

Entergy Operations, Inc.
River Bend Station
5485 U.S. Highway 61
P.O. Box 220
St. Francisville, LA 70775
Tel 504 336 6225
Fax 504 635 5068

James J. Fisicaro
Director
Nuclear Safety

March 28, 1995

U.S. Nuclear Regulatory Commission
Document Control Desk
Mail Stop P1-37
Washington, D.C. 20555

Subject: Response to Follow-Up to the Request for Additional Information
Regarding Generic Letter 92-08 Issued Pursuant to 10 CFR 50.54(f) on
December 28, 1994 (TAC No. M85596)
River Bend Station - Unit 1
License No. NPF-47
Docket No. 50-458

File Nos.: G9.5, G9.33.4

RBG-41346
RBF1-95-0084

Gentlemen:

Please find attached River Bend Station's (RBS) response to the Follow-up to the Request for Additional Information Regarding Generic Letter (GL) 92-08 Issued Pursuant to 10 CFR 50.54(f) on December 28, 1994 (Attachment 2). As requested, this information is submitted under affirmation (Attachment 1).

Should you have any questions or require additional information, please contact Mr. O. P. Bulich of my staff at (504) 336-6251.

Sincerely,

JJF/kvm
attachments

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Response to Follow-Up to the Request for Additional Information Regarding Generic Letter
92-08 Issued Pursuant to 10 CFR 50.54(f) on December 28, 1994 (TAC No. M85596)

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cc: U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

NRC Resident Inspector
P.O. Box 1051
St. Francisville, LA 70775

Mr. D. L. Wigginton
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
M/S OWFN 13-H-3
Rockville, MD 20852

ATTACHMENT 1

BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

LICENSE NO. NPF-47

DOCKET NO. 50-458

IN THE MATTER OF

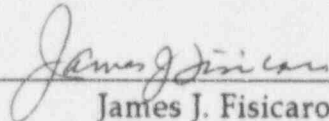
GULF STATES UTILITIES COMPANY

CAJUN ELECTRIC POWER COOPERATIVE AND

ENTERGY OPERATIONS, INC.

AFFIRMATION

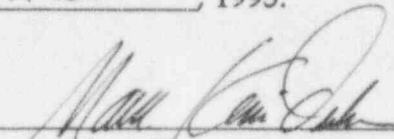
I, James J. Fisicaro, state that I am Director - Nuclear Safety of Entergy Operations, Inc., at River Bend Station; that on behalf of Entergy Operations, Inc., I am authorized by Entergy Operations, Inc., to sign and file with the Nuclear Regulatory Commission, this response to the follow-up to the Request for Additional Information regarding Generic Letter 92-08; that I signed this letter as Director - Nuclear Safety at River Bend Station of Entergy Operations, Inc.; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge, information, and belief.


James J. Fisicaro

STATE OF LOUISIANA
PARISH OF WEST FELICIANA

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the Parish and State above named, this 28TH day of MARCH, 1995.

(SEAL)


Mark Kevin Dreher
Notary Public

My commission expires 01/01/97

ATTACHMENT 2

Response to Follow-up to the Request for Additional Information Regarding Generic Letter (GL) 92-08 Issued Pursuant to 10 CFR 50.54(f) on December 28, 1994 NRC Request

1. Thermo-Lag Materials

Required Information

- 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 River Bend, 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

Response

As stated in responses to previous NRC requests for additional information, Entergy Operations, Inc., is pursuing a comprehensive analysis of in-plant Thermo-Lag assemblies. Our approach includes participation in the industry test program and plant-specific initiatives to validate the applicability of test results. The River Bend analysis will provide reasonable assurance that installed Thermo-Lag materials and configurations are representative of the tested materials and configurations.

As part of the industry test program, Thermo-Lag samples, including samples from an Entergy Operations nuclear facility, have been compared by pyrolysis

gas chromatography using ASTM D3452. The results of this testing, performed by an independent test laboratory, indicate no appreciable difference between the samples. The independent laboratory's test report concluded that the samples are the same.

River Bend has submitted Thermo-Lag samples for pyrolysis gas chromatography using the same test protocol and laboratory as in the previous testing. Our samples included material removed from installed Thermo-Lag assemblies in different areas of the plant and from warehouse stock. One-hour and three-hour samples of pre-formed conduit sections and panels were included, as well as, cured trowel grade material taken from installed assemblies. The test results for our samples will be compared with the test results for samples provided by other utilities. The scope of this testing, in addition to the previous testing, is expected to be more than sufficient to provide high confidence in the continuity of Thermo-Lag materials used across the industry, including River Bend Thermo-Lag materials.

With River Bend's Thermo-Lag materials demonstrated to be representative of tested Thermo-Lag materials, we plan to utilize the results of generic testing and industry experience to address issues such as fire endurance, combustibility, flame spread and mechanical properties.

- Combustibility and flame spread testing of Thermo-Lag have been performed by an independent test laboratory as part of the industry test program. The test protocols utilized were ASTM E1321, Lateral Flame Spread, and E1354, Heat of Combustion.
- Thermo-Lag mechanical properties (e.g., tensile strength, compressive strength, shear strength, and flexural strength) are important parameters affecting the structural integrity of Thermo-Lag assemblies. The aforementioned fire endurance testing is sufficient to insure structural integrity of Thermo-Lag assemblies when subjected to the affects of fire. As for the structural integrity of Thermo-Lag assemblies under normal plant conditions, industry experience shows Thermo-Lag assemblies to be rugged and durable. This is evidenced by our experience in destructively removing numerous Thermo-Lag samples. Also, dynamic testing of Thermo-Lag has been performed by an independent test laboratory that demonstrates seismic ruggedness.

Furthermore, the structural integrity of Thermo-Lag assemblies is not entirely dependent on the mechanical properties of Thermo-Lag. In-plant assemblies are substantially supported by a variety of mechanisms including the protected and intervening component(s), metal framing, metal banding, bolts and/or other fasteners.

With regard to installation or material anomalies (e.g., material thickness, voids, cracks, delaminations, etc.), River Bend performed visual and destructive examinations of in-plant assemblies to confirm a variety of installation parameters, as well as, identify installation or material anomalies. The information obtained from these examinations was used to establish a database of the characteristics of the as-built in-plant assemblies. Installation and/or material anomalies are typical of the attributes that are considered when comparing tested to installed configurations.

Ampacity derating is an important element in River Bend's comprehensive approach to resolve Thermo-Lag issues. Entergy Operations, Inc., supports use of the draft IEEE P848 through industry generic testing. Although we desire to proceed with ampacity testing at the earliest possible time, such testing cannot be performed without reasonable assurance that the proposed test protocol will be acceptable to the NRC.

As previously mentioned, Thermo-Lag samples from warehouse stock are included in River Bend's pyrolysis gas chromatography testing that is presently underway. Positive test results will provide reasonable assurance with regard to the chemical and physical attributes of our warehouse stock in the event that its use becomes necessary in the future. If new materials are procured from Thermal Science, Inc., at some future date, an appropriate receipt inspection will be performed to ensure material parameters.

Required Information

- 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 materials, stress skin) of samples that will be tested or analyzed.

Response

As part of the industry test program, the Nuclear Energy Institute (NEI) has requested that all plants utilizing Thermo-Lag submit samples of the material for pyrolysis gas chromatography testing. At least one sample representative of the various barrier types and trowel grade material utilized at the respective plant should be included. The broad scope of the industry-wide samples will provide specimens of Thermo-Lag material representative of a wide range of manufacturing and installation dates.

As previously mentioned, Entergy Operations, Inc., submitted two samples of Thermo-Lag for pyrolysis gas chromatography testing that was performed in August 1993. The samples were taken from warehouse stock at Grand Gulf Nuclear Station and consisted of a one-hour and a three-hour pre-formed conduit section. To support the broader industry chemical testing proposed by NEI, additional samples of Thermo-Lag were submitted from Grand Gulf, River Bend and Waterford 3. The River Bend samples consisted of the following:

- One 1-hour pre-formed conduit section taken from in-plant assemblies
- One 1-hour panel section taken from in-plant assemblies
- One 3-hour pre-formed conduit section taken from in-plant assemblies
- One 3-hour panel section taken from in-plant assemblies
- One 3-hour pre-formed conduit section taken from warehouse stock
- One 3-hour panel section taken from warehouse stock
- One sample of trowel grade material taken from installed assemblies

Required Information

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

Response

River Bend submitted samples for chemical testing in March 1995. At this time no completion date is available for the industry-wide chemical testing which is presently underway. Other attributes, as previously discussed, will be addressed

per the schedule for completion of the River Bend comprehensive Thermo-Lag evaluation.

Required Information

- 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.

Response

NEI submitted copies of the August 1993 pyrolysis gas chromatography test reports to the NRC on February 11, 1994. NEI will provide the NRC with confirmation of the completion of the industry wide chemical testing program and provide the results of the tests and analyses for NRC review. Entergy Operations will apprise the NRC of developments associated with the River Bend comprehensive Thermo-Lag evaluation in accordance with previous commitments.

2. Important Barrier Parameters

Required Information

- 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 River Bend.

Response

The River Bend Thermo-Lag barriers were installed in accordance with plant standards, based on installation instructions and training provided by Thermal Science, Inc. The plant installation standards frequently allowed more than one option for certain attributes of the in-plant assemblies. However, current documentation does not identify which option was selected by the installers for use on a specific barrier. To better document the plant-specific installation parameters, River Bend conducted walkdowns of Thermo-Lag assemblies in January 1994 to verify configuration parameters. Destructive examinations

were completed in November 1994. The destructive examinations provided a sampling of the details not evident from an external examination.

Required Information

- 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 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 modification, are representative of the parameters used to construct the fire endurance test specimens.

Response

River Bend has visually examined all required Thermo-Lag assemblies and documented those attributes which can be determined without the destruction of the respective fire barriers.

In order to confirm the material and installation attributes internal to the Thermo-Lag assemblies, forty-five assemblies were destructively examined. The configurations which were destructively examined were selected based on the following:

- A minimum of one configuration was selected from each main fire area/zone where Thermo-Lag was installed.
- Sampling included both one-hour and three-hour Thermo-Lag assemblies.
- A minimum of two samples were taken from each type of Thermo-Lag assembly (e.g., Pull Boxes, Terminal Boxes, Conduits, & Cable Trays).

River Bend is pursuing a comprehensive program to evaluate applications of Thermo-Lag in the plant. The project consists of two parts. The first is a re-analysis of the Safe Shutdown Methodology. This effort is expected to significantly reduce the amount of fire wrap material required. The second

portion of the project will address Thermo-Lag directly. This portion will review the Thermo-Lag installations that remain and determine if the Thermo-Lag can be qualified as-is through additional testing (for example, three-hour material installed in a one-hour application), if it can be economically upgraded using methods similar to those tested by NEI, or if it must be replaced with a different material. Additional options of re-routing cables and adding suppression systems will also be evaluated and pursued.

Until the results of this effort are known, specific test specimens cannot be determined. At that time, a determination will be made as to whether a large enough sample of the total population of configurations was examined. The sample size must provide reasonable assurance that the materials and important barrier parameters used to construct the remaining in-plant barriers and any future barrier installations or modifications, are representative of the parameters used to construct the fire endurance test specimens. Any fire wrap that is utilized in the project, whether existing Thermo-Lag or replacement fire wrap material, will require justification based on fire testing of appropriate parameters to ensure qualification or will have a detailed engineering evaluation quantifying acceptability. Testing will be performed in accordance with accepted NEI test protocols or equivalent guidance. Where feasible, testing may be coordinated with other utilities.

Required Information

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

Response

As mentioned previously, walkdowns of River Bend in-plant Thermo-Lag assemblies were completed in January 1994 to verify configuration parameters. Destructive examinations were conducted in November 1994. The destructive examinations provided a sampling of the details not evident from an external examination. The results of the destructive examinations are currently being reviewed and verified. This review is scheduled to be completed by July 31, 1995.

Required Information

- 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.

Response

The results of the destructive examinations are currently being reviewed and verified. This review is scheduled to be completed by July 31, 1995. Within 90 days after completion of the review, a written supplemental report providing the results of the examinations and inspections will be submitted.

As explained previously, River Bend will pursue a comprehensive program to evaluate applications of Thermo-Lag in the plant. The project will be pursued in two sections. The first is a re-analysis of the Safe Shutdown Methodology. This effort is expected to result in a significant reduction in the amount of fire wrap material required. The second portion of the project will address Thermo-Lag directly. This portion will review the Thermo-Lag installations that remain and determine if the Thermo-Lag can be qualified as-is through additional testing, if the Thermo-Lag can be upgraded economically using methods similar to those tested by NEI, or if the Thermo-Lag must be replaced with a different material. This program is based on the Safe Shutdown Methodology as opposed to whether fire barrier configurations are within or outside the scope of the NEI program. As a result, implementation and completion of corrective actions and any fire barrier upgrades for fire barrier configurations within and fire barriers outside the scope of the NEI program will be addressed simultaneously.

Resolution of Thermo-Lag issues and completion of corrective actions is scheduled to be completed by the end of refueling outage (RF) 7, currently scheduled to begin in September 1997. The primary phases of the program and timelines are shown below:

- | | |
|------|--|
| 1995 | Engineering evaluation of shutdown methodology |
| | - optimize equipment required |
| | - optimize methods of shutdown |

- optimize operator actions
- optimize use of fire wrap material

Develop required test configurations

Perform tests

1996/1997 Non-outage fire barrier installation and upgrade work

RF-7 Fire barrier installation and upgrade work requiring an outage

Verification that the parameters of the in-plant configurations are representative of the parameters of the fire endurance test specimens will be included as part of the development of the required test configurations. Entergy Operations will apprise the NRC of developments associated with the River Bend comprehensive Thermo-Lag evaluation in accordance with previous commitments.