



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

June 1, 2018

EA-18-001

Mr. Joseph W. Shea  
Vice President, Nuclear Regulatory Affairs  
and Support Services  
Tennessee Valley Authority  
1101 Market Street, LP 4A  
Chattanooga, TN 37402-2801

**SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC EVALUATION OF CHANGES, TESTS,  
AND EXPERIMENTS AND PERMANENT PLANT MODIFICATIONS  
INSPECTION REPORT 05000327/2015007 AND 05000328/2015007 –  
WITHDRAWAL OF NON-CITED VIOLATION**

Mr. Shea:

Thank you for your letter dated December 21, 2017, in response to Inspection Report Non-Cited Violation (NCV) 05000327, 328/2015007-005 "Failure to Identify Qualification Criteria Associated with Class 1E Electrical Component Static Performance Characteristics." This item was identified during an inspection conducted by region-based inspectors at your Sequoyah Nuclear Plant, Units 1 and 2 (SQN) from July 20 through July 31, 2015. The inspections were conducted to evaluate the implementation of engineering programs related to changes, tests, and experiments and permanent plant modifications.

In the December 21, 2017 letter, you denied the NCV, and also noted that the violation, as discussed in the inspection report, appeared to represent a new NRC staff position that significantly expanded the equipment qualification requirements for SQN by requiring SQN to establish qualification criteria for design life and certain performance characteristics for Class 1E molded case circuit breakers (MCCBs) in mild environments, contrary to the Commission's regulation in 10 CFR 50.49(c)(3), regulatory guidance, industry standards, and SQN's licensing basis. You contended that SQN's equipment qualification program for Class 1E MCCBs in mild environments is consistent with the Commission's regulations, guidance, and SQN's licensing basis. You also stated that if this violation is not withdrawn, your letter should serve as a Backfit Claim and the NRC Staff would be required to conduct a backfit analysis for this new staff position in accordance with 10 CFR 50.109(a)(3).

The NRC has completed its evaluation of your denial of the violation in accordance with guidance described in Section 2.2 of the NRC Enforcement Manual and determined that a violation of regulatory requirements, as documented in the inspection report, did not occur. The bases for our determination is included in the Enclosure to this letter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and the enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document management system, ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

If you have any questions regarding this correspondence, please contact Marvin D. Sykes at (404) 997-4629.

Sincerely,

*/RA/*

Mark S. Miller, Deputy Director  
Division of Reactor Safety

Docket Nos.: 50-327, 50-328  
License Nos.: DPR-77, DPR-79

Enclosure:  
NRC Evaluation and Conclusion

cc: Distribution via Listserv

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DOCUMENT NAME: S:\DRS NEWENG BRANCH 1\DRAFT RESPONSE TO

## NRC EVALUATION AND CONCLUSION

### A. Background

Inspection Report (IR) 05000327, 328/2015007 dated September 14, 2015 documented the results of onsite inspections conducted July 20 through July 31, 2015 at Sequoyah Nuclear Plant Units 1 and 2. The inspection was conducted for the purposes of monitoring the effectiveness of the implementation of changes to facility structures, systems, and components (SSCs), risk significant normal and emergency operating procedures, test programs, and the updated final safety analysis report (UFSAR) in accordance with the requirements of 10 Code of Federal Regulations (CFR) 50.59. The inspection also included reviews of previously implemented plant modifications to determine if the changes may have adversely affected availability, reliability, or functional capability of SSCs, or resulted in departures from design bases or the introduction of latent common cause failures.

Inspection Report NCV 0500327, 328/2015007-005, *Failure to Establish Static Performance Characteristics for the Qualification of Class 1E Electrical Equipment* documented a violation involving the failure to translate design requirements into programs and procedures to accomplish an activity affecting quality. The specific activity involved identifying and establishing qualification criteria for safety-related Class 1E replacement MCCBs installed under Design Change Notices (DCNs) 23085 and 23082. The breakers from DCN 23085 are MCCBs for the normal and alternate supply to the 480 Volt (V) Essential Raw Cooling Water (ERCW) Motor Control Centers (MCCs). The breaker from DCN 23082 is a MCCB for the 480V reactor vent boards that feed the ice condenser air handling units. As described in the *Analysis* of the identified performance deficiency, the licensee did not define Class 1E static and dynamic performance characteristics as noted in Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 323-1971, Section 5 and as required by IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations" during the qualification review of these replacement breakers.

***Non-Cited Violation (NCV) 050000327, 328/2015007-005 was cited as a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that "Measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components." Contrary to the requirements, since 2013, the licensee failed to establish measures for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components. Specifically, the licensee failed to establish measures for the selection and review for suitability of static and dynamic performance characteristics used in the design and qualification of Class 1E electrical equipment.***

B. Specific Bases for Disputing Violation 05000-327,328\2015007-005

In a letter dated December 21, 2017, the licensee disputed the NRC's identification of non-cited violation (NCV) 05000327, 328/2015007-005 and stated that 10 CFR Part 50, Appendix B, Criterion III, "Design Control," had been appropriately applied to the design, selection and installation of the safety-related MCCBs described in the violation. The licensee affirmed that the replacement breakers described in the NCV are functionally equivalent to the original breakers installed in the plant, and comply with the same design requirements as the original breakers. Consistent with the original breakers, once installed, station surveillance and preventive maintenance programs, through implementing procedures, provide continued review of the circuit breakers for suitability and quality. This practice was described as being consistent with SQN's approved licensing basis, and with long-established NRC rules and guidance for safety-related electrical equipment located in mild environments.

The licensee provided the following reasons for disputing the NRC's conclusion that the violation occurred as described:

1. There is no requirement under NRC regulations or SQN licensing basis to establish qualification criteria for design life for Class 1E for the MCCBs cited in the SQN NCV.
2. The finding effectively treats safety-related electrical equipment located in mild environment similarly to the treatment of such equipment located in a harsh environments.
3. The NRC finding is requiring the replacement breakers to satisfy a different requirement than the original breakers; i.e., the requirements for equipment installed in harsh environments.
4. 10 CFR Part 50.49 establishes requirements for environmental qualification of electrical equipment important to safety for nuclear power plants, and 10 CFR Part 50.49(c) specifically states, "requirements for (1) dynamic and seismic qualification of electric equipment important to safety, (2) protection of electric equipment important to safety against other natural phenomena and external events, and (3) environmental qualification of electric equipment important to safety located in a mild environment are not included within the scope of this section."
5. When TVA replaced the subject equipment described in the NCV, the procurement specifications were consistent with the procurement specifications for the original equipment during initial plant licensing.
6. TVA's program for safety-related equipment located in a mild environment is consistent with the NRC position/requirements delineated in Generic Letter 82-09, Question and Answer (Q&A) 4.
7. The NRC has introduced a new staff position/interpretation regarding requirements for safety-related equipment located in a mild environment; specifically with respect to the NRC's interpretation that static and dynamic performance characteristics require specification of a shelf life and design life.

The licensee also asserted that this interpretation effectively extends the rules for safety-related equipment located in harsh environments to safety-related equipment located in mild environments. The licensee stated that this new position conflicts with existing NRC rules and guidance specifically for equipment located in mild environments. The violation described in IR 327, 328/2015007 conflicts with the NRC staff position delineated in GL 82-09, and establishes new requirements for safety-related equipment located in a mild environment.

#### C. NRC Evaluation of Licensee's Response

The staff conducted a review of a broad range of relevant requirements for the qualification of Class 1E equipment to complete this review. The scope of the review was focused primarily on assessing the accuracy and soundness of the disputed violation. The conclusions reached as a result of this review should not be assumed to represent a broader agency position, nor should it be assumed to validate or refute any of the specific assertions made by the licensee in its denial letter.

Specifically, the Commission's regulations in 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires that structures, systems, and components important to safety in a nuclear power plant be designed to accommodate the effects of environmental conditions (i.e., remain functional under postulated accident conditions) and that design control measures such as testing be used to check the adequacy of design.

These design requirements are embodied in General Design Criteria 1, 2, 4, and 23 of Appendix A, "General Design Criteria for Nuclear Power Plants," to Part 50; in Criterion III, "Design Control," Criterion XI, "Test Control," and Criterion XVII, "Quality Assurance Records," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Part 50; § 50.54(jj), "Structures, systems, and components subject to the codes and standards in 10 CFR 50.55a must be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed," and in § 50.55a, "Codes and Standards" which incorporates by reference IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations" in paragraph (h)(2). All of these requirements are applicable to SQN.

IEEE Std. 279-1971, Section 4 "Requirements," Subsection 4.4 "Equipment Qualification" states, in part, "the protection system equipment shall meet, on a continuing basis, the performance requirements determined to be necessary for achieving the system requirements" and includes a note stating that attention is directed particularly to the requirements of Sections 3(7) and 3(9) of the standard. Neither section includes a specific reference to the installed life or design life for qualification of equipment in mild environments.

Equipment manufacturers and users of Class 1E equipment are required by the requirements identified above to provide assurance that such equipment will perform satisfactorily in service. This is typically accomplished through a defined program of quality assurance that includes but is not limited to design, qualification, production quality control, installation, maintenance, and periodic testing.

Although not specifically referenced in the regulations that govern qualification of Class 1E equipment in mild environments at SQN, the guidance and specifications noted in IEEE Std. 323-1971, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations" can be used to satisfy the requirements of IEEE Std. 279-1971. Both IEEE 279-1971 and IEEE 323-1971 standards are listed in SQN UFSAR, Sections 3.11 and 8.1. However, neither IEEE 279-1971 nor IEEE 323-1971 explicitly require licensees to define a specific design life for Class 1E equipment in mild environments.

While conducting its review, the staff also noted that SQN is subject to a license condition (Environmental Qualification), imposed by Order CLI-80-21, "Order for Modification of License Concerning Environmental Qualification of Safety-Related Electrical Equipment, dated November 6, 1980). However, the staff acknowledges that CLI-80-21 was in essence superseded by 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants." 10 CFR 50.49 sets forth requirements for Class 1E equipment located in harsh environments that must perform a necessary safety function and be capable of maintaining functional operability under all service conditions postulated to occur during the installed life or for the time it is required to operate. The requirements of 10 CFR 50.49 are not applicable to the MCCBs discussed in the SQN NCV.

#### D. NRC Conclusion

The staff carefully reviewed the various regulatory requirements applicable to SQN to evaluate the accuracy and validity of information identified in NCV 05000327, 328/2015007-005. Although there are certain requirements in the SQN licensing basis, as stated above, for the qualification of Class 1E equipment in mild environments, the staff determined that SQN was not required to establish design life as a particular performance characteristic for the qualification of Class 1E equipment in mild environments. Therefore, the violation described in NCV 05000327, 328/2015007-005 that states that the licensee is required to establish static and dynamic performance characteristics (i.e., shelf life and design life) used in the design and qualification of Class 1E electrical equipment located in mild environments at SQN was not confirmed. As a result, the staff has determined that the violation, as described and documented in NCV 05000327, 328/2015007-005 did not occur.