



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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March 1, 2018

MEMORANDUM TO: Jennifer Dixon-Herrity, Chief
Licensing Branch 4
Division of New Reactor Licensing
Office of New Reactors

FROM: Donald Habib, Project Manager /RA/
Licensing Branch 4
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: AUDIT PLAN FOR VOGTLE ELECTRIC GENERATING PLANT
UNITS 3 AND 4, REQUEST FOR LICENSE AMENDMENT
REGARDING TECHNICAL SPECIFICATION UPDATES FOR
REACTIVITY CONTROLS AND OTHE MISCELLANEOUS
CHANGES (LAR 17-024)

By letter dated July 28, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17209A755), Southern Nuclear Operating Company (the licensee) requested an amendment to Combined License (COL) Numbers NPF-91 and NPF-92, for Vogtle Electric Generating Plant Units 3 and 4.

The requested amendment proposes changes to revise COL Appendix A, plant-specific Technical Specifications (TS) by modifying the TS to make them consistent with the remainder of the design and licensing basis, including TS.

NRC staff from the Reactor Systems branch, Instrumentation and Control branch, and Technical Specifications branch plan to conduct an audit to gain better understanding of proposed changes to reach reasonable findings and review related documentation and non-docketed information to evaluate conformance with the Standard Review Plan or technical guidance.

Docket Nos.: 52-025 and 52-026

Enclosure:
Regulatory Audit Plan

cc: See next page

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AUDIT PLAN FOR VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4, REQUEST FOR LICENSE AMENDMENT REGARDING TECHNICAL SPECIFICATION UPDATES FOR REACTIVITY CONTROLS AND OTHE MISCELLANEOUS CHANGES (LAR 17 024): DATED MARCH 1, 2018

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(Revised 01/29/2018)

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**U.S. Nuclear Regulatory Commission
Audit Plan for
Vogtle Electric Generating Plant Units 3 and 4
Request for License Amendment Regarding
Technical Specification Updates for Reactivity Controls
and other Miscellaneous Changes (LAR 17-024)**

Applicant: Southern Nuclear Operating Company (SNC)

Applicant Point of Contact: Ryan Henderson, SNC

Date and Duration: Audit documents will be made available in an electronic reading room (ERR) from February 28, 2018, through March 30, 2018.

Audit Location: The licensee will arrange for access to the ERR by U.S. Nuclear Regulatory Commission (NRC) audit team members.

Purpose

The staff will perform a regulatory audit to examine and evaluate technical information in order to understand or verify the motions of control rods that support the basis of information stated in License Amendment Request (LAR) 17-024, "Technical Specification Updates for Reactivity Controls and other Miscellaneous Changes," Vogtle Electric Generating Plant (VEGP) Units 3 and 4 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17209A755).

Request for Additional Information (RAI) 17-024-1 requests information justifying the licensee's proposal to exclude axial offset (AO) control banks from Surveillance (SR) 3.1.4.2 (ADAMS Accession No. ML18054B559). The staff will review the licensee's documentation to determine whether the information in LAR 17-024 meets applicable regulations and guidance.

Background

On July 28, 2017, SNC submitted VEGP Units 3 and 4 LAR-17-024 to the NRC. The requested amendment includes changes to the technical specifications (TS) information to make it consistent with the design and remainder of the licensing basis in the following areas:

- TS 1.1 Definitions – Shutdown Margin
- TS 3.1.4 Rod Group Alignment Limits
- TS 3.1.6 Control Bank Insertion Limits
- TS 3.1.7 Rod Position Indication
- TS 3.3.1 Reactor Trip System Instrumentation
- TS 3.3.5 Reactor Trip System Manual Actuation

Enclosure

- TS 3.3.17 Post-Accident Monitoring Instrumentation
- TS 3.3.19 Diverse Actuation System Manual Controls
- TS 3.5.4 Passive Residual Heat Removal Heat Exchanger PRHR HX – Operating
- TS 3.8.3 Inverters - Operating

The applicable criteria for reactivity and power distribution design requirements are found in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, General Design Criterion (GDC) 10, “Reactor Design,” GDC 26, “Reactivity Control System Redundancy and Protection,” and 10 CFR 50.46, “Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plants.” Vogtle LAR-17-024 on pages 5 and 7 of Enclosure 1 proposes to remove the AO control bank rod cluster control assemblies (RCCAs) from SR 3.1.4.2 for verification of rod freedom of movement. The rationale for this change is given on page 7 of Enclosure 1 stating “Moving the AO control bank will significantly and inappropriately perturb the power distribution.” While the technical basis for SR 3.1.4.2 provided on page 6 of Enclosure 3 states that “[m]oving each RCCA by 10 steps will not cause radial or axial power tilts, or oscillations, to occur,” no technical basis revision is being proposed to state movement of the AO *control bank* RCCAs would cause a perturbation to the power distribution. Additionally, while the justification on page 7 of Enclosure 1 states that several steps of motion of the AO control bank RCCAs are expected during normal operations, “several steps” is not defined as being in line with the surveillance requirement of rod movement greater than or equal to 10 steps in either direction.

Additionally, in Section 7.7.1.1.2, “Axial Offset Control,” of Revision 6 of the VEGP Updated Final Safety Analysis Report, it states, in part, “To minimize the potential for interactions between the power and axial offset rod control subsystems, the power control subsystem takes precedence.” This statement coupled with the statement made in Section 7.7.1.2, “Rod Control System,” that states, in part, “For axial offset control, the rod speed demand signals are set to a fixed constant speed of 5 inches per minute (8 steps per minute).” Therefore, the staff understands the power control subsystem takes priority over the AO rods such that the movement of the AO rods would be minimized when compared to the operational use of the power control rods and that, during normal operation, the AO rods would have to operate for 75 seconds (i.e., 10 steps per the current technical specification, for rods that travel at 8 steps per minute, thus $10 \text{ steps} / 8 \text{ steps per minute} = 1.25 \text{ minutes}$) to satisfy the current SR.

The staff will perform an audit to assess the RCCA operation and control strategy for the expected movement of the AO control bank in comparison to implementing the current SR 3.1.4.2 of moving each individual RCCA (including the AO rods) by at least 10 steps in either direction.

Regulatory Bases

10 CFR Part 50, Appendix A, GDC 10 requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

10 CFR Part 50, Appendix A, GDC 26 requires that two independent reactivity control systems of different design principles shall be provided. One of the systems shall use control rods, preferably including a positive means for inserting the rods, and shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including anticipated operational occurrences, and with appropriate margin for malfunctions such as stuck rods, specified acceptable fuel design limits are not exceeded. The second reactivity control system shall be capable of reliably controlling the rate of reactivity changes resulting from planned, normal power changes (including xenon burnout) to assure that the acceptable fuel design limits are not exceeded. One of the systems shall be capable of holding the reactor core subcritical under cold conditions.

The NRC staff will follow the Office of New Reactor's (NRO) Office Instruction NRO-REG-108 (Revision 0), "Regulatory Audits," (ADAMS Accession No. ML081910260) in performing the audit of the report cited below.

Regulatory Audit Scope

1. NRC staff seeks clarification of the expected movement of the AO control bank while the reactor is under load-follow or load-regulation response control and in regards to how would SR 3.1.4.2 be implemented if the reactor has not been under load-follow or load-regulation during the surveillance completion time of 92 days.
2. Staff will review the following document:
WCAP-17603-P, Revision 0, titled "Implementation of the MSHIM Operation and Control Strategy in the AP1000 Pressurized Water Reactor," August 2012

The staff will identify additional documents, if necessary.

3. One or more audit teleconferences will be scheduled, as necessary, to clarify any information in the documents reviewed.

Audit Team Assignments

The audit team comprises of the following NRC staff. These individuals will review the relevant documents that are related to the audit and are available at the time of the audit:

- Donald Palmrose, Technical Reviewer, Reactor Systems
- William Roggenbrodt, Technical Reviewer, Instrumentation and Control
- Tarico Sweat, Technical Reviewer, Technical Specifications
- Don Habib, Project Manager, Licensing Projects Branch 4

Deliverables

Once the regulatory audit is completed, the audit team will issue an audit summary within 90 days.