



22 June 1992

RUBIN FELDMAN, P.E.
President

U S Nuclear Regulatory Commission
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, Maryland 20852

Attention: Mr. Ashok C. Thadani, Director
Division of Systems Technology
Office of Nuclear Reactor Regulation

Reference: TSI's Letter Dated 16 June 1992 - Results of the Formal Fire Resistive Tests Conducted on the THERMO-LAG 330 Fire Barrier For the Protection of Cable Trays, Conduits, Junction Boxes and Cable Trays

Subject: Texas Utilities One Hour THERMO-LAG Test Program
Omega Point Laboratory

Dear Mr. Thadani:

The purpose of this letter is to update you on the preliminary results of the recent fire resistive tests performed by Texas Utilities at the facilities of Omega Point Laboratories in San Antonio, Texas.

In the letter referenced above, we advised you of the results of two successful, TSI sponsored, one hour fire resistive and water hose stream impingement tests utilizing the THERMO-LAG 330 Prefabricated Panels and Preshaped Conduit Sections, having a thickness of $0.625" \pm 0.125"$. Accessory materials such as THERMO-LAG 330-1 Subliming Trowel Grade Material, THERMO-LAG Stress Skin, Stainless Steel Banding and Stainless Steel Tie Wires were used.

The following articles were tested:

- (i) 36" Open Top, Ladder Back Cable Tray, using one layer of generic power, control, and instrumentation cables
- (ii) 3/4" Diameter, Schedule 40, Steel Electrical Conduit, using one layer of generic instrumentation cables, and employing two condulets and a junction box

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Mr. Ashok C. Thadani
Nuclear Regulatory Commission

22 June 1992
Page 2

The tests were conducted at Omega Point Laboratory under their total control, which also included quality control during construction.

Preliminary results of ASTM E119 flame environment temperatures, electrical integrity measurements, and the internal test article thermocouples temperatures placed on the cables were previously submitted.

Texas Utilities also engaged Omega Point Laboratory to conduct several one hour fire endurance and water hose impingement tests on their plant specific designs. Thermal Science personnel witnessed these tests. We consider it important to communicate our observations to you.

The test articles utilized THERMO-LAG 330 Fire Barrier System Materials purchased through the normal procurement process from Thermal Science, Inc. Materials utilized in these tests included THERMO-LAG 330 Prefabricated Panels (0.625" \pm 0.125" thickness), THERMO-LAG 330 Preshaped Conduit Sections (0.625" \pm 0.125" thickness), and THERMO-LAG 330-1 Subliming Trowel Grade Material. Stainless steel banding and stainless steel tie wire were also used in the construction. The construction of the test articles was performed by Peak Seals under contract to Texas Utilities.

The test articles were instrumented with thermocouples placed on the cables and portions of the internal steel enclosures of the test articles. The cables used were plant specific to Comanche Peak.

The following are our observations:

- 5 Inch Steel Conduit utilizing Two Condulets, a Junction Box, Structural Supports, and a Penetrant through the fire barrier.

The results of the tests were successful. This includes the preservation of electrical integrity for the duration of the fire and water hose stream impingement exposures, and not exceeding the TU targeted temperature limits. Examination of the cables did not indicate fire damage.

Mr. Ashok C. Thadani
Nuclear Regulatory Commission

22 June 1992
Page 3

• 3/4 Inch Steel Conduit utilizing Two Condulets, a Junction Box and Structural Supports.

The electrical integrity was preserved during the fire and water hose stream impingement exposures. The maximum targeted temperature limits on the cables were exceeded. Heat damage was observed on some of the cables. The need for a construction design upgrade is indicated.

• 12 Inch Open Top Ladder Back Cable Tray with Structural Supports.

The electrical integrity was maintained for the entire duration of both the fire endurance and water hose stream exposures. The targeted temperature limits were not exceeded. Examination of the cables following the termination of the test did not show any evidence of fire damage to the cables.

• 30 Inch Open Top, Ladder Back Cable Tray with Structural Supports, and a "T" Section.

The TU plant specific method of fastening the THERMO-LAG 330 Fire Barrier Materials to the cable tray failed. It was observed in one instance that a fire barrier joint opened up in the proximity of the "T" section, allowing for the flame to penetrate into the cable tray. The test was terminated upon circuit integrity failure. The construction design requires upgrading.

The detailed test results and specific construction designs of the Texas Utilities test comprise the proprietary property of Texas Utilities. For further details, you may contact them direct.

Mr. Ashok C. Thadani
Nuclear Regulatory Commission

22 June 1992
Page 4

As a part of TSI's ongoing sponsored test activity at Omega Point Laboratory, a "general utility", easily implemented, one hour construction upgrade design is being completed by our personnel under Omega Point's quality control surveillance for testing. It utilizes:

- A 36 inch wide open top, ladder back cable tray
- THERMO-LAG 330 Prefabricated Panels, standard factory fabricated, (0.625" \pm 0.125" thick)
- THERMO-LAG 330-1 Subliming Trowel Grade Material
- THERMO-LAG Stress Skin
- Stainless Steel Banding
- Stainless Steel Tie Wire

The construction of the cable tray utilizes certain procedures delineated in TSI's Technical Note 20684, Revision V, "THERMO-LAG 330 Fire Barrier System, Installation Procedures Manual, Power Generating Plant Applications." Some of the joints between the sections of THERMO-LAG 330 Prefabricated Panels are not being probuttered, and are targeted to have a gap width of circa 0.100 inches.

It is contemplated that this upgrade design, subject to appropriate approval, will be suitable for open top, ladder back cable trays, 36 inches and smaller, loaded with one or more layers of cables, and of like underlying construction.

The above tests are targeted for completion within the next six (6) weeks.

The three hour fire endurance test program on a 36" wide open top, ladder back cable tray, and a 3/4" diameter steel conduit is continuing as previously advised. Be assured that as soon as valid test information is available on the results of these efforts, you will be promptly informed.

Yours truly,



Rubin Feldman
President

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