

Docket Nos.: 50-327  
and 50-328

Mr. S. A. White  
Manager of Nuclear Power  
Tennessee Valley Authority  
6N 38A Lookout Place  
1101 Market Street  
Chattanooga, Tennessee 37402-2801

NOV 07 1986

Dear Mr. White:

SUBJECT: Denial of License Amendment Request

By letter dated August 8, 1986, TVA requested changes to the Technical Specifications (TS) for Sequoyah Units 1 and 2. The proposed changes would clarify TVA's intent for testing molded case circuit breakers, delete references to specific surveillance instruction (SI) numbers, and describe the activity necessary to verify certain fuses. This letter only addresses TVA's proposal regarding testing of molded case circuit breakers. The other proposed changes are still under review and will be addressed in future correspondence.

Although the staff initially proposed a determination of "no significant hazards consideration" (NSHC) regarding the amendment request, upon additional considerations reached based upon a full safety review, the request for removing the testing of the instantaneous elements of the molded case circuit breakers (MCCBs) is not considered beneficial for reasons stated in the enclosed safety evaluation. It is the staff's position that testing of the MCCBs including the demonstration of the instantaneous element is required and that no reasonable basis to eliminate such testing has been provided. These devices are considered of sufficient safety significance as to require periodic testing in accordance with TS requirements to give assurance of their reliability and capability to perform their intended design function. Therefore, the proposed amendment for deleting the testing of the instantaneous element of the MCCBs is denied.

Since the instantaneous elements of the MCCBs have not been tested during previous surveillances as required by the TS, the staff requires that TVA make-up the testing that was required for one of the missed surveillances (10% of the MCCBs) in addition to the testing required for the current surveillance (10% of the MCCBs) as a one time requirement for startup to provide added assurance of safety. Therefore, the staff requires that 20% of the MCCBs are tested as a one time requirement for startup.

Sincerely,

151  
B. J. Youngblood, Director  
PWR Project Directorate #4  
Division of PWR Licensing-A

Enclosure: As stated

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Mr. S.A. White  
Tennessee Valley Authority

Sequoyah Nuclear Plant

cc:  
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ENCLOSURE

SAFETY EVALUATION

REQUEST FOR PROPOSED CHANGES TO TECHNICAL SPECIFICATIONS FOR

SURVEILLANCE REQUIREMENTS OF MOLDED CASE CIRCUIT BREAKERS

SEQUOYAH UNITS 1 AND 2

BACKGROUND

Tennessee Valley Authority (TVA) by letter dated August 8, 1986 to B.J. Youngblood, requested changes to the Technical Specifications (TS) of Sequoyah Nuclear Plant, Units 1 and 2. The proposed changes would revise Surveillance Requirements (SR) 4.8.3.1.a.1.a, 4.8.3.1.a.1.b, 4.8.3.1.a.1.c, 4.8.3.1.a.2, 4.8.3.1.a.3, 4.8.3.1.b, and 4.8.3.3.a for Units 1 and 2 Technical Specifications. The proposed revisions would accomplish the following: (1) delete testing of the instantaneous elements of the molded case circuit breakers; (2) delete references to specific surveillance instruction (SI) numbers for implementing surveillance requirements; and (3) describe the activities necessary to verify the fuses in lieu of testing them. This safety evaluation addresses testing of the molded case circuit breakers only.

EVALUATION

To meet 10 CFR 50, Appendix A, GDC 18, "Inspection and testing of electric power systems", the Sequoyah Nuclear Plant Units 1 and 2 TS, Sections 4.8.3.1.a.2 and 4.8.3.3.a, require functional testing of at least 10 percent of each type of low voltage circuit breakers. The low voltage molded case circuit breakers (MCCBs) are used for containment penetration protection and as isolation devices protecting 1E buses from nonqualified loads. The MCCB trip units consist of two separate trip elements, thermal and instantaneous; these provide

protection for the full range of expected current values (overloads and fault currents). The thermal element provides protection for overloads and moderate fault currents (1.25X to 10X breaker current rating). The instantaneous element provides protection for the high fault currents (above 10X breaker current rating). The thermal element usually is not qualified by the manufacturer for thermal capability ( $I^2T$ ) at high currents (above 10X breaker current rating). The operating characteristics of the thermal and instantaneous elements of each type of MCCB are tested per UL489 and published by the manufacturer. These published data clearly show the operating characteristics and capabilities ( $I^2T$ ) of the thermal and instantaneous elements. To ensure that the MCCB performs its intended function over its life, both the thermal and instantaneous elements are periodically tested with current injection. Industry standards (such as NEMA AB-2 and NETA specifications) and manufacturer's maintenance guides provide recommendations for periodically testing MCCBs.

It was noted during a March 20, 1986, NRC review of containment penetration overcurrent protection devices at the Sequoyah plant that TVA was not testing the MCCB instantaneous elements and the thermal elements were being tested in series rather than individually as required by industry standards. TVA has contended that the MCCBs could be tested sufficiently by testing the thermal overcurrent elements without the instantaneous trip test. Subsequent to the March 20, 1986 findings, TVA has conducted limited testing of some MCCBs and has offered the following reasons for not testing the instantaneous elements.

1. TVA contends that testing of the instantaneous elements damages the breaker contacts due to the high current values needed to ensure instantaneous tripping only. These high current values are approximately 50 to 60 times the load rating of the breaker and are unique to the type of breakers used at Sequoyah. In most circuit breakers the instantaneous elements generally require pick-up currents in the neighborhood of 20X the breaker current rating. Based on the TVA test results, which are documented in their report of June 3, 1986, "Sequoyah Nuclear Plant Units 1 and 2 - Molded Case Circuit Breakers Testing," the staff concludes that no significant contact damage would occur when testing MCCBs with current values required to test the instantaneous trip. Minor pitting and discoloration of contacts is normal in all types of circuit breakers. Based upon the Sequoyah TS, each MCCB would be tested about 3 times over its service life. Therefore, the MCCBs at Sequoyah Plant would not be subjected to the same number of tests as stated in TVA's June 3, 1986 report. A MCCB is a reuseable device (i.e., it can be used again after fault interruption), and it is designed to be reused after it has been subjected to currents many times beyond the 50 to 60X used in the test conducted by the licensee and currents delineated in the industry standards (UL 489). The staff's review of the manufacturer's (GE & Westinghouse) literature on testing of MCCBs and industry standards (UL 489 and NEMA AB-2) has not revealed any reference to possible contact damage as indicated by TVA. The normal practice employed by industry and recommended by standards (NEMA AB-2) is to

test the instantaneous trip elements at a value slightly above its pick-up value and not at higher values as used in the TVA tests.

2. TVA contends that thermal trip elements of MCCBs can perform without degradation beyond their published values; i.e., the thermal element can operate well into the instantaneous region without degradation. Since the MCCBs are tested with the instantaneous element operable (per UL 489), there is no industry test data or manufacturer's published information to substantiate that the thermal elements could provide protection in the instantaneous current region without degradation. The staff discussed this matter with TVA (Telecon, June 9, 1986) and suggested that TVA contact the manufacturer of each type of MCCB used at the Sequoyah plant and have them substantiate TVA's position regarding the use of the thermal element beyond the published values. As documented in TVA's letter to Electrical Engineering Branch Files from J. K. Greene, dated June 24, 1986, the manufacturer (GE) would not quantify the capability of the thermal element beyond published values. In support of their position TVA decided to perform a test to determine the capability of the thermal element. As documented in the above referenced letter, the thermal trip elements'  $I^2T$  capability of the GE type breakers are considerably lower than the  $I^2T$  expected due to available fault currents. Although the results of the TVA tests appear to be favorable in support of their position, these tests were limited in scope. The test procedure has

shortcomings in that it did not follow many of the UL 489 procedures as outlined in the standard. Therefore the results of the TVA tests cannot be applied generically for all MCCBs. Another factor not considered in TVA's evaluation of using the thermal element in the instantaneous region is the coordination with the upstream protective devices. It is not clear how the coordination of the backup protective devices will be affected as a result of increased time in tripping the circuit breaker by the thermal element. There is no doubt it increases the potential that upstream breakers will operate, thus increasing the possibility that other safety related loads may be lost.

3. TVA has stated in their justification that the instantaneous trip function mechanism has an extremely low probability of failure. TVA reasons that the mechanism is fixed and has only one simple moveable part. Although the above statement may be true for a given type of MCCB, it can't be applied to all circuit breakers. We believe this reasoning is very subjective and is not substantiated by published data. In addition, while it may be true that a simple trip device is employed, there are two distinct means to initiate the tripping (thermal and instantaneous), each of which acts independently on the trip mechanism and, therefore, the testing of the thermal cannot be said to be equivalent to testing the instantaneous.

4. TVA has alluded that they have conducted a review of the industry and found that the majority of those asked do not perform instantaneous testing. However, no quantitative data is offered to support their findings. The staff knows of several plants in Region 2 performing the instantaneous trip tests as required by TS. Also it is common practice in the non-nuclear industry to perform these tests. In addition, major vendors of MCCBs have guides on the various field tests for these breakers including testing of the instantaneous trip.

#### CONCLUSION

Although the staff initially proposed a determination of "no significant hazards consideration" (NSHC) regarding the amendment request, upon additional considerations reached based upon a full safety review, the staff has determined that the request for removing the testing of the instantaneous elements of the MCCBs will not be beneficial for the reasons as stated in our evaluation. It is the staff position that testing of the MCCBs including demonstration of the instantaneous trip is required and that no reasonable basis to eliminate such testing has been provided by the licensee. These devices are being relied upon as allowed by Regulatory Guide 1.63 "Electrical Penetration Assemblies In Containment Structures For Light-Water Cooled Nuclear Power Plants" to limit fault current to within the  $I^2T$  ratings of containment electrical penetrations to avoid failure of containment during accident conditions. This protection is required to be single failure proof and to be testable and tested in conformance with IEEE 279-1971 and General Design Criterion 18. These devices are considered of sufficient safety significance as to require periodic demonstration (each refueling outage) of a



percentage (10%) of these devices to give some assurance of their reliability and capability to perform their design function. These devices are designed to be reusable after experiencing faults within their design rating and therefore no sound reason to exclude testing has been provided. The staff cannot agree with the TVA position without the manufacturer's substantiation and/or industry consensus that the testing of the instantaneous element is indeed harmful and that the thermal element can be used in the instantaneous region without degradation for all MCCBs. Therefore, the proposed amendment for deleting the testing of the instantaneous element of the MCCBs is denied.

UNITED STATES NUCLEAR REGULATORY COMMISSIONTENNESSEE VALLEY AUTHORITYDOCKET NOS. 50-327 AND 50-328DENIAL OF AMENDMENTS TO FACILITY OPERATINGLICENSES AND OPPORTUNITY FOR HEARING

The U.S. Nuclear Regulatory Commission (the Commission) has denied in part a request by the licensee for amendments to Facility Operating License Nos. DPR-77 and DPR-79, issued to the Tennessee Valley Authority (the licensee) for operation of the Sequoyah Nuclear Plant (the facility) located in Hamilton County, Tennessee.

The amendments, as proposed by the licensee, would modify the Sequoyah Technical Specifications to remove the requirement for testing of the instantaneous elements of the molded case circuit breakers (MCCBs). The licensee's application for the amendments was dated August 8, 1986. Notice of consideration of issuance of these amendments was published in the Federal Register on September 24, 1986 (51 FR 33958). Other changes requested in that letter are still under staff review.

Although the Commission initially proposed a determination of "no significant hazards consideration" (NSHC) regarding the amendment request, upon additional considerations reached based upon a full safety review, the request to remove the requirement for testing of MCCBs was denied because no reasonable basis to eliminate such testing has been provided by the licensee.

The licensee was notified of the Commission's denial of this request by letter dated November 7, 1986.

NOV 07 1986

By Dec 15, 1986 the licensee may demand a hearing with respect to the denial described above and any person whose interest may be affected by the proceeding may file a written petition for leave to intervene.

A request for a hearing or petition for leave to intervene must be filed with the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch, or may be delivered to the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., by the above date.

A copy of any petitions should also be sent to the Office of General Counsel- Bethesda, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 and to Lewis E. Wallace, Acting General Counsel, Tennessee Valley Authority, 400 Commerce Avenue, E11B33, Knoxville, Tennessee 37902, attorney for the licensee.

For further details with respect to this action, see (1) the application for amendment dated August 8, 1986, and (2) the Commission's letter to Tennessee Valley Authority dated Nov. 7, 1986, which are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and at the Chattanooga-Hamilton County Bicentennial Library, 1001 Broad Street, Chattanooga, Tennessee 37401. A copy of item (2) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of PWR Licensing-A.

Dated at Bethesda, Maryland, this 7<sup>th</sup> day of November 1986.

FOR THE NUCLEAR REGULATORY COMMISSION

B.J. Youngblood, Director  
PWR Project Directorate #4  
Division of PWR Licensing-A

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November 7, 1986

DOCKET NO. S- 50-327  
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MEMORANDUM FOR: Rules and Procedures Branch  
Division of Rules and Records  
Office of Administration

FROM: Office of Nuclear Reactor Regulation

SUBJECT: Sequoyah Nuclear Plant, Units 1 and 2 (Tennessee Valley Authority)

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- Notice of Receipt of Application for Facility License(s); Notice of Availability of Applicant's Environmental Report; and Notice of Consideration of Issuance of Facility License(s) and Notice of Opportunity for Hearing.
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Office of Nuclear Reactor Regulation

Enclosure:  
As stated

Contact: Marilee Duncan  
Phone: Ext 28928

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