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U.S. Nuclear Regulatory Commission  
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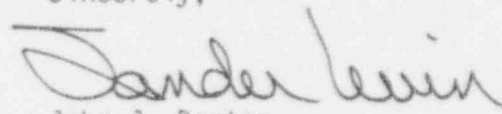
Gentlemen:

Subject: Oyster Creek Nuclear Generating Station  
Docket No. 50-219  
Response to NRC Generic Letter 92-08, "Thermo-Lag 330-1  
Fire Barriers"


Attached is GPU Nuclear's response to Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers". Much of the information requested in Generic Letter 92-08 has been provided in our response to Bulletin 92-01, "Failure of Thermo-Lag 330 Fire Barrier System to Maintain Cabling in Wide Cable Trays and Small Conduits Free From Fire Damage" and Supplement 1 to Bulletin 92-01. Where applicable, the attachment references our previous submittals.

If there are any questions regarding this matter, please call Mr. Paul Czaya, Oyster Creek Licensing Manager, at (609) 971-4643.

Sincerely,

  
for John J. Barton  
Vice President & Director  
Oyster Creek

Sworn and subscribed to before me this 15<sup>th</sup> day of April 1993.

  
Notary Public of New Jersey

Attachment

cc: Administrator, NRC Region 1  
NRC Resident Inspector  
Oyster Creek NRC Project Manager

JUDITH M. CROWE  
Notary Public of New Jersey  
My Commission Expires 1/25/95

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Attachment

Response to Generic Letter 92-08

The specific reporting requirements of Generic Letter 92-08 are listed below and a response is provided for each 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.**

All applications of Thermo-Lag 330-1 at Oyster Creek were identified in our response to Bulletin 92-01 (Ref. 1). In summary, there are 15 locations within 7 fire zones within the reactor building, turbine building and office building where Thermo-Lag was utilized. No cable trays are protected by Thermo-Lag. Thermo-Lag was installed to protect conduit (ranging from 1" to 4" diameter), drywell penetrations, and an HVAC duct, and also to form a 1 hour fire rated stairwell enclosure. The 1 and 3 hour rated barriers were fabricated from Thermo-Lag 330-1 preformed panels and conduit sections. The Thermo-Lag 330-1 barriers were installed to meet the safe shutdown capability requirement in Section III.G of 10 CFR 50 Appendix R.

- 2(a). **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.**

As stated in our response to Bulletin 92-01 (Ref. 1), Thermo-Lag 330-1 preformed conduit fire barriers installed at Oyster Creek were initially qualified based on Industrial Testing Laboratories (ITL) Report No. 86-8-207, ITL Report No. 82-11-80, and ITL Report No. 82-11-81.

ITL Report No. 86-8-207 documents a 1 hour fire endurance test conducted on a 4" diameter conduit test assembly protected by Thermo-Lag 330-1 preformed conduit sections. The test assembly was exposed to the standard time/temperature environment of ASTM E-119 for 65 minutes, followed by a 3 minute minimum water hose stream test. Examination of the cables within the test assembly, following the fire endurance and water hose stream test, indicated that they were all intact, functional and free from heat or fire damage. The report further documents that the highest average cable surface temperature recorded was 108°F and the maximum individual thermocouple cable surface temperature was 122°F.

The actual conduit sections installed on the 86-8-207 test assembly were previously manufactured and shipped to Oyster Creek by Thermal Science Inc. (TSI). They were initially rejected by site QA receipt/inspection based on surface defects, but were considered satisfactory by TSI. Therefore, test 86-8-207 was conducted using these previously rejected conduit sections to demonstrate satisfactory performance.

ITL Report Nos. 82-11-80 (5 "generic" tests, 1 hour cable trays and conduits) and 82-11-81 (5 "generic" tests, 3 hour cable trays and conduits), were also considered to bound Oyster Creek configurations. American Nuclear Insurers (ANI) accepted these test results for conduit sized up to a maximum of 4" diameter; the results were considered to bound smaller diameter conduit.

The results of ITL Report 82-11-80 were also utilized to qualify the Thermo-Lag for the drywell penetrations and the Thermo-Lag for the 1 hour fire rated stairwell enclosure.

Qualification of the Thermo-Lag HVAC duct enclosure utilized the results of ITL Report No. 86-11-155. This test (1 hour fire endurance test conducted on an 18" x 30" air duct) was performed by TSI for GPUN for specific application at Oyster Creek.

In order to ensure that our physical configurations would meet TSI qualifications, especially for conduit supports and for a large Thermo-Lag box fabricated around a number of conduits where they penetrated the west wall of the 480V room, we forwarded design drawings of all Thermo-Lag configurations to TSI for their review and concurrence prior to installation. TSI concurred with these design configurations. Following installation and acceptance of all Thermo-Lag configurations by our site quality control inspectors, TSI performed a final field walkdown of the "as installed" configurations. In a letter to GPUN (Ref. 3), TSI stated "Visual observations indicate that the envelope system including protection of attachment hardware (18" rule) appear to have been installed in good quality and in accord with the intent of TSI's Technical Note 20684, Revision V".

Thermo-Lag 330-1 barriers installed at Oyster Creek were considered operable and qualified consistent with existing NRC guidance at the time of installation. It is now understood, based on more recent Thermo-Lag 330-1 testing as identified in Bulletin 92-01 and related Information Notices, that the performance of Thermo-Lag 330-1 as a fire barrier is particularly sensitive to configuration and installation details. In accordance with the requested actions of Bulletin 92-01, these barriers are now considered inoperable although previously believed to be qualified. Accordingly, compensatory measures for inoperable fire barriers are in place as described in our response to item 3 below.

- 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.

As stated in our response to Bulletin 92-01 (Ref. 1), the installation of Thermo-Lag 330-1 was in accordance with Oyster Creek Installation Specification 402730-002, which invoked TSI Technical Note 20684, "Thermo-Lag 330 Fire Barrier System Installation Procedures Manual, Power Generating Plant Applications". Installation drawings incorporated TSI's recommendations. The installation specification required trained and certified installers, resulting in a high quality installation in accordance with TSI's qualified design details. The work was classified as "Nuclear Safety Related" and "Important to Safety" and applicable quality assurance requirements were in force, including installation inspections and post installation walkdowns.

In addition, a records review confirmed the following:

- A. All Thermo-Lag preformed sections were site receipt inspected against appropriate inspection criteria. Some sections were rejected and discarded, while others that were initially rejected were demonstrated by the manufacturer to be within the tolerances of sections that successfully passed the ASTM E-119 test.
- B. All installers and QC inspectors witnessing installation were formally trained and certified by TSI. All materials used were verified to be of proper quality and type.
- C. All installation and inspection work was actually performed by certified installers and QC inspectors and was properly documented.
- D. All final installation inspections were performed with satisfactory results. Non-compliances noted during the installation were adequately addressed and did not violate the original design.
- E. A final field walkdown of the Thermo-Lag configurations were performed by a TSI representative for concurrence that these configurations were properly installed and were bounded by TSI test results. TSI confirmed that our configurations were qualified as indicated in the response to item 2(a) above.

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.

The ampacity derating factors provided by TSI for cable contained within conduits protected by Thermo-Lag 330-1 were 7.3% (8% nominal) for 1 hour fire barriers and 10.3% (11% nominal) for 3 hour fire barriers. These values (according to TSI Brochure 7.14) were based on a combination of tests and analyses in accordance with IPCEA/NEMA Publication P-54-440 (Second Edition) and NEMA Publication No. WC 51-1975.

Neither GPUN nor our contractor who performed our specific configuration ampacity derating calculations reviewed specific TSI ampacity derating test configurations or results. Our contractor incorporated the applicable 8% or 11% derating factors from the TSI brochure, along with conduit fill (number of cables) factors and ambient temperature adjustment factors. They also utilized a cable load service factor to determine remaining margins available for additional derating.

In response to Generic Letter 92-08, a review was conducted to determine what margins exist for Thermo-Lag ampacity derating for cables within conduit protected by Thermo-Lag 330-1. Only power cables that are subject to significant current flow such that ampacity derating could be a life limiting factor were considered. A review of the original analysis confirmed that power cables would not be life limited using the 8% and 11% derating factors. An additional review using actual current loading found three cables satisfactory up to a 19% derating factor and the balance satisfactory up to a 40% ampacity derating value which bounds the worst case test result published to date. This provides confidence that should additional industry testing find the need to adjust the derating factor, margin exists to accommodate possible changes.

In the event that installing additional Thermo-Lag on the existing configuration is determined by the industry program (discussed in item 3 below) to be the appropriate solution to this issue, then additional ampacity derating calculations and/or actual field test measurement of temperature rise above ambient within the protected conduits may be required to demonstrate adequate ampacity margins.

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.**

We presently consider Thermo-Lag 330-1 barriers inoperable as stated in our response to Bulletin 92-01, Supplement 1 (Ref. 2). Actions to restore (or confirm) barrier operability are being developed through an industry program being coordinated by NUMARC. The industry program is intended to provide generic ampacity and fire endurance testing and information necessary to define the appropriate corrective actions. The specific test schedules are to be provided to the NRC by NUMARC.

In accordance with Station Procedure 101.2, "Fire Protection Program", compensatory measures for inoperable fire barriers (hourly fire watch patrols) are in place. These compensatory measures are expected to remain in place until the fire barriers can be declared operable.

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 Generic Letter 92-08 and include a schedule by which such answers shall be provided.

All responses to item 2 have been provided for all Thermo-Lag 330-1 barriers utilized at Oyster Creek.

#### References

1. GPUN Letter C321-92-2209, John J. Barton to USNRC, "Response to NRC Bulletin 92-01", dated July 24, 1992.
2. GPUN Letter C321-92-2263, John J. Barton to USNRC, "Response to NRC Bulletin 92-01, Supplement 1", dated September 25, 1992.
3. Thermal Science, Inc. Letter, Mr. Vincent L. Cortese to Mr. Frank Collado (GPUN), dated December 29, 1986.