



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

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO AMENDMENT NOS. 140 AND 139

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

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 April 26, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18116A138), Southern Nuclear Operating Company (SNC) submitted a license amendment request (LAR) 18-014 and requested that the U.S. Nuclear Regulatory Commission (NRC) amend the combined licenses (COL) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, COL Numbers NPF-91 and NPF-92, respectively. The requested amendment proposes changes to COL Appendix C, "Inspections, Tests, Analyses, and Acceptance Criteria," (ITAAC) and plant-specific Tier 1 to reflect a new design of containment sump level sensors which affects the acceptance criterion for the detected containment sump level change test and the associated minimum detectable unidentified leakage rate in plant-specific design control document (PS-DCD) Tier 2 information.

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 52.63(b)(1), SNC also requested an exemption from the provisions of 10 CFR Part 52, Appendix D, "Design Certification Rule for the AP1000 Design," Section III.B, "Scope and Contents." This requested exemption would allow a departure from the corresponding portions of the certified information in Tier 1 of the generic DCD¹. In order to modify the UFSAR (the PS-DCD) Tier 1 information,

¹ While SNC describes the requested exemption as being from Section III.B of 10 CFR Part 52, Appendix D, the entirety of the exemption pertains to proposed departures from Tier 1 information in the generic DCD. In the remainder of this evaluation, the NRC will refer to the exemption as an exemption from Tier 1 information to match the language of Section VIII.A.4 of 10 CFR Part 52, Appendix D, which specifically governs the granting of exemptions from Tier 1 information.

the NRC must find the licensee's exemption request included in its submittal for the LAR to be acceptable. The staff's review of the exemption request, as well as the LAR, is included in this safety evaluation.

2.0 REGULATORY EVALUATION

The containment sump level instruments are the primary method of Reactor Coolant Pressure Boundary (RCPB) leak detection after a safe shutdown earthquake (SSE). The sensors are seismic Category I, and the local outside containment displays for these sensors are qualified to be operable after an SSE. The design of the containment sump level sensors is being changed from ultrasonic to guided wave radar instruments. The accuracy of the new sump level instruments is expected to be affected by the instrument change (i.e., increased). The changes also require modifications to ITAAC 2.3.10. 07a.ii acceptance criteria to reflect the change in design of the sump level monitoring system.

The staff considered the following regulatory requirements in reviewing SNC's proposed LAR 18-014.

10 CFR Part 52, Appendix D, Section VIII.A.4 states that exemptions from Tier 1 information are governed by the requirements in 10 CFR 52.63(b)(1) and 10 CFR 52.98(f). It also states that the Commission will deny such a request if it finds that the design change will result in a significant decrease in the level of safety otherwise provided by the design.

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 52.63(b)(1) allows the licensee who references a design certification rule to request NRC approval for an exemption from one or more elements of the certification information. The Commission may only grant such a request if it determines that the exemption will comply with the requirements of 10 CFR 52.7, which in turn points to the requirements listed in 10 CFR 50.12 for specific exemptions, and if the special circumstances present outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption. Therefore, any exemption from the Tier 1 information certified by Appendix D to 10 CFR Part 52 must meet the requirements of 10 CFR 50.12, 52.7, and 52.63(b)(1).

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. This activity involves changes to COL Appendix C. Therefore, this activity requires an amendment to the COL. Accordingly, NRC approval is required prior to making the plant-specific changes in this LAR.

The specific NRC technical requirements applicable to the LAR 18-014 are the general design criteria (GDC) in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." In particular these technical requirements include the following GDC:

10 CFR Part 50, Appendix A, GDC 2, "Design bases for protection against natural phenomena," requires that systems, structures, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

10 CFR Part 50, Appendix A, GDC 30, "Quality of reactor coolant pressure boundary," requires that the components which are part of the reactor coolant pressure boundary be designed, fabricated, erected, and tested to the highest quality standards practical and that means be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage.

Regulatory Guide (RG) 1.45, Revision 0, "Reactor Coolant Leakage Detection Systems," provides guidance to implement the requirements of GDC 30.

3.0 TECHNICAL EVALUATION

3.1 TECHNICAL EVALUATION OF THE REQUESTED CHANGES

3.1.1 LICENSEE PROPOSED CHANGES

VEGP Units 3 and 4 COL Appendix A, TS Limiting Condition for Operation (LCO) 3.4.7 requires that reactor coolant system (RCS) operational leakage be limited to 0.5 gallons per minute (gpm) unidentified leakage. LCO 3.7.8 requires that main steam line leakage through the pipe walls inside containment be limited to 0.5 gpm.

The licensee states that one means of determining unidentified RCS leakage is with the containment sump water level channels. The acceptance criteria for ITAAC 2.3.10.4.7a requires the licensee to confirm that the containment sump water level channels would be able to detect an RCS leak by adding a known volume of water to the sump and measuring the rise in water level. When the ITAAC was developed, the calculation assumed the size of the sump pumps, which was larger than the size of the pump that was ultimately procured. The smaller pump results in a larger cross-sectional area available in the containment sump; this means that a smaller increase in level is required to detect the same volume of water and that the ITAAC acceptance criteria is no longer conservative (i.e., the level sensor needed to be able to detect a smaller increase in level).

Tier 2 UFSAR Subsection 5.2.5.3.1 "Containment Sump Level Monitor" Change

The changes to the sump level monitoring instruments and to the containment sump free volume result in changing the sump level monitoring system minimum detectable leak rate described in Tier 2 UFSAR Subsection 5.2.5.3.1 from 0.03 gpm to 0.19 gpm. There is also a clarification change to the sentence to add "rate" to the "minimum detectable leak" as the value stated is a rate.

The licensee states in LAR 18-014 that a 0.19 gpm minimum detectable leak rate results in a detectable containment sump level change in approximately 30 minutes. Therefore, the licensee concludes the proposed change to the minimum detectable leak rate from 0.03 gpm to 0.19 gpm maintains compliance with GDC 30 and conforms to the guidance of RG 1.45 which specifies that the plant should use leakage detection systems with a response time of no greater than 1 hour for a leakage rate of 1 gpm. RG 1.45 also states that leakage to the primary reactor containment from unidentified sources should be collected and the flow rate

monitored with an accuracy of 1 gpm or better. The licensee determined that the change in sump level monitoring instruments has no adverse effect on the ability to detect a 0.5 gpm leak in containment, and therefore, has no adverse effect on design criteria for leak-before-break.

The design of the containment sump level sensors is being changed from ultrasonic to guided wave radar instruments. The minimum resolution (accuracy) of the new sump level instruments detailed in the licensing basis is expected to be affected by the instrument change (i.e., increased).

Tier 1 Table 2.3.10-4 Change

The amendment requests changes to Tier 1 ITAAC Table 2.3.10-4 Item 7.a.ii Acceptance Criteria to reflect the change in design of the sump level monitoring system. The acceptance criteria is proposed to be changed from sump level channels being capable of detecting a change of 1.75 ± 0.1 inches to the sump level channels being capable of detecting a change of 1.34 ± 0.5 inches. Note that the ITAAC level change of 1.34 inches is based on the calculation of maximization of sump cross-sectional area used in the level change that would be caused by the detectable leak size of 0.5 gpm for 1 hour.

The licensee states in LAR 18-014 that the change included an uncertainty of ± 0.5 inches for bounding the expected testing conditions. The revised ITAAC acceptance criteria (1.34 ± 0.5 inches) would appropriately reflect a representation of the expected containment sump configuration, would comply with applicable regulatory guidance and TS detecting leaks, and would be within the capability of guided wave radar sensors to detect and would be expected to meet seismic qualification requirements.

3.1.2 STAFF EVALUATION OF PROPOSED CHANGES

Tier 2 UFSAR Subsection 5.2.5.3.1 Change

Based on the discussion above, with the changes proposed in LAR-18-014 the staff finds that the licensee continues to conform to the provisions in RG 1.45 by being able to detect a leak of 1 gpm within an hour. In addition, VEGP Units 3 and 4 COL Appendix A, TS LCO 3.4.7 requires that RCS operational leakage be limited to 0.5 gpm unidentified leakage and LCO 3.7.8 requires that main steam line leakage through the pipe walls inside containment be 0.5 gpm. The staff finds that the proposed detection sensitivity of 0.19 gpm has no adverse effect on the TS discussed above because the ability to detect 0.5 gpm is maintained.

The sensitivity of the containment sump level channels is such that they can provide operators with an early warning signal so that they can take corrective actions before the plant exceeds TS limits of 0.5 gpm. The revised sensitivity of 0.19 gpm still can provide operators with an early warning signal.

The staff finds that the proposed change to use guided wave radar instruments, instead of ultrasonic ones, as the containment sump level sensors will not adversely impact their design functions because the new guided wave radar instruments will continue to send signals to the plant control system to provide the required alarm and control functions in the main control room. As stated in the LAR, the sensors are seismic Category I, and the local outside containment displays for these sensors are qualified to be operable after an SSE. So the new containment sump level sensors will meet the qualification and functional requirements as described in UFSAR Subsection 5.2.5. In addition, this proposed change to the type of the

containment sump level sensors will not impact the licensing documents because such detailed design information as the specific type of containment sump level sensors is not included in the licensing documents.

Therefore, the staff determined that the proposed change to Tier 2 UFSAR Subsection 5.2.5.3.1 is acceptable.

Tier 1 Table 2.3.10-4 Change

The staff finds that the proposed change to the test acceptance criteria of 1.34 ± 0.5 inches for the registered level rise in the containment sump by the containment sump level channels verifies the ability of the instrumentation to detect an RCS leak of 0.5 gpm. The ability to detect a 0.5 gpm RCS leak meets applicable RG 1.45 guidance and provides the ability to meet TS requirements for RCS leakage and main steam line leakage. This also supports the leak-before-break design criteria assumptions. Therefore, the staff determined the proposed change in Tier 1 ITAAC Table 2.3.10-4 Item 7.a.ii is acceptable.

Further, as described in UFSAR Subsection 5.2.5.3.1, the containment sump level instruments are the primary method of RCPB leak detection after an SSE. The sensors are seismic Category I, and the local outside containment displays for these sensors are qualified to be operable after an SSE. Therefore, the containment sump level instruments meet the requirements of GDC 2 because they conform to the guidance in RG 1.45 regarding seismic qualification.

Based on the findings above, the staff concludes that there is reasonable assurance that the regulatory requirements of GDC 2 and 30 of Appendix A to 10 CFR Part 50 will continue to be met. Therefore, the staff finds the proposed changes to Tier 2 UFSAR Subsection 5.2.5.3.1 and Tier 1, ITAAC Table 2.3.10-4 are acceptable because the capability to perform the intended functions as described in Tier 2 UFSAR Section 5.2.5 are maintained. Based on the above review and evaluation, the staff also concludes that the conformance to RG 1.45, Revision 0 in the AP1000 licensing bases remains unchanged.

3.2 EVALUATION OF EXEMPTION

The regulations in Section III.B of Appendix D to 10 CFR Part 52 require a holder of a COL referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified design information in Tier 1 of the generic AP1000 DCD. Exemptions from Tier 1 information are governed by the change process in Section VIII.A.4 of Appendix D of 10 CFR Part 52. Because the licensee has identified changes to plant-specific Tier 1 information, with corresponding changes to the associated COL Appendix C information resulting in the need for a departure, an exemption from the certified design information within plant-specific Tier 1 material is required to implement the LAR.

The Tier 1 information for which a plant-specific departure and exemption was requested is described above. The result of this exemption would be that the licensee could implement modifications to Tier 1 information in the UFSAR as well as changes to Tier 2 information and a COL Appendix C table. Pursuant to the provisions of 10 CFR 52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule is requested for the involved Tier 1 information described and justified in

LAR 18-014. This exemption is a permanent exemption limited in scope to the particular Tier 1 information specified.

As stated in Section VIII.A.4 of Appendix D to 10 CFR Part 52, an exemption from Tier 1 information is governed by the requirements of 10 CFR 52.63(b)(1) and 52.98(f). Additionally, Section VIII.A.4 of Appendix D to 10 CFR Part 52 provides that the Commission will deny a request for an exemption from Tier 1 if it finds that the requested change will result in a significant decrease in the level of safety otherwise provided by the design. Pursuant to 10 CFR 52.63(b)(1), the Commission may grant exemptions from one or more elements of the certification information, so long as the criteria given in 10 CFR 52.7, which, in turn, references 10 CFR 50.12, are met, and that the special circumstances, which are defined by 10 CFR 50.12(a)(2), outweigh any potential decrease in safety due to reduced standardization.

Pursuant to 10 CFR 52.7, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 52. As 10 CFR 52.7 further states, the Commission's consideration will be governed by 10 CFR 50.12, "Specific exemptions," which states that an exemption may be granted when: (1) the exemptions are authorized by law, will not present an undue risk to public health and safety, and are consistent with the common defense and security; and (2) special circumstances are present. 10 CFR 50.12(a)(2) lists six special circumstances for which an exemption may be granted. It is necessary for one of these special circumstances to be present in order for NRC to consider granting an exemption request. The licensee stated that the requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection defines special circumstances as when "[a]pplication of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule." The staff's analysis of these findings is presented below.

3.2.1 AUTHORIZED BY LAW

This exemption would allow SNC to implement the amendment as described above. This is a permanent exemption limited in scope to particular Tier 1 information. Subsequent changes to this plant-specific Tier 1 information, and corresponding changes to Appendix C, or any other Tier 1 information would be subject to the exemption process specified in Section VIII.A.4 of Appendix D to 10 CFR Part 52. As stated above, 10 CFR Part 52, Appendix D, Section VIII.A.4 allows the NRC to grant exemptions from one or more elements of the Tier 1 information. The staff has determined that granting of SNC's proposed exemption will not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations. Therefore, as required by 10 CFR 50.12(a)(1), the exemption is authorized by law.

3.2.2 NO UNDUE RISK TO PUBLIC HEALTH AND SAFETY

As discussed above in the technical evaluation, the proposed changes comply with the NRC's substantive safety regulations. Therefore there is no undue risk to the public health and safety.

3.2.3 CONSISTENT WITH COMMON DEFENSE AND SECURITY

The proposed exemption would allow changes as described above in the technical evaluation, thereby departing from the AP1000 certified (Tier 1) design information. The change does not alter or impede the design, function, or operation of any plant structures,

systems or components (SSCs) associated with the facility's physical or cyber security and, therefore, does not affect any plant equipment that is necessary to maintain a safe and secure plant status. In addition, the changes have no impact on plant security or safeguards. Therefore, as required by 10 CFR 50.12(a)(1), the staff finds that the common defense and security is not impacted by this exemption.

3.2.4 SPECIAL CIRCUMSTANCES

Special circumstances, in accordance with 10 CFR 50.12(a)(2), are present, in part, whenever application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule. The underlying purpose of the Tier 1 information is to ensure that the licensee will safely construct and operate the plant based on the certified information found in the AP1000 DCD, which was incorporated by reference into the licensee's licensing basis. The proposed changes described in the above technical evaluation do not impact the ability of any SSCs to perform their safety functions or negatively impact safety of the facility.

Special circumstances are present in the particular circumstances discussed in LAR 18-014 because the application of the specified Tier 1 information is not necessary to achieve the underlying purpose of the rule. The proposed changes are equal or provide additional clarity to the existing requirement. The proposed changes do not affect the design of any function or feature used for the prevention and mitigation of accidents or their safety analyses, and no safety-related SSC or function is involved. This exemption request and associated revisions to the Tier 1 information and corresponding changes to Appendix C demonstrate that the applicable regulatory requirements will continue to be met. Therefore, for the above reasons, the staff finds that the special circumstances required by 10 CFR 50.12(a)(2)(ii) for the granting of an exemption from the Tier 1 information exist.

3.2.5 SPECIAL CIRCUMSTANCES OUTWEIGH REDUCED STANDARDIZATION

This exemption would allow the implementation of changes to Tier 1 information in the plant-specific DCD and corresponding changes to Appendix C of the COL that are being proposed in the LAR. The justification provided in LAR 18-014, the exemption request, and the associated licensing basis mark-ups demonstrate that there is a limited change from the standard information provided in the generic AP1000 DCD. The changes to the minimum detectable leak rate and resolution of the containment sump level monitoring instruments have no adverse effect on the design function of the instruments. Consequently, the safety impact that may result from any reduction in standardization is minimized, because the proposed design change does not result in a reduction in the level of safety. Based on the foregoing reasons, as required by 10 CFR Part 52.63(b)(1), the staff finds that the special circumstances outweigh any decrease in safety that may result from the reduction of standardization of the AP1000 design.

3.2.6 NO SIGNIFICANT REDUCTION IN SAFETY

This exemption would allow the implementation of the changes discussed above. The exemption request proposes to depart from the certified design by allowing the changes discussed above in the technical evaluation. The changes for consistency in using the proposed word "leak rate", instead of the word "leak" will not impact the functional capabilities of this system. The proposed changes will not adversely affect the ability of the sump level sensors to perform their design function, and the level of safety provided is unchanged.

Therefore, based on the foregoing reasons and as required by 10 CFR 52.7, 10 CFR 52.98(f), and 10 CFR Part 52, Appendix D, Section VIII.A.4, the staff finds that granting the exemption would not result in a significant decrease in the level of safety otherwise provided by the design.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), on July 26, 2018 the Georgia State official was consulted regarding 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 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 (FR 83 28463, published on June 19, 2018). 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. Because the exemption is necessary to allow the changes proposed in the license amendment, and because the exemption does not authorize any activities other than those proposed in the license amendment, the environmental consideration for the exemption is identical to that of the license amendment. Accordingly, the exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the exemption.

6.0 CONCLUSION

The staff has determined that pursuant to Section VIII.A.4 of Appendix D to 10 CFR Part 52, the exemption (1) is authorized by law, (2) presents no undue risk to the public health and safety, (3) is consistent with the common defense and security, (4) presents special circumstances, and (5) does not reduce the level of safety at the licensee's facility. Therefore, the staff grants the licensee an exemption from the Tier 1 information requested by the licensee.

The staff has concluded, based on the considerations discussed in Section 3.1 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) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. Therefore, the staff finds the changes proposed in this license amendment acceptable.

7.0 REFERENCES

1. Request for License Amendment and Exemption 18-014: Containment Sump level Instrumentation, letter from SNC, dated April 26, 2018 (ADAMS Accession No. ML18116A138).
2. Vogtle Electric Generating Plant Updated Final Safety Analysis Report, Revision 5, dated June 4, 2011 (ADAMS Accession No. ML11180A100)
3. AP1000 Design Control Document, Revision 19, dated June 13, 2011 (ADAMS Accession No. ML11171A500).
4. Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design, NUREG-1793, Supplement 2, dated August 5, 2011 (ADAMS Accession No. ML112061231).
5. Vogtle Electric Generating Plant, Final Safety Evaluation Report, dated September 30, 2012 (ADAMS Accession No. ML12271A045)
6. RG 1.45, "Guidance on Monitoring and Responding to Reactor Coolant System Leakage," dated May 2008 (ADAMS Accession No. ML073200271)