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

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO AMENDMENT NOS. 119 AND 118

TO THE COMBINED LICENSE NOS. NPF-91 AND NPF-92

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MEAG POWER SPVM, LLC

MEAG POWER SPVJ, LLC

MEAG POWER SPVP, LLC

CITY OF DALTON, GEORGIA

VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4

DOCKET NOS. 52-025 AND 52-026

1.0 INTRODUCTION

By letter dated July 28, 2017, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17209A759), the Southern Nuclear Operating Company (SNC/licensee) requested that the Nuclear Regulatory Commission (NRC) amend Vogtle Electric Generating Plant (VEGP) Units 3 and 4, Combined License (COL) Numbers NPF-91 and NPF-92, respectively. The License Amendment Request (LAR) LAR 17-026 requested to: change the Technical Specifications (TS) Section 1.1, Definition of Actuation Logic Test (ALT); add a new TS Section 1.1, Definition of Actuation Logic Output Test (ALOT); revise existing Surveillance Requirements (SRs) 3.3.15.1 and 3.3.16.1 and add new SRs 3.3.15.2 and 3.3.16.2 to implement the new ALOT. The proposed changes enable the required logic testing on appropriate surveillance test frequencies.

2.0 REGULATORY EVALUATION

The NRC staff considered the following regulatory requirements in reviewing the LAR that included the proposed changes.

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure

from Tier 1 information, Tier 2* information, or the TS, or requires a license amendment under paragraphs B.5.b or B.5.c of the section.

10 CFR Part 52, Appendix D, VIII.C.6 states that after issuance of a license, "Changes to the plant-specific TS will be treated as license amendments under 10 CFR 50.90." 10 CFR 50.90 addresses the application for amendment of license, construction permit, or early site permit. The proposed LAR requires changes in the TS, and therefore an LAR is required to be submitted for NRC approval.

Section 182a of the Atomic Energy Act (AEA) requires applicants for nuclear power plant operating licenses to include TS as part of the license. The U.S. NRC's requirements related to the content of the TS are contained in 10 CFR 50.36, which requires that the TS includes items in the following specific categories: (1) safety limits, limiting safety systems settings, and limiting control settings; (2) limiting conditions for operation; (3) SRs per 10 CFR 50.36(c)(3); (4) design features; and (5) administrative controls. The changes propose in this LAR are related to the SRs because existing SRs 3.3.15.1 and 3.3.16.1 are revised and new SRs 3.3.15.2 and 3.3.16.2 are proposed to be incorporated into the plant-specific TS. Therefore, the regulatory requirements in Section 182a of the AEA and 10 CFR 50.36 are considered in this safety evaluation.

10 CFR Part 50.55a(h)(3), "Safety Systems," requires compliance with Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," and the correction sheet dated January 30, 1995. Clause 5.7 of IEEE Std. 603-1991, "Capability for Test and Calibration" for safety systems requires, in part, that capability for testing and calibration of safety system equipment shall be provided while retaining the capability of the safety systems to accomplish their safety functions. Exceptions to testing and calibration during power operation are allowed where this capability cannot be provided without adversely affecting the safety or operability of the generating station. In this case: (1) appropriate justification shall be provided (for example, demonstration that no practical design exists), (2) acceptable reliability of equipment operation shall be otherwise demonstrated, and (3) the capability shall be provided while the generating station is shut down. This LAR proposed to revise existing SR and add new SR. This LAR also proposed to modify the definition of ALT and add a new definition of ALOT in the TS. Therefore, the regulatory requirements in 10 CFR 50.55a(h)(3) are considered in this safety evaluation.

10 CFR Part 50, Appendix A, GDC 21, "Protection System Reliability and Testability" requires, in part, that the protection system shall be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed. Redundancy and independence designed into the protection system shall be sufficient to assure that (1) no single failure results in loss of the protection function and (2) removal from service of any component or channel does not result in loss of the required minimum redundancy unless the acceptable reliability of operation of the protection system can be otherwise demonstrated. The protection system shall be designed to permit periodic testing of its functioning when the reactor is in operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred. This LAR proposed to change TS Section 1.1 Definition of ALT, add a new TS Section 1.1 Definition of ALOT, revise existing SRs 3.3.15.1 and 3.3.16.1, and add new SRs 3.3.15.2 and 3.3.16.2. Therefore, the regulatory requirements in 10 CFR Part 50, Appendix A, GDC 21 are considered in this safety evaluation.

3.0 TECHNICAL EVALUATION

The licensee proposed in this LAR to revise TS Section 1.1 Definition of ALT, add a new TS Section 1.1 Definition of ALOT, modify existing SRs 3.3.15.1 and 3.3.16.1, and add new SRs 3.3.15.2 and 3.3.16.2 to implement the ALOT for the Protection and Safety Monitoring System (PMS). The technical and safety evaluations of these proposed changes are provided below.

3.1 PROPOSED CHANGES

The specific technical changes proposed in this LAR by the licensee are as follows.

"An ACTUATION LOGIC TEST shall be the application of various simulated or actual input combinations in conjunction with each possible interlock logic state required for OPERABILITY of a logic circuit and the verification of the required logic output. The ACTUATION LOGIC TEST may be performed by means of any series of sequential, overlapping, or total steps."

Furthermore, the licensee also proposed to add a new TS Section 1.1 Definition of ALOT as follows:

"An ACTUATION LOGIC OUTPUT TEST shall be the application of simulated or actual logic signals and the verification of the required component actuation output signals up to, but not including, the actuated device. The ACTUATION LOGIC OUTPUT TEST may be performed by means of any series of sequential, overlapping, or total steps."

In this LAR the licensee proposed to modify the existing SRs 3.3.15.1 and 3.3.16.1 in the TS as "Perform ACTUATION LOGIC TEST on ESF [Engineered Safety Feature] Coincidence Logic."

The licensee also proposed to add a new SR 3.3.15.2 to TS 3.3.15, "ESFAS Actuation Logic – Operating," and a new SR 3.3.16.2 to TS 3.3.16, "ESFAS Actuation Logic – Shutdown," which are proposed as "Perform ACTUATION LOGIC OUTPUT TEST on ESF Actuation." The frequency for the new SRs 3.3.15.2 and 3.3.16.2 is proposed to be 24 months.

3.2 TECHNICAL EVALUATION OF PROPOSED CHANGES FROM INSTRUMENTATION AND CONTROLS (I&C) PERSPECTIVES

The PMS is a safety-related digital I&C protection safety system, which detects off-normal conditions and actuates the appropriate safety-related functions necessary to mitigate the consequences of transients and design basis accidents. The PMS controls safety-related components in the plant that are operated from the main control room or remote shutdown workstation. All the safety-related actuation logics are implemented in the PMS.

After reviewing all the proposed changes as described above, the staff finds that the proposed amendment does not involve any change to the PMS design in the certified AP1000 system. In addition, the staff finds that the PMS is still able to provide periodic testing capability of its safety functions when the reactor is in operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred. With all proposed changes in this LAR, the staff finds that the PMS still complies with the regulatory requirements in GDC 21 and 10 CFR 50.55a(h)(3). Therefore, the staff finds that the proposed changes in this LAR are acceptable from I&C perspectives.

3.3 TECHNICAL EVALUATION FROM TECHNICAL SPECIFICATION PERSPECTIVES

The licensee proposed the changes listed in Section 3.1 of this safety evaluation.

The licensee is proposing to modify the definition of current TS Section 1.1 definition of ALT and existing SRs 3.3.15.1 and 3.3.16.1, as described above. To meet the existing definition, the ALT is required to test the entire logic circuitry downstream of the Bistable Processor Logic, from the ESF Local Coincidence Logic (LCL) through the Component Interface Module (CIM) outputs in the ESF Actuation logic, and provide overlap with the actuated device. The newly proposed definition of ALT would require only the ESF Coincidence Logic to be tested to meet the definition of ALT.

To test the ESF Actuation Logic, which tests the signal path from the Integrated Logic Processor (ILP) through the CIM logic and CIM output driver circuits, the licensee proposed to add a new TS Section 1.1 definition for ALOT. The new ALOT definition notes that the test boundary does not include the actuated devices. Newly proposed SRs 3.3.15.2 and 3.3.16.2 will result in the CIMs generating actuation signals to their end devices. The licensee stated that testing of the actuated devices, except of the circuit breakers and isolation valves covered by the TS 3.3.15 and TS 3.3.16 surveillances, is governed by other TS SR and Inservice Test Program testing.

The licensee proposed to revise SR 3.3.15.1 and SR 3.3.16.1 to read “Perform ACTUATION LOGIC TEST on ESF Coincidence Logic” and add SR 3.3.15.2 and SR 3.3.16.2 to read “Perform ACTUATION LOGIC OUTPUT TEST on ESF actuation” as a result of the changes described above. The proposed surveillance frequency for the ALOT is 24 months. The ALT will continue to be surveilled on a frequency of 92-days on a staggered test basis.

The staff reviewed the changes to the SR and TS Section 1.1 definition of ALT and ALOT. The definition change to ALT still requires a test signal to be injected at the ESF LCL process modules and monitored at the ILP process modules. The ALT continues to provide overlap with the ALOT in SR 3.3.15.2 by verifying communication of the system actuation signals from the ESF LCL to the ESF Actuation Subsystem ILPs. The new ALOT demonstrates that inputs to the ILPs through the CIM logic and CIM output driver circuits in the ESF actuation logic process injected LCL system actuation signals for the applicable actuation function. The CIM can be allowed to actuate its end device in this test.

The proposed 24 month test frequency for the ALOT is consistent with the approved frequencies for testing actuated devices in surveillances. The ILP to CIM pathway is tested on the same interval as the actuated devices. This 24 month frequency would align with the plant’s operating cycle. The licensee states that there will be a reduction in the potential for challenges to the safety systems, reduced time that the safety systems are unavailable, and the reduced likelihood of actuations of end devices that would cause unacceptable plant perturbations such as reactor trip, ESF actuations, and other plant transient initiators. The licensee provided WCAP-16438-P, “Failure Modes and Effects Analysis (FMEA) of AP1000 Protection and Safety Monitoring System” to justify the 24 month frequency for the ILP to CIM pathway. The FMEA discusses various failure modes and associated detectability classes for the integrated logic cabinets containing the ILPs and CIMs, most of which are detected by self-diagnostics.

The staff finds that the proposed changes described above meets 10 CFR 50.36(c)(3) in that, it still meets the requirements relating to testing and calibration needed to assure that the necessary quality of the systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met. The testing of the

PMS on a testing frequency similar to that in NUREG-2194, “Standard Technical Specifications, Westinghouse Advanced Passive 1000 (AP1000) Plants,” is appropriate.

Therefore, the staff finds that the proposed changes to the TS in this LAR are acceptable. In addition, the staff finds that the proposed TS Bases are consistent with the TS.

3.4 SUMMARY

In LAR 17-026, the licensee proposed to change the frequency testing of the ALOT from 92 days on a Staggered Test Basis (which results in each division being tested once a year and four separate test per year during plant operation) to one test every 2 years during plant shutdown. Four separate tests per year during plant operation exposes the plant to risk of operator errors which can result in plant transients. Extending the division test interval from 1 to 2 years, enables the test to be perform during plant shutdown; thereby, avoiding at least four potential operator errors that could result in 4 transient per year. The NRC staff documented its review of the above changes in Section 3.0 of this safety evaluation and finds the changes acceptable in accordance with 10 CFR 50.55(h)(3), 10 CFR 50.36, and 10 CFR 52.98.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), on February 21, 2018, the Georgia State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, “Standards for Protection Against Radiation.” The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite. Also, there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (82 FR 55410, published on November 21, 2017). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The staff has concluded, based on the review and evaluation discussed in Sections 3.0 through 3.3 above, that there is reasonable assurance that: (1) the health and safety of the public will not be endangered by operation in the proposed manner; (2) such activities will be conducted in compliance with the Commission’s regulations; and (3) the issuance of the proposed amendment will not be inimical to the common defense and security or to the health and safety of the public. Therefore, the staff finds that the changes proposed in this LAR to modify TS Section 1.1 Definition of ALT, add a new TS Section 1.1 Definition of ALOT, revise existing SR 3.3.15.1 and 3.3.16.1, and add new SR 3.3.15.2 and 3.3.16.2 to implement the ALOT are acceptable.

7.0 REFERENCES

1. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4 Request for License Amendment: Clarify Technical Specification Definition of Actuation Logic Test and Add New Actuation Logic Output Test (LAR-17-026) dated July 28, 2017 (ADAMS Accession No. ML17209A759).

2. NUREG-2194, "Standard Technical Specifications, Westinghouse Advanced Passive 1000 (AP1000) Plants," April 2016.

3. IEEE 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations."

4. Vogtle Units 3 and 4 Updated Final Safety Analysis Report, Revision 6 and Tier 1, Revision 5, March 12, 2017 (ADAMS Accession No. ML17172A218).

5. AP1000 Design Control Document, Revision 19, June 13, 2011 (ADAMS Accession No. ML11171A500).

6. Combined License NPF-91 for Vogtle Electric Generating Plant Unit 3, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A106).

7. Combined License NPF-92 for Vogtle Electric Generating Plant Unit 4, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A135).

8. WCAP-16438-P, "Failure Modes and Effects Analysis (FMEA) of AP1000 Protection and Safety Monitoring System."