and verifying all of the important barrier parameters.*

FPL Response

See response to item 2.d below.

- d. *After the information has been obtained and verified, submit a written supplemental report that confirms that this effort has been completed and provides the results of the examinations and inspections. Verify that the parameters of the in-plant configurations are representative of the parameters of the fire endurance test specimens. Describe any changes to previously submitted plans or schedules that result from the examinations.*

FPL Response

The schedules in this letter supersede and replace the schedules and activities provided in FPL letters L-93-96 dated April 16, 1993, L-94-33 dated February 11, 1994, L-94-104 dated April 29, 1994 and L-94-275 dated November 4, 1994. The current FPL activities for resolving the Thermo-Lag concerns are listed below:

- 1 Analysis is being performed to identify those applications of Thermo-Lag that are required to satisfy NRC fire protection rules and Regulatory Guide 1.75. These efforts are expected to be completed by April 28, 1995.
- 2 Schedules will be prepared for analyses to verify barrier parameters and rate fire barriers for required Thermo-Lag applications identified in activity 2.d.1 above. The schedule for these analyses will be transmitted to the NRC within 90 days after completion of the NEI test for chemical composition and following resolution of concerns related to the use of the NEI application guide. This is expected to be on or before October 27, 1995.
- 3 Analysis for the one hour test of wall-type configurations was completed as scheduled in January, 1995. Additional testing is planned to quantify the fire rating of wall type configurations beyond one hour.

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St. Lucie Units 1 and 2

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- 4 Based on the results of activities 2.d.1, 2.d.2 & 2.d.3, schedules will be prepared for the evaluations and/or exemptions needed to support revisions to the Safe Shutdown Analysis in accordance with either 10 CFR 50.59, or with 10 CFR 50.12, as appropriate. These schedules will be transmitted to the NRC within 90 days after completion of the NEI test for chemical composition and following resolution of concerns related to the use of the NEI application guide. This is expected to be on or before October 27, 1995.
- 5 An updated response to this RAI will be provided by October 27, 1995. This response will provide a schedule for implementing modifications.
- 6&7 The schedules for the preparation and implementation of plant change modifications are expected to be transmitted to the NRC within 90 days after completion of the NEI test for chemical composition and following resolution of concerns related to the use of the NEI application guide. This is expected to be on or before October 27, 1995.

FPL will continue to aggressively track industry developments regarding Thermo-Lag. FPL will advise/update the NRC Project Manager on the status of the above workplan as appropriate.