

FLORIDA POWER

CORPORATION

Crystal River Unit 3

Docket No. 50-302

March 30, 1996
3F0396-26

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

Subject: Mecatiss Fire Barrier Endurance Test Results

Reference: A. FPC to NRC letter, 3F0195-03, dated January 6, 1995
B. FPC to NRC letter, 3F0395-11, dated March 6, 1995

Dear Sir:

The purpose of this letter is to forward the results of the Mecatiss fire barrier tests sponsored by Florida Power Corporation (FPC) and conducted at Underwriters Laboratories Incorporated (UL). This letter also forwards our proposed "bounding" criteria for installation of Mecatiss at Crystal River, Unit 3 (CR-3). We are requesting review and acceptance of the fire tests as satisfying the guidance of Generic Letter 86-10, Supplement 1 and the proposed bounding criteria for installation of Mecatiss at CR-3. Ampacity will be addressed by a separate submittal which is currently scheduled for June 30, 1996.

Attachment A provides a summary of our evaluation of the fire endurance tests. Attachment B contains five (5) fire endurance test reports of the various tests conducted. In addition, an ASTM E 136 test titled "Special Services Investigation - Combustion Characteristics Tests On Mecatiss Fire Barrier Materials" dated December 13, 1995 and an ASTM E 84 test titled "Special Services Investigation - Surface Burning Characteristics Tests on Mecatiss Fire Barrier Materials" dated December 7, 1996 are included.

Please note that the enclosed test reports are proprietary. As such, FPC is submitting an affidavit requesting that Attachment B be withheld from public disclosure on the grounds that the attachment contains information proprietary to FPC. The affidavit is provided in accordance with 10 CFR 2.790 (b)(1). A non-proprietary version of the test reports for placement in the Public Document Room will be forwarded by May 31, 1996.

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P PDR

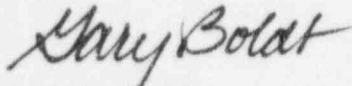
CRYSTAL RIVER ENERGY COMPLEX
15760 W. POWER LINE STREET - CRYSTAL RIVER, FL 34428-6708

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Book 1-6*

U. S. Nuclear Regulatory Commission
3F0396-26
Page 2

Please contact W. L. Rossfeld at (352) 563-4374 if you have any questions concerning this submittal.

Sincerely,

A handwritten signature in cursive script that reads "G. L. Boldt".

G. L. Boldt
Vice President
Nuclear Production

GLB/WLR:mag

Attachments

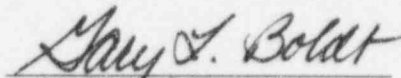
xc: Regional Administrator, Region II
NRR Project Manager
Senior Resident Inspector

AFFIDAVIT OF G. L. BOLDT

- A. My name is G. L. Boldt. I am the Vice President - Nuclear Production for the Florida Power Corporation (FPC), and as such I am authorized to execute this affidavit.
- B. I am familiar with the criteria set forth in Title 10 of the Code of Federal Regulations, Part 2.790 (10 CFR 2.790), to determine whether certain information of FPC is proprietary.
- C. The following information is provided to demonstrate that the provisions of 10 CFR 2.790 have been considered:
- (i) The information contained in Exhibit "A", which is attached hereto and made a part hereof, has been held in confidence by FPC. Copies of the document are clearly identified as proprietary. In addition, should FPC transmit the information identified in Exhibit "A" to an external agency, the recipient will be requested to hold the information as proprietary, as FPC has requested the Nuclear Regulatory Commission to so do.
 - (ii) Information may be classified as proprietary if one or more of the criteria below are met. FPC applied the criteria in determining whether the information in Exhibit "A" should be classified as proprietary. FPC has determined that the documents listed in Exhibit "A", contain information which falls within one or more of the enumerated criteria. Exhibit "B", which is attached hereto and made a part hereof, identifies which specific criteria applies to the documents listed in Exhibit "A".
 - a. The information reveals data or material concerning FPC research or development plans or programs of present or potential competitive advantage to FPC.
 - b. The use of the information by a competitor would decrease his expenditures, in time or resources, in designing, producing or marketing a similar product.
 - c. The information consists of test data or other similar data concerning a process, method, or component, the application of which results in a competitive advantage to FPC.
 - d. The information reveals special aspects of a process, method, component or the like, the exclusive use of which results in a competitive advantage to FPC.

AFFIDAVIT OF G. L. Boldt (Cont'd.)

- (iii) The documents listed in Exhibit "A", which have been made available to the United States Nuclear Regulatory Commission were made available in confidence with a request that the documents and the information contained therein be withheld from public disclosure.
 - (iv) The information contained in Exhibit "A" is not available in the open literature and to the best of our knowledge is not known by current or potential domestic or foreign competitors of FPC.
 - (v) Specific information with regard to whether public disclosure of the information in Exhibit "A" is likely to cause harm to FPC's competitive position taking into account the value of the information to FPC; the amount of money or effort FPC expended developing the information; and the ease or difficulty with which the information could be properly duplicated by others. This information is addressed in Exhibit "B".
- D. I have personally reviewed the documents listed on Exhibit "A" and have found that they are considered proprietary by FPC because they contain information which falls within one or more of the criteria enumerated in Paragraph C. Exhibit "A" contains information which affords FPC an opportunity to obtain a competitive advantage over those who may wish to know or use the information contained in the document.


G. L. Boldt

STATE OF FLORIDA

COUNTY OF CITRUS

G. L. Boldt states that he is the Vice President, Nuclear Production for Florida Power Corporation; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.

G. L. Boldt

G. L. Boldt
Vice President
Nuclear Production

G. L. Boldt, personally known to me. Subscribed and sworn to before me, a Notary Public in and for the State and County above named, this 30th day of March, 1996.

LYNNE S. SMITH

Notary Public (print)

Lynne S. Smith

Notary Public (signature)



EXHIBIT A

Underwriters Laboratories Inc. (UL) reports: File NC1973 - Project 95NK17030.

- Test Deck #1 - Raceway Fire Barriers for Aluminum Cable Tray & Aluminum Conduit Systems (Book 1 of 6)
- Test Deck #2 - Raceway Fire Barriers for Aluminum Cable Tray & Aluminum Conduit Systems (Book 2 of 6)
- Test Deck #3 - Raceway Fire Barriers for Aluminum Cable Tray & Aluminum Conduit Systems (Book 3 of 6)
- Test Deck #4 - Raceway Fire Barriers for Aluminum Cable Tray & Aluminum Conduit Systems (Book 4 of 6)
- Test Deck #5 - Raceway Fire Barriers for Aluminum Cable Tray, Aluminum Junction Box and Aluminum Conduit Systems (Book 5 of 6)
- UL letter to FPC dated December 7, 1995 - Re: 95NK17030, File NC1973
UL letter to FPC dated December 8, 1995 - Re: 95NK17030, NC1973
UL letter to FPC dated December 13, 1995 - Re: 95NK17030, NC1973
(UL letters comprise Book 6 of 6)

EXHIBIT B

The documents listed in Exhibit "A" contain information which is considered proprietary in accordance with Criteria "b" and "c" of the attached affidavit.

The information contained in Exhibit "A" represents a significant expenditure of time, money, and manpower. The effort to develop this information represents the efforts of a multi-discipline team spanning over one and one-half years. The financial expenditure represented exceeds 1.1 million dollars. The task of duplicating this effort includes material design and engineering, fabrication of test assemblies, coordination of various working organizations, and conduct and evaluation of tests.

ATTACHMENT A

SUMMARY OF MECATISS FIRE TESTS

As described in our December 21, 1995 letter, the Florida Power Corporation (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 major activities, titled: "Appendix R Reanalysis", "NEI Application Guide", "Alternative Barriers", and "EPRI-Tailored Collaboration". The "Alternative Barriers" activities were intended to investigate other materials that could be used as an overlay or as a replacement to the Thermo-Lag fire barriers. As reported in our March 6, 1995 letter, FPC conducted fire tests in France to evaluate an alternate material (Mecatiss) to overlay presently installed Thermo-Lag barrier systems and to evaluate barrier fire endurance rating of the installed Thermo-Lag configurations at Crystal River. These tests demonstrated the viability of Mecatiss as an overlay to Thermo-Lag and lead to the development of the qualification tests conducted at Underwriters Laboratories (UL).

The fire endurance test program conducted at UL was designed to qualify both Mecatiss fire barrier systems (MTS-1 and MTS-3) as a replacement material and Mecatiss overlay upgrades (MPF-60 and MPF-180).

MTS-1	Mecatiss 1-Hour Fire Barrier System
MTS-3	Mecatiss 3-Hour Fire Barrier System
MPF-60	Mecatiss Upgrade to Thermo-Lag 330-1, 1-Hour Fire Barrier
MPF-180	Mecatiss Upgrade to Thermo-Lag 330-1, 3-Hour Fire Barrier

Further, one of the goals of the fire endurance program for the Mecatiss overlay was to conclusively demonstrate that the Mecatiss material overcomes Thermo-Lag's inherent thermal and structural failure mechanisms.

The fire test program consisted of five fire test decks containing 85 segments for evaluation. The fire endurance tests were conducted in accordance with the guidance provided in NRC Generic Letter 86-10, Supplement 1 and the latest revisions to NFPA 251, ASTM E-119 and ASTM E-5. Test deck #1 consisted of three test articles: two 3/4" conduits and a 24" x 4" tray. The test articles were placed in the UL "Column Furnace" in an inverted "U" shape with a unistrut support at midspan. One conduit was covered with a 1/2" layer of Thermo-lag 330 and an "overlay" of Mecatiss MPF-60 fire barrier material. The second conduit was covered with a "stand alone" of Mecatiss MTS-1 fire barrier material. The tray was covered on one vertical leg, a radial bend and a 60" horizontal segment with Thermo-lag 330 and MPF-60. The other vertical leg was covered with MTS-1 only. The deck was then subjected to a 1-hour fire test. Each of the fire barrier systems tested successfully met the criteria set forth in GL 86-10. Mecatiss stand-alone fire barriers had approximately 105°F margin in the averaged thermocouple readings and 177°F for single point thermocouple readings. Thermo-lag 330/Mecatiss MPF-60 had approximately 66°F margin in the averaged thermocouple readings and 58°F for single point thermocouple readings. All articles successfully passed a fog nozzle hose stream test conducted immediately after the fire test.

Test deck #2 consisted of three articles of identical configuration to those in test deck #1 except that each article was protected with a three hour fire barrier instead of a one-hour barrier. The first conduit was protected with Thermo-lag 330 and Mecatiss MPF-180. The second conduit was protected with stand alone Mecatiss MTS-3. The tray was protected with both stand alone and upgrade barriers. The deck was then subjected to a 3-hour fire test. Each of the fire barriers tested successfully met the criteria set forth in GL 86-10. Mecatiss stand-alone fire barriers had approximately 104°F margin in the averaged thermocouple readings and 172°F for single point thermocouple readings. Thermo-lag 330/Mecatiss MPF-60 had approximately 48°F margin in the averaged thermocouple readings and 75°F for single point thermocouple readings. All articles successfully passed a fog nozzle hose stream test conducted immediately after the fire test.

Test deck number #3 consisted of four articles placed in the UL "Floor Furnace". The articles in the deck were designed to be subjected to a one-hour fire test. One article was a horizontal 24" x 4" tray that complimented the tray tested in the UL column furnace. This article test was covered with only MTS-1 as a fire barrier. The other three articles were designed to test various barrier geometries and transitional arrangements. Each article was protected with a layer of Thermo-Lag 330 and an overlay of Mecatiss MPF-180. One of three articles tested 3/4" and 4" conduits in single, transitional and "banked" arrangements. A second article was configured to test heat transfer between 3/4" conduits across unistrut supports. The third article tested a 2" x 4" section cable tray with four conduits attached perpendicular to the tray side rail. This article was designed to test a 41" unsupported span of Thermo-lag board, the largest dimensional span installed at CR-3. Each of the fire barriers tested successfully met the criteria set forth in GL 86-10. The Mecatiss stand alone fire barrier for the tray had approximately 109°F margin in the averaged thermocouple readings and 184°F for single point thermocouple readings. The highest recorded temperatures for the other three articles took place on a 3/4" conduit in the unistrut support test. Margins for this test article were 47°F for the averaged thermocouple readings and 99°F for single point thermocouple readings. All articles successfully passed a playpipe hose stream test conducted immediately after the fire test.

Test deck #4 consisted of four articles of identical configuration to those in test deck #3 except that each article was protected with a three-hour fire barrier instead of a one-hour fire barrier. The horizontal tray was protected with MTS-3 only. Each of the other three articles were protected with a combination of Thermo-lag 330 and an overlay of Mecatiss MPF-180. The deck was then subjected to a three-hour fire test. Each of the barriers successfully met the criteria set forth in GL 86-10. The Mecatiss stand alone fire barrier for the tray had approximately 106°F margin in the averaged thermocouple readings and 181°F for single point thermocouple readings. The highest recorded temperatures for the other three articles took place on the 3/4" conduit in the single portion of the banked conduit test. Margins in these tests were 30°F in the averaged thermocouple readings and 59°F for single point thermocouple reading. All articles successfully passed a playpipe hose stream test conducted immediately after the fire test.

Test deck #5 consisted of three articles placed in the UL "Wall Furnace". The articles in the deck were designed to be subjected to a one-hour fire test. Each article was protected with a combination of Thermo-lag 330 and an overlay of Mecatiss MPF-60. The first article was a 24" x 4" tray mounted vertically to test tray/wall and tray/penetration interfaces. The second article was a 12" x 12" junction box with two 3/4" conduits attached. This test article was designed to test junction box/wall and conduit/wall interfaces. The third test article was designed to test the compressible nature of fire barrier materials. Two conduits, one 3/4" and the other 4", were mounted vertically on the wall. A portion of Thermo-lag was removed and covered with MTS-1. The rest of both conduits were covered with the Mecatiss MPF-60 overlay. Two steel bars were then threaded down tangent to each conduit so as to compress the Mecatiss to 50% of original thickness. Each of the fire barriers tested successfully met the requirements set forth in GL 86-10. Stand alone Mecatiss MTS-1 in compression had a margin of 175°F for single point thermocouple reading for the 3/4" conduit. The upgrade configuration with Mecatiss MPF-60 in compression had a margin of 163°F for single point thermocouple reading for the 3/4" conduit. The 24" x 4" tray and 12" x 12" junction box readings were significantly lower than similar articles in the above described test decks. The lower readings were attributed to the target exposure on only five sides and the walls' heat sink affects. All articles successfully passed a playpipe hose stream test after the fire test.

The fire endurance program demonstrated the acceptability of the Mecatiss 1 hour and 3 hour fire barrier systems. In addition, the fire endurance program demonstrated the acceptability of Mecatiss as an overlay for Thermo-Lag. Based on the significant margins demonstrated by the test program and our analysis of the NEI test program of Thermo-Lag, the following criteria is proposed for application of Mecatiss at Crystal River.

RACEWAY INSTALLATION CRITERIA

Fire Barrier System	Raceway	Acceptable Configurations
MTS-1	3/4"-4" conduit	Vertical runs, horizontal runs, radial bends, conduit fittings, and conduit/support interfaces
MTS-1	18"-24" tray	Vertical runs, horizontal runs, radial bends, and tray/support interfaces
MTS-3	3/4"-4" conduit	Vertical runs, horizontal runs, radial bends, conduit fittings, and conduit/support interfaces
MTS-3	18"-24" tray	Vertical runs, horizontal runs, radial bends, and tray/support interfaces
MPF-60	3/4"-4" conduit	Over existing Thermo-Lag for vertical runs, horizontal runs, radial bends, conduit fittings, and conduit/support interfaces
MPF-60	18"-24" tray	Over existing Thermo-Lag for vertical runs, horizontal runs, radial bends, and tray/support interfaces
MPF-180	3/4"-4" conduit	Over existing Thermo-Lag for vertical runs, horizontal runs, radial bends, conduit fittings, and conduit/support interfaces
MPF-180	18"-24" tray	Over existing Thermo-Lag for vertical runs, horizontal runs, radial bends, and tray/support interfaces

In addition, the test program demonstrated the adequacy of the following criteria for protection of the raceway supports.

RACEWAY SUPPORT INSTALLATION CRITERIA

Fire Barrier Rating	Acceptable Support Coverage Configurations
1 Hour	Existing 5/8" Thermo-Lag
1 Hour	1 layer (approx. 1") of Mecatiss
3 Hour	1 layer (approx. 1") of Mecatiss over the existing 5/8" Thermo-Lag
3 Hour	2 layers (approx. 2") of Mecatiss

The above described criteria will be used in the development of modification work packages for the upgrade and replacement of certain Thermo-Lag fire barriers at Crystal River.