

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED ALTERNATIVE TO THE REQUIREMENTS OF THE ASME CODE

FOR MAIN TURBINE SYSTEM VALVE TESTING

(VEGP 3&4-IST-ALT-02)

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GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MEAG POWER SPVM, LLC

MEAG POWER SPVJ, LLC

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CITY OF DALTON, GEORGIA

VOGTLE ELECTRIC GENERATING PLANT, UNITS 3 AND 4

DOCKET NOS. 52-025 AND 52-026

EPID NO. L-2022-LLR-0042

1.0 INTRODUCTION

By letter dated April 8, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22098A144), Southern Nuclear Operating Company, Inc. (SNC or licensee) submitted Alternative Request VEGP 3&4-IST-ALT-02 to the U.S. Nuclear Regulatory Commission (NRC) regarding specific inservice testing (IST) program requirements in the 2012 Edition of the American Society of Mechanical Engineers (ASME) *Operation and Maintenance of Nuclear Power Plants*, Division 1, OM Code, Section IST (hereafter referred to as OM Code) as incorporated by reference in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a, "Codes and standards," for the initial 10-Year IST Program interval at Vogtle Electric Generating Plant (VEGP) Units 3 and 4.

Specifically, pursuant to 10 CFR 50.55a(z)(1), the licensee proposed to implement Alternative Request VEGP 3&4-IST-ALT-02 on the basis that the alternative provides an acceptable level of quality and safety. The NRC documented its review of Alternative Request VEGP 3&4-IST-ALT-02 in this safety evaluation (SE).

2.0 REGULATORY EVALUATION

The NRC regulations in 10 CFR 50.55a(f)(4), "Inservice testing standards requirement for operating plants," state that throughout the service life of a boiling or pressurized water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the IST requirements (except design and access provisions) set forth in the ASME OM Code edition and addenda 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 IST requirements for pumps and valves that are within the scope of the ASME OM Code but are not classified as ASME *Boiler and Pressure Vessel Code* Class 1, Class 2, or Class 3 may be satisfied as an augmented IST program in accordance with 10 CFR 50.55a(f)(6)(ii) without requesting relief under 10 CFR 50.55a(f)(5) or alternatives under 10 CFR 50.55a(z). This use of an augmented IST program may be acceptable provided the basis for deviations from the ASME OM Code, as incorporated by reference in 10 CFR 50.55a, demonstrates an acceptable level of quality and safety, or that implementing the Code provisions would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, where documented and available for NRC review.

The NRC regulations in 10 CFR 50.55a(z), "Alternatives to codes and standards requirements," state that alternatives to the requirements of 10 CFR 50.55a(b) through (h) or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. In the proposed alternative, the applicant or licensee must demonstrate:

(1) *Acceptable level of quality and safety.* The proposed alternative would provide an acceptable level of quality and safety; or

(2) *Hardship without a compensating increase in quality and safety.* Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

3.0 TECHNICAL EVALUATION

3.1 Applicable ASME OM Code

The following request is a proposed alternative in lieu of certain IST program requirements in the 2012 Edition of the ASME OM Code as incorporated by reference in 10 CFR 50.55a for the IST Program at VEGP Units 3 and 4 described in the initial 10-Year IST Program interval.

3.2 Licensee's Alternative Request VEGP 3&4-IST-ALT-02

The IST requirements of the ASME OM Code as incorporated by reference in 10 CFR 50.55a related to this alternative request are as follows:

ASME OM Code (2012 Edition), Subsection ISTC, "Inservice Testing of Valves in Light-Water Reactor Nuclear Power Plants," paragraph ISTC-3510, "Exercising Test Frequency," states:

Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 mo [months], except as provided by paras. ISTC-3520, ISTC-3540, ISTC-3550, ISTC-3570, ISTC-5221, and ISTC-5222. Power-operated relief valves shall be exercised once per fuel cycle.

ASME OM Code (2012 Edition), Subsection ISTC, paragraph ISTC-3520, "Exercising Requirements," subparagraph ISTC-3521, "Category A and Category B Valves," states in part:

Category A and Category B valves shall be tested as follows:

(a) full-stroke exercising of Category A and Category B valves during operation at power to the position(s) required to fulfill its function(s).

In its submittal, the licensee requests alternative testing for the following valves in the Main Turbine System (MTS):

Turbine stop valves: MTS-PL-V001A/B and MTS-PL-V003A/B

Turbine control valves: MTS-PL-V002A/B and MTS-PL-V004A/B

The licensee states that these MTS valves are Class N, Active, OM Category B valves.

Reason for Request

In its submittal dated April 8, 2022, the licensee provided the following reason for its request:

10 CFR 50.55a(z) allows for alternatives to the requirements when the licensee can demonstrate that: 1) the proposed alternative would provide an acceptable level of quality and safety; or 2) compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The proposed alternative test methodology and frequency provides an acceptable level of quality and safety, while reducing the risk of an unplanned turbine trip and associated potential challenges to safety systems.

Proposed Alternative

In its submittal dated April 8, 2022, the licensee described its proposed alternative as follows:

In lieu of the Code requirement for full-stroke testing of these valves on a quarterly frequency per ISTC-3510 and ISTC-3521(a), it is proposed to establish partial stroke testing on a semiannual basis (6-month frequency as identified in Code Case OMN-20).

Basis for Use

In its submittal dated April 8, 2022, the licensee provided the following basis for use of its alternative request:

The turbine stop and control valves close to perform the function of providing backup isolation in the event of a main steam line break (MSLB) or steam generator tube rupture with the single failure of a main steam isolation valve (MSIV) to mitigate the event (Bases for Technical Specification 3.7.2, "Main Steam Line Flow Path Isolation Valves"), and to prevent the generation of turbine missiles in the event of a turbine overspeed condition (UFSAR [Updated Final Safety Analysis Report] Section 10.2). When Westinghouse was designing the AP1000, the stroking of these valves was assumed, as documented in the DCD [Design Control Document], to be informed by industry initiatives to minimize the chances of an unanticipated turbine trip (turbine valve testing is the most common cause of unplanned reactor trips), while maintaining the probability of generating a turbine missile at an appropriately low probability (see UFSAR Subsection 10.2.3.6). This testing frequency (every six months) is within the assumed testing frequency used in the PRA [Probabilistic

Risk Assessment] which demonstrated an acceptable overall risk, including the use of these valves in their MSIV backup function. Additionally, the change from full-stroke to partial stroke exercising during operation minimizes the required power reduction (to 90 percent for partial stroke testing versus to 75 percent for full-stroke testing) and associated secondary transient which also contributes to reducing the risk of a turbine trip event. The UFSAR discussion of the turbine maintenance and inspection program in Subsection 10.2.3.6 indicates:

“Turbine valve testing is performed at six-month intervals. The semiannual testing frequency is based on nuclear industry experience that turbine-related tests are the most common cause of plant trips at power. Plant trips at power may lead to challenges of the safety-related systems. Evaluations show that the probability of turbine missile generation with a semiannual valve test is less than the evaluation criteria.”

The Unit 3 Turbine Maintenance and Inspection Program (submitted on July 9, 2020) identifies this testing at 6-month intervals as partial stroke testing.

The partial stroke testing on a 6-month frequency, provides an acceptable level of quality and safety. As such, SNC proposes this alternative to the OM Code under 10 CFR 50.55a(z)(1).

Note: Approval of this Alternative will require the fail-safe test to be done in conjunction with the existing full-stroke exercise on a Cold Shutdown frequency.

3.3 NRC Staff Evaluation

In ASME Code Alternative VEGP 3&4-IST-ALT-02, the licensee proposed that in lieu of full-stroke testing of specific MTS valves on a quarterly frequency as required in ASME OM Code (2012 Edition), Subsection ISTC, paragraphs ISTC-3510 and ISTC-3521(a), as incorporated by reference in 10 CFR 50.55a, the licensee would perform partial stroke testing of these MTS valves on a semiannual basis. On December 13, 2021, the NRC staff held a public meeting for a pre-submittal discussion of draft Alternative VEGP 3&4 IST-ALT-02. The public meeting summary is available at ML21355A003. Based on the discussion during the public meeting, the licensee submitted Alternative VEGP 3&4 IST-ALT-02 on April 8, 2022.

As indicated by the licensee, the MTS valves specified in Alternative VEGP 3&4 IST-ALT-02 are required to close to perform the function of providing backup isolation in the event of an MSLB or steam generator tube rupture with the single failure of an MSIV to mitigate the event, and to prevent the generation of turbine missiles in the event of a turbine overspeed condition. AP1000 DCD, Section 10.3, “Main Steam Supply System,” Subsection 10.3.1.1, “Safety Design Basis” (ML11171A343) specifies that the AP1000 reactor design takes credit for these non-safety-related MTS valves as backups to the MSIV in lieu of having two MSIVs. The 6-month testing frequency for these MTS valves is within the testing frequency assumed in the VEGP Units 3 and 4 PRA. Therefore, the licensee has included these MTS valves in the IST Program at VEGP Units 3 and 4.

The licensee’s proposed change from full-stroke to partial stroke exercising of the MTS valves during plant operation in Alternative VEGP 3&4 IST-ALT-02 minimizes the required power reduction and associated secondary transient which also contributes to reducing the risk of a turbine trip event. VEGP Units 3 and 4 UFSAR, Revision 11 (ML22179A121), Section 10.2.3.6, “Maintenance and Inspection Program Plan,” indicates that turbine valve testing will be

performed at 6-month intervals based on nuclear industry experience. The licensee submitted the Unit 3 Turbine Maintenance and Inspection Program on July 10, 2020 (ML20192A048), which specifies partial stroke testing at 6-month intervals for these MTS valves.

In its submittal, the licensee noted that approval of this alternative will require the fail-safe test to be done in conjunction with the existing full-stroke exercise on a Cold Shutdown frequency. ASME OM Code, Subsection ISTC, paragraph ISTC-3521(b), states that if full-stroke exercising during operation at power is not practicable, it may be limited to part-stroke during operation at power and full-stroke during cold shutdowns. In this situation, the NRC staff agrees with the licensee that this paragraph in the ASME OM Code allows full-stroke exercising and fail-safe testing of the MTS valves within the scope of this request to be performed during cold shutdowns.

The NRC staff notes that the purpose of ASME OM Code Case OMN-20, "Inservice Test Frequency," is to allow an interval "grace period" for conducting tests, as needed. As indicated by SNC, the reference to Code Case OMN-20 in Alternative Request VEGP 3&4-IST-ALT-02 is to clarify that semiannual testing is equivalent to testing every 6 months. The staff did not rely on Code Case OMN-20 in reviewing Alternative VEGP 3&4-IST-ALT-02.

Based on its review, the NRC staff finds that Alternative VEGP 3&4-IST-ALT-02 proposing to conduct partial stroke tests of the MTS valves within the scope of the request at 6-month intervals, in lieu of full-stroke testing on a quarterly frequency specified in the ASME OM Code (2012 Edition), with full-stroke and fail-safe tests to be performed at cold shutdown, represents an acceptable level of quality and safety that will provide reasonable assurance of the operational readiness of the applicable MTS valves in accordance with 10 CFR 50.55a(z)(1).

4.0 CONCLUSION

As set forth above, the NRC staff finds that Alternative VEGP 3&4-IST-ALT-02 proposing the partial stroke testing of the MTS valves listed in this SE every 6 months, with full-stroke and fail-safe tests to be performed at cold shutdown, will provide an acceptable level of quality and safety for the Initial 10-Year IST Program interval at VEGP Units 3 and 4. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for Alternative Request VEGP 3&4-IST-ALT-02. Therefore, the NRC authorizes the use of Alternative VEGP 3&4-IST-ALT-02 for the Initial 10-Year IST Program interval at VEGP Units 3 and 4. All other ASME Code requirements for which relief or an alternative was not specifically requested, and granted or authorized (as appropriate), in the subject request remain applicable.

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