

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS  
RELATED TO AMENDMENT NO. 25 TO THE COMBINED LICENSE NO. NPF-91  
AND LICENSE NO. NPF-92  
SOUTHERN NUCLEAR OPERATING COMPANY, INC.  
GEORGIA POWER COMPANY  
OGLETHORPE POWER COMPANY  
MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA  
CITY OF DALTON, GEORGIA  
VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4  
DOCKET NOS. 52-025 AND 52-026

**1.0 INTRODUCTION**

By the letter dated April 18, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14108A196), Southern Nuclear Operating Company (SNC-Licensee) requested that the U.S. Nuclear Regulatory Commission (NRC) amend the combined licenses (COLs) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, COL Numbers NPF-91 and NPF-92, respectively.

The proposed license amendment request (LAR) would revise the Updated Final Safety Analysis Report (UFSAR) in regard to Tier 2\* information related to fire area boundaries. These changes add three new fire zones in the middle annulus to provide enclosures for the Class 1E electrical containment penetrations in accordance with UFSAR Appendix 9A, Subsection 9A.3.1.1.15. The addition of the three new fire zones extended the fire area boundaries for three existing fire areas and therefore constitutes a change to Tier 2\* information. Additionally, the licensee proposed changes that require revisions to UFSAR Tier 2 information involving changes to plant-specific Tier 2\* information.

In a letter dated July 30, 2014 (ADAMS Accession No. ML14211A621), the licensee provided additional information that clarified the application, did not expand the scope of the application as originally noticed and did not change the staff's original proposed "no significant hazards consideration" determination published in the *Federal Register* on May 27, 2014 (79 FR 30189).

## **2.0 REGULATORY EVALUATION**

- 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.6a requires NRC approval for departures from Tier 2\* information. Because the proposed amendment request involves changes to Tier 2\* information, NRC approval is required before making the Tier 2\* changes addressed in this departure.
- 10 CFR Part 52, Appendix D, Section VIII.B.5.a requires prior NRC approval for Tier 2 departures that involve changes to Tier 2\* information. The proposed changes affect the Tier 2\* figure.
- 10 CFR 50.48(a)(1) requires a fire protection plan that satisfies 10 CFR 50, Appendix A, General Design Criterion (GDC) 3, “Fire Protection”. GDC 3 requires structures, systems and components important to safety to be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions.
- 10 CFR 50.150, “Aircraft impact assessment (a) Assessment requirements”, requires a design-specific assessment of the effects on the facility of the impact of a large commercial aircraft. Using realistic analyses, the applicant shall identify and incorporate into the design those design features and functional capabilities to show that, with reduced use of operator actions: (i) the reactor core remains cooled, or the containment remains intact; and (ii) spent fuel pool cooling or spent fuel pool integrity is maintained.

In performing its technical review, the NRC staff evaluated the LAR for compliance with regulations, and applicable regulatory guidance. In addition, the NRC staff reviewed the licensee’s current licensing and design basis, as described in its UFSAR.

## **3.0 TECHNICAL EVALUATION**

The NRC staff has evaluated various aspects of the proposed changes included in the LAR. The staff’s evaluations are contained in the following sections.

### **3.1 FIRE PROTECTION EVALUATION**

The fire protection review of this LAR concerns changes to certain fire areas within the middle annulus. The primary purpose of these fire areas is to confine the effects of fires to a single compartment, thereby minimizing the potential for adverse effects from fires on structures, systems and components (SSCs) important to safety. The proposed changes revise the Vogtle Units 3 and 4 UFSAR in regard to Tier 2\* information related to fire area boundaries. The changes are:

- A. Adding of three new fire zones in the middle annulus to provide fire barrier enclosures for the Class 1E Electrical Divisions B, C, and D containment penetrations,
- B. Eliminating the Class 1E Electrical Division A enclosure and making the Division A containment penetration assemblies part of the existing middle annulus fire zone.

The staff reviewed the LAR to determine the effects of the proposed changes to fire area boundaries on the fire protection and aircraft impact analyses for the Vogtle Units 3 and 4.

*A. Addition of three new fire zones in the middle annulus*

As currently described in the Vogtle Units 3 and 4 UFSAR Sections 9A.3.1.1.15, 9A.3.1.2.1.2, 9A.3.1.2.2.1, 9A.3.1.2.3.1 and 9A.3.1.2.4.1, the four Class 1E electrical penetration assemblies, Divisions A, B, C, and D, pass through the middle annulus fire zone, 1200 AF 12341. These four Class 1E electrical penetration assemblies are enclosed by three-hour fire barriers, which are considered a part of fire areas: 1201 AF 02 for Division B, 1201 AF 03 for Division D, 1202 AF 03 for Division C, and 1242 AF 02 for Division A. However, the extension of these fire areas into the middle annulus is not currently reflected on UFSAR Figure 9A-1 sheet 5 of 16. The licensee proposes to revise the UFSAR to show three new enclosures in the middle annulus. The three new enclosures result in three new fire zones: 1231 AF 12344 within fire area 1201 AF 02 for Division B, 1232 AF 12343 within fire area 1202 AF 03 for Division C, and 1231 AF 12345 within fire area 1201 AF 03 for Division D.

In the LAR, the licensee stated that the Vogtle Units 3 and 4 fire protection analysis is performed using a methodology that follows the guidance in Branch Technical Position (BTP) CMEB 9.5.1. This analysis is provided in Appendix 9A, "Fire Protection Analysis," of the Vogtle Units 3 and 4 UFSAR. The fire protection analysis is performed on a fire area by fire area basis outside containment and a fire zone by fire zone basis inside containment, and provides reasonable assurance that the plant can be safely shut down in the event of a fire.

The addition of the three new fire zones for the Division B, C, and D Class 1E electrical penetration rooms support the Fire Protection Analysis as described in UFSAR Appendix 9A because the Division B, C, and D Class 1E electrical containment penetrations will have three-hour rated fire barriers constructed between the containment steel shell and the shield building concrete structure. The new fire zones are considered extensions of the associated Class 1E divisional fire areas in the Auxiliary Building on the other side of the shield building wall. The new fire zones are assigned fire zone number designations and this information is indicated on Appendix 9A, revised Figure 9A-1 (sheet 5 of 16), as depicted in the LAR Enclosure 3, page 3 of 6.

The licensee also stated that the three new fire zones penetration assemblies to the middle annulus add a negligible amount of combustible material as indicated on revised Appendix 9A Table 9A-3, "Fire Protection Summary," (LAR Enclosure 2, page 7 of 8). The three-hour rated fire barriers between the Division B, C, and D Class 1E electrical penetration rooms do not interface with or affect safety-related equipment or a fission product barrier. Therefore, the fire protection analysis is not adversely affected, i.e., the analysis results remain acceptable. The licensee also provided revised Appendix 9A Section 9A.3.1.1 (LAR Enclosure 2, page 3 of 8) to indicate that the Division B, C, and D middle annulus penetration rooms are not part of the Containment/Shield Building fire area, but are part of the adjacent Auxiliary Building rooms' fire areas, and revised 9A Section 9A.3.1.1.15 (LAR Enclosure 2, page 3 of 8) to indicate that the Divisions B, C and D Class 1E containment penetration assemblies are enclosed by three-hour barriers.

The NRC staff reviewed the licensee's changes provided in the LAR to the Fire Hazard Analysis and finds them acceptable because the changes follow the guidance in BTP CMEB 9.5.1 for performing a fire hazard analysis and demonstrate that the plant will maintain the ability to safely shut down in the event of a fire.

*B. Eliminate the Class 1E Electrical Division A enclosure*

Due to the lack of space, the Class 1E Division A enclosure has been eliminated from the design and the Division A Class 1E electrical penetration assemblies within the annulus are now considered part of the middle annulus fire zone 1200 AF 12341, which is contained within the Containment/Shield Building Fire Area, 1000 AF 01. The Division A Class 1E electrical containment penetrations are physically separated from the Division B, C, and D Class 1E electrical containment penetrations by three-hour fire barriers as indicated in revised Appendix 9A section 9A.3.1.1.15 (LAR Enclosure 2, page 3 of 8.)

In the original LAR submission, the licensee indicated that “The extension of these fire areas into the middle annulus is not currently reflected on UFSAR Figure 9A-1 (Sheets 5, 6 of 16).” However, no revised Figure 9A-1 (Sheet 6 of 16) was provided in the LAR. Figure 9A-1 (Sheet 6 of 16) depicts the Division A electrical penetration room. In a public meeting (July 10, 2014) the staff requested that the licensee clarify this discrepancy. In a letter dated July 30, 2014 (ADAMS Accession No. ML14211A621), the licensee provided additional information stating that the Division A penetration is being changed such that an enclosure is not required, therefore, no change is needed or proposed to Figure 9A-1 (Sheet 6 of 16).

In the LAR, the licensee stated that elimination of the Division A individual fire zone is acceptable from a fire protection perspective because overall divisional separation is maintained. The Division A Class 1E electrical penetration room, which is part of the middle annulus Fire Zone 1200 AF 12341, does not affect any other cable or component not associated with the electrical penetration assemblies. The addition of the Division A penetration assemblies to the middle annulus adds a negligible amount of combustible material. Therefore, the fire protection analysis is not adversely affected.

The licensee also provided revised Table 9A-2, “Safe Shutdown Components,” (LAR Enclosure 2 page 6 of 8) that identifies safe shutdown components and the fire area and fire zones that they are located in. The revision to Table 9A-2 identifies the three Division A Class 1E electrical penetrations (EY-P11Z, EY-P12Y and EY-P13Y) in the general middle annulus fire area 1000 AF 01 to reflect the elimination of the Division A electrical penetration enclosure. Table 9A-2 also indicates that two Passive Containment Cooling System (PCS) containment pressure instruments for Division B and D are located in the middle annulus fire area. The licensee stated that the redundant Division A and C PCS containment pressure instruments are located in a different fire area 1200 AF 01. The Division A Class 1E electrical penetration assemblies that are a part of fire area 1000 AF 01 are not associated with the cables necessary to support the redundant Division A PCS containment pressure instrument. Therefore, in the event of a fire, instrumentation necessary to provide the logic for PCS actuation is maintained.

The NRC staff reviewed the licensee’s changes provided in the LAR to the Fire Hazard Analysis and finds them acceptable because the changes follow the guidance in BTP CMEB 9.5.1 for performing a fire hazard analysis and demonstrate that the plant will maintain the ability to safely shut down in the event of a fire.

The electrical penetrations and the associated new fire zone designations are identified in Table 1 below.

Table 1

<b>Electrical Penetration Division</b>	<b>Fire Area</b>	<b>Electrical Penetration Fire Zone</b>	<b>UFSAR Sections Descriptions</b>
Division A	1000 AF 01	1200 AF 12341	9A.3.1.1.15, 9A.3.1.2.1.2
Division B	1201 AF 02	1231 AF 12344	9A.3.1.1.15, 9A.3.1.2.2.1
Division C	1202 AF 03	1232 AF 12343	9A.3.1.1.15, 9A.3.1.2.3.1
Division D	1201 AF 03	1231 AF 12345	9A.3.1.1.15, 9A.3.1.2.4.1

The NRC staff has reviewed the licensee’s analysis provided in the LAR and finds that:

The addition of three fire zones for the Class 1E Electrical Division B, C, and D, and the elimination of the Class 1E Electrical Division A enclosure meet the guidance of BTP CMEB 9.5.1 and demonstrates that the plant will maintain the ability to safely shutdown in the event of a fire.

The Licensee performed the fire protection analysis for each fire area using the methodology that follows the guidance of NRC BTP CMEB 9.5-1 and since the guidance in BTP CMEB 9.5-1 provides the methodology to assess reasonable assurance, the NRC staff concludes that there is reasonable assurance that the requirements of 10 CFR 50.48 and 10 CFR 50, Appendix A, GDC 3 will continue to be met. Therefore, the NRC staff finds the proposed changes acceptable.

### **3.2 AIRCRAFT IMPACT ASSESSMENT – FIRE PROTECTION**

The results of the staff’s review of Appendix 19F, “Malevolent Aircraft Impact,” of the AP1000 DCD Revision 19 are described in NUREG-1793 Supplement 2, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design Docket No. 52-006.” The staff determined that the shield building is a key design feature for the protection of the safety systems located inside containment from the impact of a large commercial aircraft. The assessment concludes that a strike upon the shield building would not result in perforation of the shield building so damage to the containment vessel would not occur. Therefore, the systems and equipment within the containment vessel are not damaged from the impact or from exposure to jet fuel. The Vogtle Units 3 and 4 UFSAR incorporated by reference, with no departures or supplements, Appendix 19F of the AP1000 Design Control Document (DCD) Revision 19.

In the LAR, the licensee states that the addition of the three new fire zones in the middle annulus to provide fire barrier enclosures for the Class 1E Electrical Divisions B, C, and D containment penetrations and the elimination of the Class 1E Electrical Division A enclosure and make the Division A containment penetration assemblies part of the existing middle annulus fire area do not affect the shield building and that there is no impact to the aircraft impact assessment.

The staff reviewed the licensee's analysis provided in the LAR and finds that the proposed changes do not affect the fire protection perspective of the aircraft impact assessment.

Based on these findings the NRC staff concludes that there is reasonable assurance that the requirements of 10 CFR 50.150 will continue to be met. Therefore, the NRC staff finds the proposed changes acceptable.

#### Conclusion

Based on the technical evaluation above, the staff finds that the proposed changes included in the LAR and the supporting analysis provided in the LAR meet the guidance of BTP CMEB 9.5.1 and demonstrate that the plant will maintain the ability to safely shutdown in the event of a fire and do not affect the fire protection perspective of the aircraft impact assessment. Based on these findings, the NRC staff concludes that there is reasonable assurance that the requirements of 10 CFR 50.48, GDC 3 of 10 CFR Part 50, Appendix A, and 10 CFR 50.150, will continue to be met. Therefore, the staff finds the proposed changes to be acceptable.

#### **4.0 STATE CONSULTATION**

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), 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 change in the types or significant increase in the amounts of any effluents that may be released off site. Also, that 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 (*Federal Register* (FR) notices published on May 27, 2014 (79 FR 30189). 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 3.0, 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 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 request acceptable.

## **7.0 REFERENCES**

1. Request for License amendment – Enclosures For Class 1E Electrical Penetrations in Middle Annulus (LAR 13-023) letter from Southern Nuclear Operating Company dated April 18, 2014 (ADAMS Accession No. ML14108A196) and supplemented by the letter dated July 30, 2014 (ADAMS Accession No. ML14211A621).
2. Vogtle Electric Generating Plant (VEGP) Updated Final Safety Analysis Report (UFSAR), Revision 3, dated June 27, 2014 (ADAMS Accession No. ML14183A926).
3. VEGP Final Safety Evaluation Report (FSER) dated August 5, 2011 (ADAMS Accession No. ML111950510 – letter, ADAMS Accession No. ML110450302 – FSER package).
4. Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design, Supplement 2, NUREG-1793, dated August 5, 2011 (ADAMS Accession No. ML112061231).