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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
Response to NRC Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers"

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) Thermo-Lag 330-1 fire barrier materials are not utilized in Arkansas Nuclear One-Unit 1 (ANO-1); however, Arkansas Nuclear One-Unit 2 (ANO-2) does utilize a small quantity of Thermo-Lag, 2) ANO-2 depends on Thermo-Lag to satisfy 10CFR50.48, an operating license condition, and licensing commitments, but not to achieve physical independence of electrical systems per Regulatory Guide 1.75, 3) Thermo-Lag installations at ANO-2 are not qualified by site specific or generic fire tests which are presently acceptable to the NRC, and 4) an evaluation concluded that a derating factor of 58 percent could be applied to cables protected with Thermo-Lag while still providing necessary ampacities.

As noted in previous correspondence with the NRC, Entergy Operations, Inc. (EOI) now considers the performance of Thermo-Lag to be questionable and will take corrective actions in accordance with new guidance developed by the industry. EOI is participating in the industry program, coordinated by NUMARC, to provide generic testing and information necessary to accomplish corrective actions. In the mean time, compensatory measures, consistent with the actions normally taken for inoperable fire barriers, have been implemented at ANO-2 as described in our response to NRC Bulletin 92-01.

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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 for ANO in Attachment 1.

If you have any questions concerning this submittal, please contact my office.

Very truly yours,

James J. Fisicaro

James J. Fisicaro
Director, Licensing

JJF/EGR

To the best of my knowledge and belief, the statements contained in this submittal are true.

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for Logan County and the State of Arkansas, this 16th day of April, 1993.

Sandy Siebenmorgen

Notary Public
My Commission Expires May 11, 2000

Attachment

cc: Mr. James L. Milhoan
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RESPONSES TO GENERIC LETTER 92-08

As previously stated in our response to NRC Bulletin 92-01 and its Supplement 1, no Thermo-Lag 330-1 fire barrier materials are utilized at ANO-1. Consequently, all subsequent discussion should be understood to involve only ANO-2.

Generic Letter 92-08, Item 1:

State whether Thermo-Lag 330-1 barriers are relied upon (a) to meet 10CFR50.48, 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 ANO-2:

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 10CFR50.48 (Fire Protection) and 2) the use of Thermo-Lag 330-1 materials for compliance with Criterion 17 of Appendix A to 10CFR50 (Electric Power Systems).

(a) The requirements of 10CFR50.48 specify, in part, that 10CFR50, Appendix R establishes fire protection features required to satisfy Criterion 3 of Appendix A to 10CFR50 with regard to certain generic issues for nuclear power plants licensed to operate prior to January 1, 1979. ANO-2 was licensed to operate prior to January 1, 1979, and Thermo-Lag 330-1 fire barriers are utilized for compliance with Section III.G. of 10CFR50, Appendix R. Consequently, Thermo-Lag fire barriers are relied upon to meet 10CFR50.48.

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 Criterion 17. Thermo-Lag 330-1 fire barrier materials are not utilized to achieve physical independence of electrical systems per the requirements of Regulatory Guide 1.75.

(b) ANO-2 Operating License Condition 2.C.(3)(b) Specifies that EOI shall implement and maintain in effect all provisions of the approved fire protection program as described in Amendment 9A to the Safety Analysis Report (SAR) and as approved in the Safety Evaluation dated March 31, 1992 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." Since Thermo-Lag 330-1 fire barriers were installed to comply with Appendix R, and our fire protection program, as described in Amendment 9A of the SAR, includes our Appendix R submittals and their subsequent SERs, ANO-2 currently relies on Thermo-Lag 330-1 fire barriers to meet Operation License Condition 2.C.(3)(b). However, per the license condition, any fire barrier approved for use under the 10CFR50.59 evaluation process could be utilized.

(c) The 1984 and 1985 Appendix R submittals stated that fire barriers capable of meeting the 3-hour separation requirements specified in Section III.G. of 10CFR50, Appendix R, would be provided below elevation 354 feet of the ANO-2 intake structure. These barriers are composed of Thermo-Lag 330-1 materials; therefore, Thermo-Lag fire barriers are currently utilized at ANO-2 to meet 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) for ANO-2:

Fire tests were not performed to justify site specific Thermo-Lag 330-1 installations; however, Thermal Science, Inc. (TSI) Test Report ITL-82-11-81 was reviewed. 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, EOI now considers the performance of Thermo-Lag to be questionable and will ultimately take corrective actions in accordance with our response to Item 3 of the Generic Letter.

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

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) for ANO-2:

(1) Thermo-Lag fire barriers utilized at ANO-2 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 is not, or 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) At the time of their installation, Thermo-Lag barriers at ANO-2 were considered to be representative of test and installation information provided by 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. Consequently, documented evaluations associated with Thermo-Lag deviations at ANO-2 were not performed.

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

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) for ANO-2:

(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, EOI believes the original TSI ampacity test results may be questionable. Therefore, EOI has no plans to compare as-built Thermo-Lag configurations to the original tested configurations reported by TSI.

An evaluation of the ampacity margin of cables protected with Thermo-Lag has been performed by EOI. The evaluation concluded that a derating factor of 58 percent could be applied to the ANO-2 cables protected with Thermo-Lag while still providing necessary ampacities for the applicable circuits. The 58 percent derating margin far 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, EOI 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 ANO-2 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 for ANO-2:

(a) EOI 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 in accordance with approved acceptance criteria, Thermo-Lag upgrades or replacement, fire protection program changes or exemption requests based on analyses of actual fire loading, or product substitutions. The schedule for completion of ANO's corrective actions is dependent upon the ongoing industry program. However, based upon the current industry testing schedule, ANO's corrective actions are currently scheduled to be completed by June 1, 1994.

(b) Information regarding implementation of compensatory measures was provided in response to NRC Bulletin 92-01, Supplement 1, by letter dated September 30, 1992. EOI 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 ANO fire protection program. When the final corrective actions are completed, EOI will provide a submittal confirming this completion.

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 for ANO-2:

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