

TENNESSEE VALLEY AUTHORITY

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JUL 06 1988

U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555

Gentlemen:

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

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2 - 40-YEAR QUALIFICATION
TESTING OF SILICONE RUBBER-INSULATED CABLES

- References:
1. NRC letter to TVA dated May 25, 1988, "Qualification Testing of Installed Silicone Rubber Insulated In Containment (TAC Nos. R00332, R00333)"
 2. TVA letter to NRC dated March 17, 1988, "Sequoyah Nuclear Plant (SQN) - Silicone Rubber Cable Environmental Qualification"
 3. TVA letter to NRC dated December 28, 1987, "Sequoyah Nuclear Plant (SQN) - Silicone Rubber Insulated Cable Issue Resolution"
 4. TVA letter to NRC dated November 24, 1987, "Sequoyah Nuclear Plant (SQN) Units 1 and 2 - Wyle Laboratories Test Report for Silicone Rubber-Insulated Cables"

This letter provides NRC with TVA's program to extend the qualified life of silicone rubber-insulated cables installed at SQN from 10 to 40 years. The program provided herein is pursuant to TVA commitments made in reference 2 and responds to those views presented by the staff in reference 1.

Enclosure 1 provides both the details and background information associated with TVA's 40-year environmental qualification testing program. This program will supplement the successful results of the 10-year qualification program provided to NRC in references 3 and 4. The program will involve obtaining silicone rubber-insulated cable samples (i.e., five for each manufacturer) selected from the worst-case conduit configurations located in containment at Watts Bar Nuclear Plant (WBN). Details of the sample selection, sample size, and removal process are

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provided within enclosure 2. These cable samples will then be sent to Wyle Laboratories located in Huntsville, Alabama, where they will undergo environmental qualification testing. To remain consistent with the existing qualification of these cables, the acceptance criteria will be the same as that used in the previous 10-year Wyle test program provided in reference 4. This acceptance criteria has been found acceptable by NRC as stated in reference 1.

In conjunction with the 40-year samples, TVA also intends to prepare 15-year samples of Anaconda and Rockbestos cables using the criteria outlined in the enclosures to this letter. This alternate qualification test is detailed in enclosure 3 and will only be used in the event of test failure in the 40-year samples.

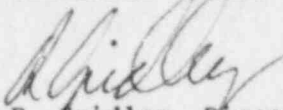
Enclosure 3 also provides the procedure TVA will follow to disposition a test anomaly or test failure in the event one occurs during the environmental qualification test program at Wyle Laboratories.

TVA is proceeding with the implementation of this test program. The intent of TVA's 40-year qualification program envelopes those views expressed by the staff in reference 1. The completion of this program is scheduled to be before the restart of unit 2 following the unit 2 cycle 3 refueling outage. This is in accordance with the commitment made by TVA in reference 2. As mutually agreed, the successful completion of this 40-year qualification program on Rockbestos and Anaconda silicone rubber insulated cable resolves the one remaining issue relative to the acceptability of the cable installation practices at TVA.

Summary statements of commitments contained in this letter are provided in enclosure 4. Please direct questions you may have concerning this issue to Barry A. Kimse, at (615) 870-6847.

Very truly yours,

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R. Gridley, Director
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Enclosures
cc: See page 3

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Enclosures

cc (Enclosures):

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ENCLOSURE 1

40-Year Qualification Test Program Information and Background

TVA resolved concerns detailed in the 10 CFR 21 final report on silicone rubber-insulated cables (dated January 25, 1988) by performing environmental qualification testing of silicone rubber-insulated cables at Wyle Laboratories. The cables included in the program were manufactured by American Insulated Wire (AIW), Anaconda, and Rockbestos. The test specimens from all three vendors were artificially damaged to simulate reduced insulation wall thickness and impact damage before receiving pretest aging equivalent to 10 years inside containment service and subsequent accident exposure.

A review of the SQN unit 1 inside containment 10 CFR 50.49 cable listing of Category A and B circuits revealed that only a very small population of AIW silicone rubber-insulated cable existed (i.e., 14 cables consisting of 44 individual conductors). TVA performed the same review at WBN units 1 and 2 and found no AIW silicone rubber cable in 10 CFR 50.49 Category A or B circuits. Therefore, TVA has elected to replace all AIW silicone rubber-insulated cable in 10 CFR 50.49 Category A and B circuits inside containment at SQN unit 1. AIW silicone rubber-insulated cables are not installed in 10 CFR 50.49 Category A or B circuits inside containment of SQN unit 2. Consequently, AIW silicone rubber-insulated cable will be excluded from further testing.

To supplement the successful 10-year qualification, a new program will be performed utilizing currently installed cable from WBN. The selection and removal process will be as defined in enclosure 2. After removal, the cables will be shipped to Wyle Laboratories in Huntsville, Alabama, where they will receive pretest thermal and radiation aging to simulate 40 years in containment service. The cables will then be exposed to steam/chemical spray while energized to rated voltage and current to simulate the SQN and WBN accident environment. To remain consistent with the existing qualification of these cables, the acceptance criteria will be the same as that used in the previous Wyle test of silicone rubber cables, which has been accepted by NRC. However, the post-loss-of-coolant-accident, high-potential-withstand-test voltage for margin assessment will be equal to twice the cable's rated voltage plus 1,000 volts (e.g., 2 x rated voltage + 1,000).

In the event of an actual test failure (one that is not attributed to a testing anomaly), NRC will be promptly notified; and a Condition Adverse to Quality Report (CAQR) will immediately be issued. The CAQR will be evaluated and dispositioned in accordance with established procedures that require that an operability determination with respect to technical specifications be performed. An additional discussion of this issue can be found in enclosure 3.

ENCLOSURE 2

Sample Selection, Size, and Removal Process

The total population of conduits containing safety-related circuits located inside containment at WBN will be screened to find those in 10 CFR 50.49 Category A and B circuits containing silicone rubber-insulated cables that have been subjected to "worst-case pulls." The screening process to be used is outlined below. Given the large population of cables manufactured by Rockbestos in unit 1 (~400 cables), that unit will be considered as representative of both units at WBN and SQN. Worst-case installations containing Anaconda cables will be determined using both units at WBN as the initial family.

The following steps outline the cable test specimen selection and removal process.

1. The first step of the process will be to identify all circuits inside containment that contain 10 CFR 50.49 silicone rubber cables manufactured by Anaconda (units 1 and 2) and Rockbestos (unit 1 only).
2. General Construction Specification (G-38), "Installing Insulated Cables Rated up to 15,000 Volts," Appendix F, Table F1 for power and Table F2 for control cables G-38, will be used to determine worst-case cable pulls. These tables show the maximum cable length allowed for a given conduit size that can be pulled without performing a sidewall pressure calculation. Using these tables as a guide, all cables with a circuit length less than those defined in Appendix F will be eliminated from the selection process.
3. Additional eliminations may be made for circuit lengths that are less than those defined in G-38, Appendix F, as requiring sidewall pressure calculations based on conduit size. If an adequate sample is not found, the scope of the selection process will be expanded by reducing the Appendix F values by 25 percent.
4. The next step in the process will be to eliminate the cables installed in conduits that have less than two 90-degree condulets in the run. This number of conduits will be as determined by field walkdowns.
5. Five cables will be selected from each manufacturer for the test specimens. Each of the samples for a given manufacturer will be selected from different conduits. The selection will be based on the actual length between pull points relative to the length allowed by G-38. For the purpose of this evaluation, "C" condulets are not considered as pull points. Cables that exceed or come closest to exceeding the values given in Appendix F of G-38 by the greatest percent will be selected.

6. After identifying the worst-case section of the conduit run, the cable test sample will be carefully removed from this section of conduit by the field. Each sample will be approximately 15 feet in length and tagged with a unique cable identifier number.
7. Finally, the cable samples will be placed in a shipping crate for transportation to Wyle Laboratories located in Huntsville, Alabama.

ENCLOSURE 3

Resolution of Test Anomalies and
Test Failures

TVA will follow the procedure outlined below in the event of a test anomaly or test failure in any of the 40-year samples of Anaconda or Rockbestos cables.

The scope of work documented for this test requires the test laboratory to notify TVA of all anomalies within 24 hours of the occurrence. Upon receipt of the notice, TVA will promptly notify NRC and proceed to work with the test lab to evaluate the anomaly. The evaluation will be based on compliance with the criteria established in the scope of work document. The results of the anomaly evaluation will be reported to NRC immediately after a determination has been made.

In the event that the anomaly is determined to be an actual test failure, a CAQR will be issued. As previously stated, the CAQR will be evaluated in accordance with existing procedures. The procedures require that the anomaly be evaluated against technical specifications in regard to unit operability. NRC will be notified immediately of the results of this evaluation.

If a failure occurs in one of the 40-year samples, TVA intends to proceed with the qualification process using the 15-year samples. It should be noted that TVA only intends to proceed with this process using cable from the vendor that failed (i.e., if Rockbestos passes, only Anaconda will be retested).

ENCLOSURE 4

Commitments

1. TVA will replace all AIW silicone rubber-insulated cables installed in SQM unit 1 containment that are in either 10 CFR 50.49 Category A or B circuits before unit 1 restart.
2. TVA will provide the results of the Wyle Laboratories environmental qualification tests and TVA's evaluation of these results, associated with the 40-year qualification program of Rockbestos and Anaconda silicone rubber-insulated cables, upon completion of TVA's test program.