

Docket Nos. 50-390
and 50-391

December 2, 1992

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford, Vice President
Nuclear Assurance, Licensing and Fuels
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: WATTS BAR UNIT 1 - CONDUIT FIRE BARRIER SYSTEM FIRE ENDURANCE
TESTING PROGRAM (TAC M63648)

On October 7, 1992, the staff met with TVA to discuss TVA's plans to conduct fire endurance testing of Thermo-Lag fire barrier system designs which are intended to be used at the Watts Bar Facility. During this meeting TVA presented an overview of its testing program and indicated that TVA intended to follow Underwriters Laboratories (UL), Inc., Subject 1724, "Outline of Investigation For Fire Tests For Electrical Circuit Protective Systems." The staff asked TVA to submit its program for review and informed TVA that the staff planned to witness some of TVA's construction activities and fire endurance and ampacity tests. On October 16, 1992, TVA submitted the conduit fire test program. In order to complete review of this test program, the staff needs TVA to provide the information as delineated in the enclosed Request For Additional Information (RAI).

After your staff has reviewed the enclosed RAI, we will discuss a target date for TVA's response at the next licensing status meeting. This requirement affects 9 or fewer respondents and, therefore, is not subject to Office of Management and Budget review under P. L. 96-511.

Sincerely,

Original signed by

Peter S. Tam, Senior Project Manager
Project Directorate II-4
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosure:
Request for Additional Information

cc w/enclosure:
See next page

MAY

OFC	PDII-4/LA	PDII-4/PM	PDII-4/D		
NAME	MSanders <i>MS</i>	PTam:as <i>PST</i>	FHebdon <i>PST</i>		
DATE	12/2/92	12/2/92	12/2/92		

9212080348 921202
PDR ADDCK 05000390
PDR

NRC FILE CENTER COPY

DF01

Watts Bar Nuclear Plant

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford

cc:

Mr. John B. Waters, Chairman
Tennessee Valley Authority
ET 12A
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Mr. D. E. Nunn, Vice President
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Mr. W. J. Museler, Vice President
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. M. J. Burzynski, Manager
Nuclear Licensing and Regulatory Affairs
Tennessee Valley Authority
5B Lookout Place
Chattanooga, Tennessee 37402-2801

Mr. G. L. Pannell, Site Licensing Manager
Watts Bar Nuclear Plant
Tennessee Valley Authority
3B Lookout Place
Spring City, Tennessee 37381

TVA Representative
Tennessee Valley Authority
11921 Rockville Pike
Suite 402
Rockville, Maryland 20852

Mr. Michael H. Mobley, Director
Division of Radiological Health
3rd Floor, L and C Annex
401 Church Street
Nashville, Tennessee 37243-1532

General Counsel
Tennessee Valley Authority
ET 11H
400 West Summit Hill Drive
Knoxville, Tennessee 37902

The Honorable Robert Aikman
County Judge
Rhea County Courthouse
Dayton, Tennessee 37321

The Honorable Johnny Powell
County Judge
Meigs County Courthouse
Route 2
Decatur, Tennessee 37322

Regional Administrator
U.S.N.R.C. Region II
101 Marietta Street, N.W.
Suite 2900
Atlanta, Georgia 30323

Senior Resident Inspector
Watts Bar Nuclear Plant
U.S.N.R.C.
Route 2, Box 700
Spring City, Tennessee 37381

ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION
WATTS BAR NUCLEAR PLANT
CONDUIT FIRE BARRIER SYSTEM FIRE ENDURANCE TESTING PROGRAM

1. The submittal did not provide a schedule which outlines the various phases of the program. In order to properly monitor and observe the various test program activities, we need the applicant to provide a schedule which covers the specimen construction and fire ampacity derating and cable functionality testing phases.
2. Conduit Fire Test Plan, Section 3.1, Acceptance Criteria, states, "If the average temperature recorded by the exterior raceway thermocouples is less than 250 degrees F (121 degrees C) above their initial temperature and no individual thermocouple is in excess of 325 degrees F (163 degrees C) above its initial temperature, the fire barrier shall be acceptable for use with any type of cable." This thermal limit criteria appears consistent with the intent of the thermal limits established in Generic Letter 86-10 by measuring the temperatures on the external surfaces of the raceway. From this criteria, if the fire barrier system does not exceed the thermal limits, the barrier has successfully performed.

In order for us to fully assess the intent of this criteria, we would like the applicant to clarify its position with respect to when the barrier system does not meet the thermal limit acceptance criteria.

3. Section 3.2 states that a bare copper cable (8 AWG) will be installed inside the raceway and used to measure the internal temperature conditions. Is this conductor going to be solid or stranded? In addition, the proposed ASTM standard for the testing of electrical raceway fire barrier systems recommends that a 14 AWG copper conductor be used. In order to understand the thermal response of the 8 AWG copper conductor, we would like the applicant's view concerning the difference in thermal lag measured by the thermocouples installed on an 8 AWG compared to those installed on a 14 AWG copper conductor, and those installed on the external raceway surface.
4. Section 5.2.3 indicates that Omega Point Labs (OPL) is to provide, assemble, install, and document the installation of all cable trays, conduits, cables etc. We request that the applicant verify that the materials being supplied by the OPL (e.g., cable tray, and conduit) have similar characteristics (e.g., mass) to that used at the Watts Bar facility. This section references cabling; it is our understanding from the information the applicant presented at the October 7, 1992 meeting that cables were not going to be installed in the test specimen during the fire test. Please clarify which cables TVA is referring to in this section.
5. In Section 7.5.2, Conduit Items, the applicant identified the sizes of conduits and the configurations to be tested. We noted that the applicant intends to test a conduit configuration consisting of two 5-inch and two 1-inch conduits. In order to determine if the proposed tests bound the sizes of conduits being protected by the Thermo-Lag fire barrier system at the Watts Bar facility, we request that the applicant

provide us with a list of conduits and cable trays being protected by these fire barriers. This list should identify the sizes of the raceway (conduit and cable tray) and the cable percent fill.

6. In Section 7.8, the applicant discussed the placement of thermocouples on the test specimens. The applicant indicated that it intends to follow UL 1724 to determine the number and spacing of the thermocouples along the raceway. With respect to TVA's test configuration, we need additional information concerning the distribution of thermocouples on the raceway. In order to complete our review, we request that TVA submit drawings which show the locations and the installation details of the thermocouples on the test specimen. In addition, we need the applicant to discuss how it intends to average the temperature readings of the thermocouple strings and apply this data to the acceptance criteria.
7. Section 8.2 specifies the conditions of the hose stream test except that it does not identify the duration of application. This same basic fog stream application was found acceptable for TU Electric. This test protocol specified a 5-minute duration of application. We request that the applicant confirm that its hose stream method will apply the fog stream to the test specimen for a minimum duration of 5 minutes.
8. In Figure 3, the applicant provided an overview of its conduit test configuration. In this figure the applicant identifies the use of a UniStrut trapeze support for these conduits. We request that the applicant confirm that this support configuration is representative of those installed at Watts Bar.
9. Watts Bar Nuclear Plant Fire Barrier Installation Instructions, Revision A, Section 1.3, "Definitions," Item B., 18-Inch rule, specifies variances in the rule. In order to confirm the performance of both the 18-inch and the 6-inch minimum protection for penetrating objects into the fire barrier system, we request that the applicant confirm that its test program bounds the variances specified in the definition.
10. In reviewing Sections 5.2 and 5.3 of the applicant's installation procedure, we noted that various fastening and supporting techniques (e.g. bolting to UniStrut steel frames) are going to be used. During our review of the applicant's conduit test plans, we could not confirm that these alternative methods of enclosing raceway with Thermo-Lag fire barrier panels are included in the testing program. We request that the applicant confirm that these panel/wall type fire barrier systems are going to be tested by the testing program. In addition, we request that the applicant review the applicability of other fire testing standards (e.g., ASTM E-119) when developing the acceptance criteria for these proposed fire barrier system applications.

11. Section 5.2.H addresses the protection of supports and indicates that the primary load-bearing supports for these fire barrier systems will be protected in the plant. It is our understanding the applicant will be testing the test specimen supports unprotected. We find this appropriate and that it demonstrates a conservative approach.
12. In the October 7, 1992 meeting, the applicant indicated that all of the fire barrier configurations to be tested would consist of enhanced configurations. In order to get a better understanding of the scope of this program, we request that the applicant provide an overview which identifies, in some detail, the configurations being tested, the fire barrier system application being used, and the design enhancements or upgrades being applied to each configuration.
13. At the October 7, 1992 meeting, the applicant indicated that it intends to follow the intent of air oven testing outlined in UL 1724, in conjunction with megger and high potential testing, to demonstrate cable functionality. In order to properly evaluate the applicant's approach for functionality, we request that the applicant, in a timely manner, their electrical cable testing acceptance criteria for review prior to its initiation of any functionality testing. In addition, this criteria should provide us with sufficient details on the configuration of the air oven and the test specimen and the test methods for demonstrating cable functionality.

Principal contributor: Patrick M. Madden

Date: December 2, 1992

Distribution

Docket File

NRC & Local PDRs

WBN Rdg. File

S. Varga 14-E-4

G. Lainas 14-H-3

F. Hebdon

M. Sanders

P. Tam

G. Walton RII

K. Barr RII

B. Wilson RII

E. Merschoff RII

V. Nerses

OGC 15-B-18

ACRS(10)

P. Madden 8-D-1