



April 13, 1993

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

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Docket No. 50-416
License No. NPF-29
Response to NRC Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers"

GNRO-93/00033

Gentlemen:

NRC Generic Letter 92-08, dated December 17, 1992, requested information from licensees to verify that Thermo-Lag 330-1 fire barrier systems comply with NRC requirements. Entergy Operations, Inc. has reviewed the generic letter and confirms that:

- 1) Grand Gulf Nuclear Station depends on Thermo-Lag to satisfy licensing commitments,
- 2) Thermo-Lag installations at the Grand Gulf Nuclear Station are not qualified by site specific or generic fire tests which are presently acceptable to the NRC, 3) a preliminary evaluation concluded that a derating factor of at least 40 percent could be applied to Grand Gulf circuits protected with Thermo-Lag without exceeding necessary ampacities, and 4) Thermo-Lag 330-1 materials are not utilized to achieve physical independence of electrical systems per Regulatory Guide 1.75.

As noted in previous correspondence with the NRC, Entergy Operations, Inc. now considers the performance of Thermo-Lag to be questionable and will ultimately requalify these barriers in accordance with new guidance developed by the industry. Entergy Operations, Inc. is participating in the industry program, coordinated by NUMARC, to provide generic testing and information necessary to accomplish corrective actions. In the meantime, compensatory measures, consistent with the actions normally taken for inoperable fire barriers, have been implemented at the Grand Gulf Nuclear Station.

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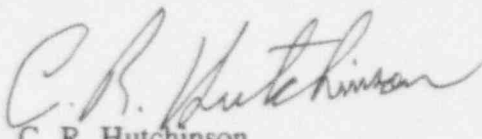
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Generic Letter 92-08 included four items requiring a written response within 120 days from the date of the generic letter. The responses to these items are provided by Entergy Operations, Inc. for the Grand Gulf Nuclear Station in Attachment 1. As requested in Generic Letter 92-08, this information is being submitted under affirmation in accordance with 10 CFR 50.54(f) (Attachment 2). Please contact Emmett Roan at (601) 984-9792 should you have any questions, or require additional information regarding this matter.

Sincerely,



C. R. Hutchinson

Vice President, Operations GGNS

EGR/egr

attachments: 1) Response to Generic Letter 92-08
2) Affirmation per 10 CFR 50.54(f)

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Generic Letter 92-08, Item 1:

State whether Thermo-Lag 330-1 barriers are relied upon (a) to meet 10 CFR 50.48, to achieve physical independence of electrical systems, (b) to meet a condition of a plant's operating license, or (c) to satisfy a licensing commitment. If applicable, state that Thermo-Lag 330-1 is not used at the facility. This generic letter applies to all 1-hour and 3-hour Thermo-Lag 330-1 materials and barrier systems assembled by any assembly method such as by assembling preformed panels and conduit shapes, as well as spray, trowel and brush on applications.

Response to Item 1 for the Grand Gulf Nuclear Station :

- (a) For the purpose of this response, item 1, part (a) is assumed to be requesting information on: 1) the use of Thermo-Lag 330-1 materials for compliance with 10 CFR 50.48, (Fire Protection) and 2) the use of Thermo-Lag 330-1 materials for compliance with Criterion 17, of Appendix A to 10 CFR 50 (Electric Power Systems).

The requirements provided in 10 CFR 50.48 specify, in part, that Appendix R to 10 CFR 50 establishes fire protection features required to satisfy Criterion 3 of Appendix A to 10 CFR 50 regarding certain generic issues for nuclear power plants licensed to operate prior to January 1, 1979. Entergy Operations, Inc. was licensed to operate the Grand Gulf Nuclear Station after January 1, 1979; consequently, Appendix R is not applicable under the rule. Therefore, Grand Gulf Nuclear Station does not rely upon Thermo-Lag to meet 10 CFR 50.48.

General Design Criterion 17 specifies, in part, that onsite electric power supplies, including the batteries, and the onsite electric distribution system have sufficient independence to perform their safety functions assuming a single failure. Regulatory Guide 1.75, "Physical Independence Of Electric Systems," describes a method acceptable to the NRC for complying with General Design Criteria 17. Thermo-Lag 330-1 fire barrier materials are not utilized at the Grand Gulf Nuclear Station to achieve physical independence of electrical systems per the requirements of Regulatory Guide 1.75.

- (b) Operating License Condition 2.C.(41) specifies that Entergy Operations, Inc. shall implement and maintain in effect all provisions of the approved fire protection program as described in Revision 5 to the Updated Final Safety Analysis Report and as approved in the Safety Evaluation dated August 23, 1991, subject to the following provision. The licensee may make changes to the approved Fire Protection Program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. Thermo-Lag 330-1 fire barriers were installed to

comply with a previous commitment to meet the requirements of Section III.G. of Appendix R; however, a combination of fire protection features and other provisions of the approved fire protection program are utilized to satisfy License Condition 2.C(41). Given the performance of certain Thermo-Lag 330-1 configurations in recent fire tests, Entergy Operations, Inc. believes some Thermo-Lag barriers may be questionable and is participating in the industry program to assess the level of degradation and implement necessary corrective actions.

- (c) By letter dated August 27, 1981, Entergy Operations, Inc. committed the Grand Gulf Nuclear Station to implement Sections III.G., J., and O. of 10 CFR 50, Appendix R. Thermo-Lag 330-1 fire barrier materials are utilized at the Grand Gulf Nuclear Station for compliance with Section III.G. of Appendix R. Consequently, Thermo-Lag is utilized to satisfy licensing commitments.

Generic Letter 92-08, Item 2(a):

If Thermo-Lag 330-1 barriers are used at the facility, state whether or not the licensee has qualified the Thermo-Lag 330-1 fire barriers by conducting fire endurance tests in accordance with the NRC's requirements and guidance or licensing commitments.

Response to Item 2(a):

Fire tests were not performed to justify site specific Thermo-Lag 330-1 installations; however, information provided by Thermal Science Inc. in technical note 1130-83A concerning tests performed on their products was reviewed. These tests were reported to have been witnessed by members of Industrial Testing Laboratories, Inc., American Nuclear Insurers, and Thermal Science, Inc. The Thermo-Lag protective envelopes were subjected to the standard time/temperature curve of ASTM E119 for a minimum of one or three hours, depending on the respective one or three hour ratings, which was followed by a 2½ minute minimum hose stream test. Recorded article surface temperature (un-exposed side) for the 1-hour barriers averaged 210° Fahrenheit with a maximum single thermocouple temperature of 288° Fahrenheit. For the 3-hour barriers, recorded article surface temperature (un-exposed side) in all tests did not exceed 320° Fahrenheit.

Questions have since risen relative to the performance of Thermo-Lag and the conduct of previous tests that were widely used as a qualification basis. The NRC has since declared previous tests and their corresponding installations to be indeterminate and is reevaluating the test and acceptance criteria and the degree of detail necessary in comparing installed to tested configurations. Although previously believed to be qualified, Entergy Operations, Inc. now considers the performance of Thermo-Lag to be questionable and will ultimately requalify these barriers in accordance with new guidance developed by the industry.

Generic Letter 92-08, Item 2(b):

If Thermo-Lag 330-1 barriers are used at the facility, state (1) whether or not the fire barrier configurations installed in the plant represent the materials, workmanship, methods of assembly, dimensions, and configurations of the qualification test assembly configurations; and (2) whether or not the licensee has evaluated any deviations from the tested configurations.

Response to Item 2(b):

- (1) Thermo-Lag fire barriers utilized at Grand Gulf Nuclear Station resemble but do not exactly replicate fire tested configurations; however, initial NRC guidance did not require detailed consideration of all the attributes mentioned above. NRC requirements for test performance, acceptance, and comparison of tested to installed configurations evolved over time and were provided in documents such as Generic Letter 86-10. The NRC recognized that fire endurance testing of every as-built fire barrier configuration was not possible. Where exact replication of a tested configuration could not be achieved in field installations, NRC guidance provided that: continuity of the fire barrier should be maintained, thickness of the barrier should be maintained, the nature of the support assembly should be unchanged, the application of the fire barrier should be unchanged, and review by a qualified fire protection engineer should determine that an equivalent level of protection is provided.
- (2) Fire barriers of this nature were still in the developmental stages when Thermo-Lag was installed at the Grand Gulf Nuclear Station and the complexities of its physical properties and failure mechanisms were unrecognized. At the time of their installation, Thermo-Lag barriers were considered to be representative of test and installation information provided by Thermal Science, Inc. (TSI). Subtle differences were not perceived to be a deviation from a tested configuration and such conditions were not considered when comparing tested to installed configurations. Less subtle deviations were evaluated based on the NRC guidance outlined above. Evaluations were performed when the twelve inch maximum anchor bolt spacing, specified by TSI, could not be adhered to. Also, an evaluation was performed to determine the adequacy of a Thermo-Lag enhancement to the wall and ceiling of an HVAC chase.

Generic Letter 92-08, Item 2(c):

If Thermo-Lag 330-1 barriers are used at the facility, state (1) whether or not the as-built Thermo-Lag 330-1 barrier configurations are consistent with the barrier configurations used during the ampacity derating tests relied upon by the licensee for the ampacity derating factors used for all raceways protected by Thermo-Lag 330-1 (for fire protection of safe shutdown capability or to achieve physical independence of electrical systems) and (2) whether or not the ampacity derating test results relied upon by the licensee are correct and applicable to the plant design.

Response to Item 2(c):

(1)&(2) Various Thermo-Lag ampacity derating factors have been published for similar configurations, covering a wide margin for derating potential. Given the wide margins between published Thermo-Lag derating factors for similar configurations, Entergy Operations, Inc. believes the original TSI ampacity test results may be questionable. Therefore, Entergy Operations, Inc. has no plans to compare as-built Thermo-Lag configurations to the original tested configurations reported by TSI.

A preliminary evaluation of the ampacity margin of cables protected with Thermo-Lag was performed utilizing conservative derating factors and concluded that a derating factor of at least 40 percent could be applied to the Grand Gulf circuits protected with Thermo-Lag without exceeding necessary ampacities for these circuits. The 40 percent derating margin exceeds the most conservative ampacity derating factors known to be published for Thermo-Lag fire barrier materials and near term ampacity derating tests will be performed to validate Thermo-Lag derating factors as part of the industry program. Therefore, Entergy Operations, Inc. plans to utilize the results of the industry tests to assess the long term performance of cables protected with Thermo-Lag. As previously stated, Thermo-Lag fire barrier materials are not utilized at Grand Gulf Nuclear Station to achieve physical independence of electrical systems per the requirements of Regulatory Guide 1.75.

Generic Letter 92-08, Item 3:

With respect to any answer to items 2(a), 2(b), or 2(c) above in the negative, (a) describe all corrective actions needed and include a schedule by which such actions shall be completed and (b) describe all compensatory measures taken in accordance with the technical specifications or administrative controls. When corrective actions have been completed, confirm in writing their completion.

Response to Item 3:

- (a) Entergy Operations, Inc. is participating in the industry program, coordinated by NUMARC, to provide generic testing and information necessary to accomplish corrective actions. Corrective actions may include evaluation of new fire tests that demonstrate rated performance, Thermo-Lag upgrades, fire protection program changes or deviation requests based on analyses of actual fire loading, or product substitutions. Specific schedules with respect to the industry program will be provided to the NRC by NUMARC.
- (b) Information regarding implementation of compensatory measures was provided in response to NRC Bulletin 92-01, Supplement 1, by letter dated September 25, 1992. Entergy Operations, Inc. established compensatory measures consistent with the actions normally taken for inoperable fire barriers. These measures consist of roving hourly fire watches as directed by the Grand Gulf Nuclear Station fire protection program. Upon completion of the Thermo-Lag reevaluation, Entergy Operations, Inc. will provide a summary of the evaluation process, corrective actions, and programmatic changes.

Generic Letter 92-08, Item 4:

List all Thermo-Lag 330-1 barriers for which answers to item 2 cannot be provided in the response due within 120 days from the date of this generic letter, and include a schedule by which such answers shall be provided.

Response to Item 4:

Entergy Operations, Inc. has answered items 2(a), 2(b), and 2(c) above; consequently, item four is not applicable.

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

LICENSE NO. NPF-29

DOCKET NO. 50-416

IN THE MATTER OF
MISSISSIPPI POWER & LIGHT COMPANY
and
SYSTEM ENERGY RESOURCES, INC.
and
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION
and
ENTERGY OPERATIONS, INC.

AFFIRMATION

I, C. R. Hutchinson, being duly sworn, state that I am Vice President, Operations GGNS of Entergy Operations, Inc.; that on behalf of Entergy Operations, Inc., System Energy Resources, Inc., and South Mississippi Electric Power Association I am authorized by Entergy Operations, Inc. to sign and file with the Nuclear Regulatory Commission, this response to Generic Letter 92-08 for the Grand Gulf Nuclear Station; that I signed this response as Vice President, Operations GGNS 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.

C. R. Hutchinson
C. R. Hutchinson

STATE OF MISSISSIPPI
COUNTY OF CLAIBORNE

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 13th day of April, 1993.

(SEAL)

Elizabeth L. Laug
Notary Public

My commission expires:

December 28, 1995