

Florida Power

CORPORATION
Crystal River Unit 3
Docket No. 50-302

December 21, 1995
3F1295-05

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

Subject: Thermo-Lag Resolution Strategy

References: A. FPC to NRC letter 3F1092-04 dated October 2, 1992
B. FPC to NRC letter 3F0493-06 dated April 15, 1993
C. FPC to NRC letter 3F0195-03 dated January 6, 1995
D. FPC to NRC letter 3F0395-25 dated March 28, 1995
E. FPC to NRC letter 3F0795-02 dated July 6, 1995

Dear Sir:

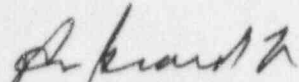
Florida Power Corporation (FPC) representatives met with the NRC Staff on October 19, 1995 and discussed our strategy for resolving Thermo-Lag fire barrier issues for the Crystal River Unit 3 (CR-3) Nuclear Power Plant. Attachment 1 contains a description of our resolution strategy and a schedule for implementation. Also included is information on various topics related to Thermo-Lag performance and properties which have been discussed in previous NRC and FPC correspondence. We anticipate that this additional information will serve to close any remaining open issues on these topics.

Ampacity derating is not addressed in the attached resolution strategy. This is being resolved as a separate but related issue. As previously committed, FPC will provide the NRC a summary of our recent ampacity derating tests and a preliminary derating evaluation applicable to CR-3 by June 30, 1996.

U. S. Nuclear Regulatory Commission
3F1295-05
Page 2

Should you have any questions concerning this request, please call Mr. Bill Rossfeld at (904) 563-4374.

Sincerely,



P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/SCP:ff

Attachment

xc: Regional Administrator, Region II
NRR Project Manager
Senior Resident Inspector

ATTACHMENT 1

THERMO-LAG RESOLUTION STRATEGY

The FPC Thermo-Lag Resolution Strategy was designed to explore all the options available for resolution of the Thermo-Lag fire barrier issues, with a goal of identifying solutions that considered both safety benefit and cost. The FPC Thermo-Lag Resolution Strategy consisted of four (4) major activities, titled: Appendix R Reanalysis, NEI Application Guide, Alternative Barriers, and EPRI-Tailored Collaboration (TC). The "Appendix R Reanalysis" activities were to identify means of reducing the plant's reliance on Thermo-Lag fire barriers either by analysis or by modifications to the plant. The "NEI Application Guide" effort was to identify any installed configurations that were 1 or 3 hour fire rated barriers and configurations that could, with minor upgrades, be qualified as 1 or 3 hour fire rated barriers. The "Alternative Barrier" evaluations were intended to investigate other materials that could be used as an overlay or as a replacement to the Thermo-Lag fire barriers. The "EPRI-TC" effort was intended to identify the Thermo-Lag configurations that were acceptable, as installed, for the hazard in the area and to identify those configurations that would be acceptable with additional fire protection features. The "EPRI-TC" activities included "common sense", traditional fire hazard assessments. It was anticipated that the "EPRI-TC" activities would lead to the development of exemption requests.

The "Appendix R Reanalysis" activities indicated that analysis changes would provide a 55% reduction in the raceways (conduits and trays) that require fire barriers. These analysis changes would eliminate the need for all the raceway fire barriers in 9 fire areas and reduce the requirements for raceway fire barriers in 11 additional fire areas. Further, the "Appendix R Reanalysis" activities identified plant modifications consisting primarily of cable reroutes that would provide an additional 22% reduction in the raceways that require fire barriers. These cable reroutes would eliminate the need for the remaining raceway fire barriers in 5 fire areas and further reduce the requirements for raceway fire barriers in other fire areas.

The "NEI Application Guide" effort was unsuccessful in identifying any configurations that could be qualified as a 1 or 3 hour fire rated barrier. The NEI Application Guide, by itself, will not be used to resolve any Thermo-Lag barrier issues. However, the NEI Application Guide will be used as input in the development of exemption requests.

The activities which were titled, "EPRI Tailored Collaboration" indicated that Thermo-Lag fire barriers in the Control Complex, Auxiliary Building and Intermediate Building could be addressed by the exemption request process. Further, an exemption request could be used to reduce the existing protection in the Reactor Building.

The evaluation of "Alternative Barriers" has identified Mecatiss as a candidate for an overlay material to Thermo-Lag or as a replacement fire barrier to Thermo-Lag. The testing program for Mecatiss has recently been completed and the results are currently being evaluated.

Implementation Plan

After careful consideration of the available options, FPC has initially selected the following options for resolution of the Thermo-Lag fire barrier issues at Crystal River Unit-3:

- (a) the proposed analysis changes will be fully implemented to achieve a 55% reduction in the raceways (conduits and trays) that require fire barriers;
- (b) plant modifications consisting primarily of cable reroutes will be used to provide an additional 22% reduction in the raceways that require fire barriers;
- (c) Mecatiss will be used either as an overlay material to Thermo-Lag or as a replacement fire barrier for 5% of the raceways currently wrapped with Thermo-Lag; and
- (d) the remaining 18% of the raceways currently wrapped with Thermo-Lag will be addressed by the exemption request process.

The percentages presented above are approximations which may vary slightly during final implementation. The options will be implemented on the following schedule:

- (a) exemption requests submitted by May 31, 1996
- (b) analysis changes implemented by September 30, 1996;
- (c) Mecatiss installed by December 31, 1996; and
- (d) plant modifications completed by refueling outage 12 (Spring 2000).

With this schedule, FPC will complete the close-out of the Thermo-Lag fire barrier issues by December, 2000.

In References A and B, we stated that we would maintain roving fire watch tours of areas containing Thermo-Lag as compensatory actions and would continue to track barrier breaches and repair or replace damaged Thermo-Lag barriers in accordance with plant procedures. Compensatory fire watches have been maintained as stated and breached barriers are being tracked. However, since identification of the Thermo-Lag issues, we have not repaired or replaced damaged or breached Thermo-Lag barriers, as all rated Thermo-Lag barriers were declared inoperable. Given our resolution plans at this time, only the existing breached Thermo-Lag barriers which will be relied upon for protection following implementation our Thermo-Lag resolution strategy, will be repaired or replaced. These repairs or replacements will be implemented after the exemption request process has been completed. Until the resolution strategy is implemented, adequate protection will be provided by the combination of automatic fire detection systems and roving fire watch patrols.

As the need for specific Thermo-Lag barriers is eliminated based on implementation of the analysis changes and plant modifications, the associated compensatory actions will be terminated and the specific Thermo-Lag fire barriers will no longer be controlled or maintained. Thermo-Lag barriers which are required, will be controlled via the normal design control and work control processes.

Analysis Changes

The proposed strategies to reduce the plant's reliance on Thermo-Lag fire barriers included several changes to the Appendix R post-fire safe shutdown analysis as documented in the Fire Study Report. The proposed analysis changes to the Appendix R post-fire safe shutdown analysis included:

- (a) using manual control of the Emergency Feedwater System in lieu of automatic initiation and control;
- (b) using offsite power sources for post-fire safe shutdown;
- (c) using the auxiliary feedwater pump for initial heat removal;
- (d) using additional instrumentation that was not included in the current Fire Study Report;
- (e) using other means of ensuring reactivity control in lieu of using nuclear source range instrumentation for post-fire safe shutdown in every fire area;
- (f) ensuring the availability of one of the three Makeup system pumps for post-fire safe shutdown;
- (g) using post-fire operator actions to align breakers and valves; and
- (h) using post-fire repairs to restore equipment needed for cooldown and cold shutdown.

The analysis changes will be implemented by modifying AP-880, "Fire Protection" (AP-880 is the Operations Procedure that addresses actions in response to a fire.), by changing the Fire Study (the Appendix R safe shutdown analysis) and supporting drawings, and by modifying the Appendix R Topical Design Basis Document. The analysis changes will be implemented on a fire area basis with implementation completed by September 30, 1996.

Plant Modifications

The proposed strategies to reduce the plant's reliance on Thermo-Lag fire barriers includes rerouting circuits to achieve the required separation of redundant post-fire safe shutdown systems and circuits. Rerouting offers a technically feasible option for the Control Complex and was selected to limit the overall number of raceways addressed by the exemption process.

The proposed rerouting of circuits involve circuits for the offsite power sources, a diesel generator, the 480V switchgear, the 120VAC vital distribution system, the 250/125 VDC distribution system, inverters, safety-related 4160V pumps and HVAC components. Because of the redundant equipment and the importance of the circuits being rerouted, the plant modifications will be carefully coordinated during planned system outages and/or refueling outages 11 and 12.

In addition, the existing motor feeder cables for one SW pump and one RW pump will be modified with a termination box to facilitate a post-fire repair.

The conceptual designs for these proposed plant modifications will be completed by December 31, 1996. The actual modifications will be completed during refueling outages 11 and 12. If these plant modifications can be performed during system outages versus refueling outages, FPC may elect to perform these plant modifications on an earlier schedule.

Mecatiss

Even with the above described efforts to reduce the plant's reliance on Thermo-Lag fire barriers, raceway fire barriers are still required in several plant areas. It is planned that Mecatiss will be used in the Control Complex only. Mecatiss will be used either as an overlay material to Thermo-Lag or as a replacement fire barrier for both 1 and 3 hour configurations. We will submit the results of our fire test program along with our proposed bounding criteria for review by February 15, 1996.

Exemptions

Our traditional fire hazard assessments which were performed as part of the EPRI-TC activities, indicated that the existing separation and/or Thermo-Lag barriers are acceptable as installed for the hazards in several areas of the Control Complex, Auxiliary Building, Intermediate Building and Reactor Building. However, FPC has decided not to pursue exemption requests for all of these areas, but only to pursue exemption requests in those areas where further modifications to the plant would clearly not improve the overall level of safety beyond the current conditions. As such, exemption requests will be submitted for areas in the Reactor Building, the Auxiliary Building and the Intermediate Building.

Reactor Building - An exemption request was submitted on October 16, 1995 based on an alternate fire protection configuration. FPC plans to amend that exemption request with additional information concerning the protection provided for one train of instrumentation in the vicinity of the penetrations.

Intermediate Building - The existing exemption, in Fire Area IB-119-201, for separation of redundant reactor building penetration assemblies, will be re-submitted to reflect the proposed analysis changes and the installed configurations of the Thermo-Lag fire barriers. Also, the existing exemption, in Fire Area IB-95-200, for the separation of redundant emergency feedwater pumps and valves, will be withdrawn to reflect the proposed analysis changes.

Auxiliary Building - Exemption requests for the corridor areas of Fire Areas AB-95-3 and AB-119-6 will be submitted to reflect the proposed analysis changes and to justify the acceptability of the installed Thermo-Lag fire barriers. The existing exemption, in Fire Area AB-95-3, for separation of redundant RW and SW pumps, will be re-submitted to reflect the proposed analysis changes and plant modification which eliminates the need for Thermo-Lag fire barriers. Also, the existing exemption, in Fire Area AB-95-3, for separation of redundant makeup system block valves, will be withdrawn to reflect the proposed analysis changes.

In addition, an exemption request from the requirements of Section III.J, "Emergency Lighting" will be submitted based on the post-fire availability of normal lighting. The exemption requests will be submitted including the additional information for the Reactor Building by May 31, 1996. To support our overall implementation schedule, the exemption request process including RAIs, RAI responses, and issuance of a Safety Evaluation will need to be completed by December 31, 1996.

Thermo-Lag Fire Barrier Issues

With respect to the small percentage of Thermo-Lag fire barriers that FPC will continue to rely upon for protection of a post-fire safe shutdown capability, the following information is provided to close-out open items from our previous correspondence:

In References C and D, FPC provided information regarding barrier construction, in which we stated that if new parameters were identified which were important to barrier fire endurance, FPC would perform additional examinations to determine conformance to those parameters. The destructive examinations conducted to date have been documented and construction parameters have been verified. No weaknesses in our barrier construction have been identified that deviate from previously reported information. Further, no new barrier construction parameters important to barrier performance have been identified by the NRC or the industry. Therefore, FPC does not plan to conduct any additional program of barrier inspections or destructive examinations for the purpose of verifying construction.

In Reference C, FPC addressed problems with establishing fire endurance ratings of junction boxes, valve enclosures, and other unique configurations. FPC will no longer rely upon valve enclosures for the protection of safe shutdown components. Per our proposed analysis changes, valves that were previously protected by Thermo-Lag, are either no longer required or will be manually operated after the fire. If Thermo-Lag protection is needed for junction boxes and other unique configurations, FPC will use all available relevant fire test information to establish a fire rating. FPC plans no plant specific testing of these Thermo-Lag configurations. Any remaining Thermo-Lag for junctions boxes or unique configurations will be included in exemption requests.

In Reference E, FPC stated that we would report our conclusions and future actions on density testing of Thermo-Lag by December 31, 1995. FPC has reviewed the fire endurance test reports compiled in the NEI Application Guide to determine the role of Thermo-Lag density on barrier performance. No correlation has been established between material density and barrier fire endurance. In the process that was used to procure and accept Thermo-Lag materials, and the ultimate construction and testing of barriers, density of specific boards or pre-shapes was not traceable to any particular barrier. In the absence of data showing that barrier performance is dependent on Thermo-Lag density, FPC does not plan to conduct any density tests of our installed Thermo-Lag barriers.