



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 1, 2021

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

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNIT 1 – AUTHORIZATION OF
ALTERNATIVE REQUEST RP-10 FOR THE 1B-B MOTOR DRIVEN AUXILIARY
FEEDWATER PUMP (EPID L-2021-LLR-0039)

Dear Mr. Barstow:

By letter dated May 28, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21148A301), as supplemented by letter dated May 28, 2021 (ADAMS Accession No. ML21148A311), the Tennessee Valley Authority (the licensee) proposed to the U.S. Nuclear Regulatory Commission (NRC) an alternative to specific requirements in the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants*, Section IST, "Rules for Inservice Testing of Light-Water Reactor Power Plants" (OM Code), 2004 Edition through 2006 Addenda, for Sequoyah Nuclear Plant (SQN), Unit 1.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to use an alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty. The licensee proposed to perform a Group A test of the 1B-B motor driven auxiliary feedwater pump in accordance with the ASME OM Code using the pump minimum flow recirculation path while SQN Unit 1 was in Mode 3. Further, the licensee proposed to perform the preservice test of the 1B-B motor driven auxiliary feedwater pump, required by ISTB-3310, in Mode 1 during power ascension of SQN Unit 1, up to 95 percent power level, but no later than 10 days from the Group A test. The licensee stated that compliance with ISTB-3310 would cause a hardship or unusual difficulty without a compensating increase in the level of quality or safety.

On May 29, 2021 (ADAMS Accession No. ML21152A125), the NRC staff provided a verbal authorization for the licensee's one-time use of Alternative Request RP-10 for SQN Unit 1, until completion of the preservice test of the 1B-B motor driven auxiliary feedwater pump following SQN Unit 1, entering Mode 1, no later than 10 days from the performance of the Group A test.

The NRC staff has determined, as set forth in the enclosed safety evaluation, that the Tennessee Valley Authority has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2) for Alternative Request RP-10. The NRC staff authorized Alternative Request P-10 until the preservice test for the motor driven auxiliary feedwater (MDAFW) pump 1B-B was completed following SQN Unit 1 entering Mode 1, no later than 10 days from the performance of the Group A test.

All other ASME OM Code requirements for which relief or an alternative was not specifically requested and approved as part of these requests remain applicable.

Please direct any inquiries to Mr. Perry Buckberg at 301-415-1383 or Perry.Buckberg@nrc.gov.

Sincerely,

David J. Wrona, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-327

Enclosure:
Safety Evaluation

cc: Listserv



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR ALTERNATIVE REQUEST RP-10

RELATED TO FOURTH 10-YEAR INSERVICE TESTING PROGRAM INTERVAL

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNIT 1

DOCKET NUMBER 50-327

EPID NO. L-2021-LLR-0039

1.0 **INTRODUCTION**

By letter dated May 28, 2021 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML21148A301), Tennessee Valley Authority (TVA, the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for alternative RP-10 related to certain Inservice Testing (IST) requirements in the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants*, Section IST, "Rules for Inservice Testing of Light-Water Reactor Power Plants" (OM Code), for the IST program at Sequoyah Nuclear Plant (SQN), Unit 1. Based on discussions with NRC staff, the licensee submitted a follow-up letter also on May 28, 2021 (ADAMS Accession No. ML21148A311), providing supplemental information to support its alternative request.

Specifically, pursuant to subparagraph (2) in paragraph 55a(z) in Part 50 to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested that the NRC authorize Alternative Request RP-10 on the basis that compliance with the ASME OM Code would result in hardship or unusual difficulty without compensating increase in level of quality or safety.

On May 29, 2021, the NRC provided a verbal authorization (ADAMS Accession Number ML21152A125) of proposed Alternative Request RP-10 for SQN Unit 1. The verbal authorization documentation provides a summary of the NRC staff's evaluation for this proposed alternative. This safety evaluation (SE) provides the details of the NRC staff's review of proposed Alternative Request RP-10 for SQN Unit 1.

2.0 **REGULATORY EVALUATION**

The NRC regulations in 10 CFR 50.55a(f)(4), "Inservice testing standards requirement for operating plants," state, in part, that throughout the service life of a boiling or pressurized

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water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the inservice test requirements (except design and access provisions) set forth in the ASME OM Code and addenda that become effective subsequent to editions and addenda specified in 10 CFR 50.55a(f)(2) and (3) and that are incorporated by reference in 10 CFR 50.55a(a)(1)(iv), to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The NRC regulations in 10 CFR 50.55a(z) state, in part, that alternatives to the requirements of 10 CFR 50.55a(f) may be used, when authorized by the NRC, if the licensee demonstrates (1) the proposed alternatives would provide an acceptable level of quality and safety or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The SQN Unit 1 Fourth 10-Year IST Program interval began on September 1, 2016, and is scheduled to end on June 30, 2026. The applicable ASME OM Code edition for the SQN Unit 1 Fourth 10-Year IST Program interval is the 2004 Edition through 2006 Addenda, which are incorporated by reference in 10 CFR 50.55a with conditions.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Alternative Request RP-10

The licensee submitted Alternative Request RP-10 related to the pump testing requirements in the ASME OM Code, Subsection ISTB, "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants," in accordance with 10 CFR 50.55a(z)(2).

Paragraph ISTB-3310, "Effect of Pump Replacement, Repair, and Maintenance on Reference Values," in the ASME OM Code, Subsection ISTB, states:

When a reference value or set of values may have been affected by repair, replacement, or routine servicing of a pump, a new reference value or set of values shall be determined in accordance with ISTB-3300, or the previous value reconfirmed by a comprehensive or Group A test run before declaring the pump operable. The Owner shall determine whether the requirements of ISTB-3100, to reestablish reference values, apply. Deviations between the previous and new set of reference values shall be evaluated and verification that the new values represent acceptable pump operation shall be placed in the record of tests (see ISTB-9000).

The licensee requested the NRC staff to authorize the use of Alternative Request RP-10 described below for the pump listed in Table 1 of this SE.

Table 1

Site/Unit	Pump ID	Pump Description	Pump Type	ADME Code Class	OM Group
SQN Unit 1	SQN-1-PMP-003-0128	Motor Driven Auxiliary Feedwater (MDAFW) Pump 1B-B	Centrifugal – Horizontal, Fixed Speed	3	A

Reason for Request

In May 2021, the licensee needed to replace MDAFW pump 1B-B due to a fire in its inboard pump bearing. ASME OM Code, Subsection ISTB, paragraph ISTB-3310, required the licensee to perform a preservice test on the new pump to develop a new pump curve, and to establish new reference values and acceptance criteria before declaring the pump operable. SQN Unit 1 Technical Specification 3.7.5, "Auxiliary Feedwater (AFW) System," Condition B, requires that with one AFW train inoperable in Mode 1, 2, or 3, for reasons other than Condition A, an AFW train must be restored to operable status within 72 hours.

At the time of the licensee's request, SQN Unit 1 was in Mode 3, and the high flow rates of 480 to 490 gallons per minute (gpm) required for the preservice test of MDAFW pump 1B-B could potentially cause letdown isolations on low pressurizer level as well as reactor coolant system (RCS) average temperature (Tavg) temperature drops. Water flow to the steam generators (SGs) would be cycled and place potential stress on the SG nozzles. The preservice test could be performed in Mode 3, but the licensee considered this to present a hardship with manual management of critical parameters of the RCS temperature, SG, and pressurizer level.

Proposed Alternative

The licensee proposed to perform an ASME OM Code, Subsection ISTB, Group A test of the MDAFW pump 1B-B in accordance with the ASME OM Code during the then-current Mode 3 at SQN Unit 1 using the pump minimum flow recirculation path. The licensee stated that the preservice test of the MDAFW pump 1B-B would be performed in Mode 1 during power ascension of SQN Unit 1 up to 95 percent power level, but no later than 10 days from the Group A test. If the preservice test was not performed within this timeframe, the licensee stated that SQN Unit 1 would enter the required Action Statement of Technical Specification 3.7.5 Condition B.

The licensee stated that in accordance with ASME OM Code, Subsection ISTB, paragraph ISTB-3100, the preservice test method would be in accordance with paragraph ISTB-5110, "Preservice Testing," which requires flow and differential pressure to be measured at a minimum of five points. If practicable, these points shall be from pump minimum flow to at least pump design flow. The Group A reference value for flow and differential pressure would be essentially the same point as the minimum flow and differential pressure used as the minimum flow point for the preservice test.

NRC Staff Evaluation

In Alternative Request RP-10 submitted on May 28, 2021, the licensee proposed to perform a Group A test of the MDAFW pump 1B-B while SQN Unit 1 was in Mode 3, then perform a preservice test when SQN Unit 1 moved to Mode 1, no later than 10 days after the Group A test.

In its request, the licensee provided justification that compliance with the provisions of ASME OM Code, Subsection ISTB, paragraph ISTB-3310, as incorporated by reference in 10 CFR 50.55a, to perform a preservice test of the MDAFW pump 1B-B during the then-current Mode 3 at SQN Unit 1 would result in a hardship without a compensating increase in the level of quality and safety in accordance with 10 CFR 50.55a(z)(2). Specifically, the licensee reported that performing the preservice test of the MDAFW pump 1B-B in Mode 3 at SQN Unit 1 would cycle water flow to the SGs and place potential stress on the SG nozzles. Further, the high AFW flow necessary for the preservice test could potentially cause letdown isolations on low

pressurizer level and cause temperature reductions in the SQN Unit 1 reactor coolant system. Also, there might be reactor operator challenges for manual control of plant parameters if the preservice test of the MDAFW pump 1B-B was conducted in Mode 3 that are not present when conducting the preservice test in Mode 1 at SQN Unit 1.

The licensee proposed to perform a Group A test of the MDAFW pump 1B-B in accordance with the ASME OM Code during the then-current Mode 3 at SQN Unit 1 using the pump minimum flow recirculation path. The licensee specified that the preservice test of the MDAFW pump 1B-B in accordance with the ASME OM Code would be performed in Mode 1 during power ascension of SQN Unit 1 up to 95 percent power level, but no later than 10 days from the Group A test. If the preservice test was not performed within this timeframe, the licensee stated that SQN Unit 1 would enter the required Action Statement of Technical Specification 3.7.5 Condition B.

In its supplemental letter dated May 28, 2021, the licensee stated that the preservice test method for the MDAFW pump 1B-B would be in accordance with ASME OM Code, Subsection ISTB, paragraph ISTB-5110, which requires flow and differential pressure to be measured at a minimum of five points. The licensee further stated that if practicable, these points would be from minimum flow to at least pump design flow. Also, the licensee specified that the Group A reference value for flow and differential pressure would be essentially the same point as the minimum flow and differential pressure used as the minimum flow point for the preservice test of the MDAFW pump 1B-B at SQN Unit 1.

Based on the information described above for MDAFW pump 1B-B at SQN Unit 1, the NRC staff finds that (1) the Group A test of the MDAFW pump 1B-B in accordance with the ASME OM Code during the then-current Mode 3 at SQN Unit 1 using the pump minimum flow recirculation path would provide reasonable assurance of the operational readiness of the MDAFW pump 1B-B for the short time period before the preservice test would be conducted; (2) the licensee would verify that the MDAFW pump 1B-B is operating acceptably during the preservice test because the Group A test reference value for flow and differential pressure would be essentially the same point as the minimum flow and differential pressure used as the minimum flow point for the preservice test; and (3) a hardship existed without a compensating increase in the level of quality and safety in accordance with 10 CFR 50.55a(z)(2) for the performance of a preservice test of the MDAFW pump 1B-B during the then-current Mode 3 at SQN Unit 1.

4.0 CONCLUSION

On May 29, 2021, the NRC provided verbal authorization of proposed Alternative Request RP-10 for SQN Unit 1. As described in this SE, the NRC staff determined that Alternative Request RP-10 provided reasonable assurance that the MDAFW pump 1B-B is operationally ready. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2) for Alternative Request RP-10. Therefore, the NRC staff authorized Alternative Request P-10 until the preservice test for the MDAFW pump 1B-B was completed following SQN Unit 1 entering Mode 1, no later than 10 days from the performance of the Group A test.

All other ASME OM Code requirements for which relief or an alternative was not specifically requested and approved as part of these requests remain applicable.

Principal Contributor: R. Wolfgang, NRR/DEX/EMIB
T. Scarbrough, NRR/DEX/EMIB

Date: October 1, 2021

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ADAMS Accession Nos.:**ML21266A389 (Package)****ML21266A383 (Authorization of Relief Request)****ML21152A125 (Verbal Authorization)****ML21148A311 (Supplement to Request)****ML21148A301 (Request)**

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