



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

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO AMENDMENT NOS. 122 AND 121 TO COMBINED OPERATING 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 August 18, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17230A365), and supplemented by letter dated December 19, 2017 (ADAMS Accession No. ML17349A854), Southern Nuclear Operating Company (SNC/licensee) submitted license amendment request (LAR) 17-028 and requested that the U.S. Nuclear Regulatory Commission (NRC/Commission) amend the combined licenses (COL) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, COL Numbers NPF-91 and NPF-92, respectively.

The LAR-17-028 proposed changes which would depart from approved AP1000 Design Control Document (DCD) Tier 2 information and involved Tier 2\* information as incorporated into the Updated Final Safety Analysis Report (UFSAR) as plant-specific DCD information. The licensee proposes to increase the design pressure of the main steam isolation valve (MSIV) compartments from 6.0 pounds per square inch (psi) to 6.5 psi pressurization load and proposes other changes to the licensing basis regarding descriptions of the MSIV compartments. The changes are proposed to VEGP UFSAR Section 3.6.1.2.2, Section 3.8.4.3.1.4, Section 3D.5.5.2, and Sections 3H.3.3, 3H.5.1, and 3H.5.1.3.

The December 19, 2017, supplement did not expand the scope of the LAR and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 21, 2017 (82 FR 55411).

## 2.0 REGULATORY EVALUATION

The LAR summarizes the changes as follows: The proposed changes consist of increasing the design pressure of the MSIV compartments. These areas include MSIV Compartments B (Rooms 12404 and 12504) and MSIV Compartments A (Rooms 12406 and 12506), located in the VEGP auxiliary building. The current design pressure of the MSIV compartments is 6.0 psi. The proposed change increases the design pressure to 6.5 psi pressurization load. The LAR states that the additional margin supports initial testing and long term operation of the plant.

The NRC staff considered the following regulatory requirements in reviewing the proposed LAR:

Appendix D, "Design Certification Rule for the AP1000 Design," of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," 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 Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section.

10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion (GDC) 2, "Design Bases for Protection against Natural Phenomena," specifies that structures, systems, and components (SSCs) important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions.

GDC 4, "Environmental and dynamic effects design bases," specifies that SSCs important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These SSCs shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

Regulatory Guide 1.142, Revision 2, "Safety-Related Concrete Structures for Nuclear Power Plants (Other than Reactor Vessels and Containments)," November 2001. This regulatory guide provides guidance to licensees and applicants on methods acceptable to the NRC staff for complying with the NRC's regulations in the design, evaluation, and quality assurance of safety-related nuclear concrete structures, excluding concrete reactor vessels and concrete containments.

NRC Standard Review Plan (SRP) 3.6.1, "Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment," this document guides the regulatory review of the plant design for protections against piping failures to ensure that environmental effects of such failures would not cause the loss of needed functions of safety-related systems and ensure that the plant could be safely shut down in the event of a piping failure.

NRC SRP 3.8.4, "Other Category I Structures," this document guides the regulatory review of the descriptive information, including plans and sections of each structure, to establish that it sufficiently defines the primary structural aspects and elements relied upon for the structure to perform the safety-related function. The staff also reviews the relationship between adjacent structures, including the separation provided or structural ties, if any.

### 3.0 TECHNICAL EVALUATION

In LAR-17-028, the licensee proposed to increase the design pressure of the MSIV compartments from 6.0 to 6.5 psi pressurization load. The affected areas are the MSIV Compartment B (Rooms 12404 and 12504) and MSIV Compartment A (Rooms 12406 and 12506) located in the VEGP auxiliary building. These MSIV compartments are located on the north side of the auxiliary building.

The current design pressure of the MSIV compartments is 6.0 psi (see VEGP Units 3 and 4 UFSAR Section 3.8.4.3.1.4, Section 3D.5.5.2, and Sections 3H.3.3, 3H.5.1, and 3H.5.1.3). The proposed design pressure is based on the calculated pressure for the limiting event (main feedwater break in MSIV Compartment B) and determined to be 5.97 psi by the licensee. The proposed change increases the design pressure to 6.5 psi. The licensee stated that a design pressure increase to 6.5 psi provides additional margin for the MSIV Compartments A and B design. The licensee stated that the MSIV compartment SSCs remain structurally and environmentally qualified to withstand the effects of the 0.5 psi increase in design pressure.

The licensee stated that auxiliary building's MSIV compartments house the main feedwater, startup feedwater, and main steam lines as they pass to and from the primary containment through the shield building to and from the turbine building, as well as the MSIVs, the main steam safety valves (MSSVs), the power-operated relief valves (PORVs), the PORV block valves, thermal relief valves, and other essential components credited in providing the capability to safely shut down the reactor in the event of a pipe rupture accident.

The licensee indicated in its LAR that MSIV compartments are provided with pressure relief devices, including steam relief vents, doors and other features designed and specified to open under established differential pressures. The purpose of the MSIV compartment pressure relief devices is to relieve pressure from postulated pipe breaks in the MSIV compartments through drains and vents into the turbine building and through the roof to the atmosphere. In the case of the MSIV Compartment B, the released pressure as a result of a postulate pipe break to the turbine building is through the piping/valve penetration room.

The licensee also stated that the structures forming the MSIV compartment boundaries are designed and analyzed to withstand MSIV compartment pressurization, and the essential equipment contained therein remains qualified for the increase in pressure. The licensee indicated that the MSIV compartment SSCs remain structurally and environmentally qualified to withstand the effects of the 0.5 psi requested increase in design pressure.

In Request for Additional Information (RAI) 9207, Question 30887 (ADAMS Accession No. ML17305B331), the NRC staff requested the licensee describe its actions to address the increased MSIV compartment pressure on the structural and environmental qualification of safety-related valves, and the planned setup of safety and relief valves for increase backpressure, for the applicable valves located in these compartments.

In its response to the RAI (ADAMS Accession No. ML17349A854) dated December 15, 2017, the licensee indicated that to account for the room pressure increase, the AP1000 Environmental Conditions specification within the equipment qualification data packages for environmentally qualified equipment has been updated to specify the maximum accident pressure of Rooms 12404, 12406, 12504, 12506, and 12306 as 6.5 psi. This document establishes the acceptance criteria for environmental qualification of equipment located in those rooms and effect of the pressure increase on the structure of the compartments. In particular, the licensee discussed the potential effect on specific SSCs at VEGP Units 3 and 4. For example, the licensee stated that the MSSVs are located in the upper MSIV Compartments A and B (in Rooms 12506 and 12504, respectively). The MSSVs vent to the outside atmosphere. Therefore, the MSSVs are not affected by the MSIV compartment pressure. The licensee also stated that the main steam PORVs are located in the lower MSIV Compartments A and B (in Rooms 12406 and 12404, respectively). The main steam PORVs vent to outside atmosphere. Therefore, these PORVs are not affected by the MSIV compartment pressure.

Additionally, the licensee noted that in its supplement, that SNC LAR-17-012, "Addition of Steam Generator System (SGS) Thermal Relief Valves" (ADAMS Accession No. ML17111A958), issued by NRC as Amendment Nos. 99 and 98 on November 17, 2017, (ADAMS Accession No. ML17263A070) approved the addition of four thermal relief valves to the main feedwater and startup feedwater lines. Each thermal relief valve discharges into the room in which it is located. The licensee stated that each valve is specified to be able to open in the case of a 6.5 psi constant backpressure and is designed for a set pressure that encompasses the requested compartment design pressure of 6.5 psi.

Based on its review of the licensee's response to RAI 9207, Question 30887, the NRC staff finds that the applicant has adequately addressed the ability of the safety-related valves located in the MSIV compartments to operate and relieve pressure build-up under a room backpressure of 6.5 psi. Therefore, the NRC staff considers RAI 9207, Question 30887 to be closed and resolved.

In LAR-17-028, the licensee also indicated that the pressure relief pathways for both MSIV compartments are the nearly the same, with the exception that MSIV Compartment A has an additional pressure relief pathway to the valve/piping penetration room (Room 12306). In RAI 9207, Question 30888 (ADAMS Accession No. ML17305B331), the NRC staff requested the licensee describe this additional pressure relief pathway, and its potential impact on the structural and environmental qualification of any applicable safety-related equipment located in Room 12306. In its response to RAI 9207, Question 30888 (ADAMS Accession No. ML17349A854) dated December 15, 2017, the licensee stated that the lower MSIV Compartment A (Room 12406) vents to the valve/piping penetration room (Room 12306) via three penetrations in the floor of Room 12406. In addition, these floor penetrations from Room 12406 to Room 12306 are small relative to the totality of the other relief paths which include (1) the MSIV Compartment A roof vent; (2) the door between the MSIV Compartment A and the turbine building; and (3) the MSIV Compartment A lower relief panel. The limiting case for MSIV compartment pressurization is a main feedwater break in MSIV Compartment B (Room 12404) which results in that compartment reaching 5.97 psi. The licensee stated that there is not a relief pathway from MSIV Compartment B (Room 12404) to Room 12306, therefore, Room 12306 will not exceed 5.97 psi. In addition, the licensee has stated that the equipment in Room 12306 is to be qualified to 6.5 psi external pressure (post-accident) per its AP1000 Environmental Conditions specification.

Based on its review of the licensee's response to RAI 9207, Question 30888, the NRC staff finds that the licensee has confirmed that the equipment in Room 12306 will not be subject to a backpressure that would exceed 5.97 psi and the equipment in Room 12306 are to be conservatively qualified to 6.5 psi. Therefore, the NRC staff considers RAI 9207, Question 30888 to be closed and resolved.

The staff has concluded that the proposed increase in design pressure of the MSIV compartments from 6.0 psi to 6.5 psi will not adversely affect the functioning of the safety-related equipment and structures in these compartments and, therefore, has met the relevant requirements of GDC 4. The staff's evaluation confirmed the systems, structures and components will continue perform their safety related functions if the pressure in the MSIV room were to reach a value of 6.5 PSI, and therefore concludes the equipment will continue to support the analyses conducted in the initial approval of the COL.

In the structural evaluation review, the staff considered the guidance in Standard Review Plan (SRP) 3.8.4. In the LAR supplement, the licensee stated that the largest increases in required reinforcement due to the increase in compartment pressure, occur in the floor of MSIV Compartment A and in Wall Q. The licensee provided two tables that show the ratio of the "required" versus "provided" reinforcement necessary due to the increase in pressure from 6.0 psig to 6.5 psi differential pressure, for MSIV Compartment A floor and Wall Q, respectively. The tables show a varying ratio of demand to capacity that is less than 1.0. The ratio of less than 1.0 establishes that the demand is less than capacity of the floor and wall. The staff reviewed the tables provided in the RAI response and concluded that the MSIV Compartment A floor and Wall Q are the limiting cases for demand to capacity. The remainder of the compartment floors and walls show increased demand to capacity but the changes in these ratios are less than those in the floor of Compartment A and Wall Q, with interaction ratios remaining below 1.0. The licensee also deleted sentences from the RAI Enclosure 3 and 4 which are not relevant to this LAR per SNC email (ADAMS Accession No. ML18071A247). Based on the tables in the SNC RAI response, the staff finds that the design of the structural elements of the compartments are in accordance with the American Concrete Institute ACI 349-01 code, as supplemented by RG 1.142, and meets the requirements of GDC 2 and 4. Therefore, the staff accepts the licensee's evaluation of the structural elements of the compartments for the proposed increase in pressure. The NRC staff considers RAI 9207, Question 30888 to be closed and resolved.

### 3.1 SUMMARY

The NRC staff has reviewed the licensee's analysis provided in LAR-17-028 and RAI responses provided by the submittal dated December 15, 2017, in support of proposed LAR-17-028 for VEGP Units 3 and 4. For the reasons discussed above, the staff has concluded that the proposed increase in design pressure of the MSIV compartments from 6.0 psi to 6.5 psi pressurization load will not adversely affect the functioning of the safety-related equipment and structures in these compartments. Based on its evaluation, the staff has also concluded that there is reasonable assurance that the requirements of GDC 2 and 4 will continue to be met in regard to equipment and structure qualification with the implementation of LAR-17-028. Therefore, the staff finds that the proposed changes in LAR-17-028 for VEGP Units 3 and 4 are acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), on February 22, 2018, the Georgia State official was consulted on the amendment. The State official had no comment.

## 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 55413 published on November 21, 2017). The December 19, 2017, supplement did not expand the scope of the LAR and did not change the NRC staff's original proposed no significant hazards consideration determination. 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 considerations discussed in Section 3 of this safety evaluation and confirming that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed activities, (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 LAR-17-028 to be acceptable.

## 7.0 REFERENCES

1. Southern Nuclear Operating Company, Inc., Letter to U.S. Nuclear Regulatory Commission, "Request for License Amendment Regarding: Increase in MSIV Compartment Pressure (LAR-17-028)," August 18, 2017 (ADAMS Accession No. ML17230A365).
2. Southern Nuclear Operating Company, Inc., Letter to U.S. Nuclear Regulatory Commission, "Supplement to Request for License Amendment Regarding: Increase in MSIV Compartment Pressure (LAR-17-028)," December 15, 2017 (ADAMS Accession No. ML17349A856).
3. Southern Nuclear Operating Company, Inc., Letter to U.S. Nuclear Regulatory Commission, "Addition of Steam Generator System (SGS) Thermal Relief Valves (LAR-17-012)," (ADAMS Accession No. ML17111A958).
4. U.S. Nuclear Regulatory Commission, Letter to Southern Nuclear Operating Company, Inc., "Vogtle Electric Generating Plant Units 3 and 4 - Issuance of Amendments and Granting of Exemptions Regarding the Addition of Steam Generator System Thermal Relief Valves (ADAMS Accession No. ML17263A080).

5. U.S. Nuclear Regulatory Commission, Email from Bill Gleaves to file, "FW: LAR-17-028 RAI Response Supplement," dated March 12, 2018 (ADAMS Accession No. ML18071A247).
6. U.S. Nuclear Regulatory Commission, NUREG-1793, Supplement 2, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," (ADAMS Accession No. ML112061231).
7. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.142, Revision 2, "Safety-Related Concrete Structures for Nuclear Power Plants (Other Than Reactor Vessels and Containments)," November 2001 (ADAMS Accession No. ML013100274).
8. U.S. Nuclear Regulatory Commission, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," March 2007 (ADAMS Accession No. ML070660036).
9. American Concrete Institute, ACI-349-01, "Code Requirements for Nuclear Safety Related Concrete Structures," February 1, 2001.
10. Combined License NPF-91 for Vogtle Electric Generating Plant Unit 3, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A106).
11. Combined License NPF-92 for Vogtle Electric Generating Plant Unit 4, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A135).