Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379

June 30, 1999

U.S. Nuclear Regulatory Commission 10 CFR 50.54(f)
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of) Docket Nos. 50-327
Tennessee Valley Authority) 50-328

SEQUOYAH NUCLEAR PLANT (SQN) - FINAL CLOSEOUT REGARDING RESOLUTION OF THERMO-LAG 330-1 FIRE BARRIER UPGRADES

The purpose of this letter is to provide written confirmation that our commitment for final implementation of Thermo-Lag 330-1 fire barrier corrective actions at SQN is complete. This letter confirms the actions required by Confirmatory Order Modifying License for SQN, issued by NRC on June 18, 1998 and Generic letter (GL) 92-08, "Thermo-Lag 330-1 Fire Barriers," dated December 17, 1992.

This letter also fulfills the reporting requirement (Item 3) of GL 92-08 and the requested information for Item 2d of NRC letter to TVA dated December 22, 1994. The details are provided in the enclosure to this letter.

A029

If you have any questions concerning this matter, please telephone me at (423) 843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

Pedro Salas
Licensing and Industry Affairs Manager

Subscribed and sworn to before me
on this 30th day of June

Deborah J. Smith
Notary Public

My Commission Expires October 7, 2002

Enclosure
cc: (Enclosure):
Mr. R. W. Hernan, Project Manager
Nuclear Regulatory Commission
One White Flint, North
1555 Rockville Pike
Rockville, Maryland 208522-2739

NRC Resident Inspector
Sequoyah Nuclear Plant
2600 Igou Ferry Road
Soddy-Daisy, Tennessee 37379-3624

Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsythe St., SW, Suite 23T85
Atlanta, Georgia, 30303-3415

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2
DOCKET NOS. 327 AND 328

FINAL CLOSEOUT REGARDING
THERMO-LAG 330-1 FIRE BARRIER UPGRADE

BACKGROUND

NRC Generic Letter (GL) 92-08, "Thermo-Lag 330-1 Fire Barriers," dated December 17, 1992, requested information to verify that Thermo-Lag 330-1 fire barrier systems manufactured by Thermal Science, Incorporated (TSI) comply with the NRC requirements. The GL identified three general areas of concern:

1. The fire endurance capability of Thermo-Lag 330-1 fire barriers;

2. The ampacity derating of cables enclosed in Thermo-Lag 330-1 fire barriers; and

3. The evaluation and application of the results of tests conducted to determine the fire endurance ratings and the ampacity derating factors of Thermo-Lag 330-1 fire barriers.

TVA initially responded to GL 92-08 by letter dated April 15, 1993. The NRC issued a GL 92-08 response letter dated June 29, 1993, and subsequent requests for information letters dated December 21, 1993, September 19, 1994, and December 22, 1994. TVA responded by letters dated February 10, 1994, March 22, 1995, June 15, 1995, January 12, 1996, and September 9, 1996. On May 30, 1997, TVA's management presented to NRC staff the status of the Thermo-Lag fire barrier upgrades at SQN. On June 25, 1997, TVA submitted a letter providing SQN's revised schedule and commitments for completing Thermo-Lag fire barrier upgrades.

On April 29, 1998, NRC issued a Consent to Confirmatory Order Modifying License to TVA for Sequoyah Units 1 and 2. TVA responded to the consent letter and provided the following commitment:

> *The Tennessee Valley Authority (TVA) shall complete final implementation of Thermo-Lag 330-1 fire barrier corrective actions at the Sequoyah Nuclear Plant, Units 1 and 2, as described in the TVA submittal dated June 25, 1997. Walkdowns, evaluations and upgrades will be completed by June 30, 1999.*

On June 18, 1998, NRC issued a Confirmatory Order Modifying the SQN License that confirmed TVA's commitment stated above.

On March 19, 1999, TVA's commitment for upgrading Thermo-Lag fire barriers was completed. This upgrade included the installation of Thermo-Lag 330-1 on conduits smaller than three inches, junction boxes, a cable tray, and other applicable unique configurations.

Prior to completion of SQN's Thermo-Lag upgrade, TVA performed a Thermo-Lag reduction review. Based on design factors such as existing 20-foot separation and alternate shutdown capabilities, certain raceways were determined to no longer require Thermo-Lag 330-1 coverage. Design Change Notice (DCN) M12739 for Unit 1 and DCN M12740 for Unit 2 documents the removal of Thermo-Lag from these raceways. In addition, field walkdowns were performed prior to the upgrade to verify proper installation of existing Thermo-Lag configurations. The constructability of the upgrade configurations was verified. Conduit spans and supports were evaluated. Walkdown data and evaluations were used as input for SQN's Thermo-lag upgrade program that is described in DCN M12743 for Unit 1 and DCN M12744A for Unit 2.

TVA RESPONSE TO NRC REQUEST ITEM 2D

Item 2d of NRC letter to TVA dated December 22, 1994 states:

> *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.*

In response to the above, TVA's Thermo-Lag reduction review at SQN identified a number of areas where Thermo-Lag 330-1 could be removed from raceways. As Thermo-Lag was removed from these areas, destructive examinations were performed. The number of these destructive examinations was sufficient to provide a representative sample that would reflect the configuration of existing Thermo-Lag installations. As a result of these examinations, the original installation methods for the existing Thermo-Lag 330-1 fire barriers were verified.

Plant areas identified in the reduction review contained the largest size conduit (4 inch diameter) and small size conduits (1 inch diameter), and included radial bends, LB and C type condulets, junction boxes, wall and ceiling penetrations, air drops and supports. The quantities of Thermo-Lag removed as a result of the reduction review were as follows:

840 linear feet of 4-inch conduit
23 - 4-inch condulets
1 - 4-inch C condulet
4 - 18-inch x 18-inch x 30-inch junction boxes
15 - penetrations
42 linear feet of box enclosure for multiple 4-inch diameter conduits
64 - conduit supports
180 linear feet of 1-inch conduit
14 - 1-inch LB condulets
8 - 1-inch diameter radial bends

Thermo-Lag from the above areas was destructively examined and found to be representative of the remaining installed Thermo-Lag enclosures at SQN.

The destructive examinations identified some areas where the conduit surfaces were not prebuttered during the original installation. As a result of this finding, it was determined that the 3-inch diameter conduits required an upgrade in order to conform to tested configurations. This upgrade was not previously identified in TVA submittals. The upgrade consisted of reinforcing the exterior of the Electrical Raceway Fire Barrier System (ERFBS) with stress skin reinforcement and trowel grade build-up. The resultant installation conforms to the tested configurations.

In addition, the destructive examinations identified some areas where the Thermo-Lag material was thinned. Thinned areas (coupling and ground clamps) were identified during the upgrade and oversize pieces (5/8-inch Thermo-Lag) were installed to bring installations into compliance with TVA installation procedures. The resultant installation conforms to the tested configurations. Areas where thinning occurred at baseplate bolts were evaluated and compared to acceptable test results.

As a result of destructive examinations conducted during the Thermo-Lag reduction effort, the following upgrades to the existing installations were also specified in order for the installed configurations to compare with acceptable test configurations.

Qualification of Conduit ERFBS for Conduits Less Than 3 Inches in Diameter

Essential conduits less than 3 inches in diameter were initially protected with a single layer of 5/8-inch Thermo-Lag 330-1. According to TVA Engineering Design Standard DS-M17.2.2, conduits less than 3 inches in diameter require a 2-layer Thermo-Lag ERFBS. Industry testing of Thermo-Lag 330-1 conduit ERFBS substantiates the results of the TVA tests; therefore, conduit ERFBS on raceways less than 3 inches were upgraded with an overlay layer of 3/8-inch Thermo-Lag 330-1. Qualified conduit ERFBS also included stress skin reinforcement at radial bends and at interfaces with box enclosures. Therefore, stress skin reinforcement was added at radial bends and interfaces with box enclosures for conduits less than 3 inches in diameter.

Qualification of Conduit ERFBS for Conduits 3 Inches in Diameter

Essential conduits 3 inches in diameter were initially protected with a single layer of 5/8-inch Thermo-Lag 330-1. Based on the results of the destructive examinations, it was determined that prebutter was not applied in all cases to the annular area between the conduit exterior and the inside surface of the Thermo-Lag. Qualified conduit ERFBS on 3-inch diameter conduit with postbuttered joints had joints and seams reinforced with external stress skin. Therefore, conduit ERFBS on raceways 3 inches in diameter were upgraded with external stress skin reinforcement.

Qualification of Conduit ERFBS for Conduits Greater Than 3 Inches in Diameter

Essential conduits greater than 3 inches in diameter were initially protected with a single layer, 5/8-inch Thermo-Lag 330-1 enclosure. Based on the results of the destructive examinations, it was determined that pre-butter was not applied in all cases to the area between the conduit exterior and the fire barrier material. There were no similarly constructed Thermo-Lag ERFBS qualified without structural reinforcement at radial bend regions and interfaces with box enclosures. Therefore, similarly constructed conduit ERFBS have been qualified through industry tests, and radial bend regions and interfaces with box enclosures were reinforced with stress skin and Thermo-Lag 330-1 trowel grade material. As a result, the as-installed conduit ERFBS on conduits greater than 3 inches in diameter were upgraded with stress skin reinforcement at radial bends and at interfaces with box-type enclosures (junction boxes, condulets, etc.) to ensure the as-installed configuration was representative of Thermo-Lag 330-1 conduit ERFBS qualified through testing.

Qualification of Cable Tray ERFBS

An inspection of the essential cable tray indicated that the existing installation was constructed with full thickness 5/8-inch board material, had internal stress skin intact, and v-ribs were properly oriented. Therefore, the essential cable trays were upgraded with an external stress skin to conform with tested configurations.

CONCLUSION

In conclusion, the design and fieldwork for the Thermo-Lag reduction review and the Thermo-Lag upgrades at SQN are complete. The parameters of these plant fire barrier configurations are bound by fire endurance tests.