



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

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS  
RELATED TO AMENDMENT NOS. 132 AND 131  
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 November 17, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17321B080), as supplemented by letter dated June 8, 2018 (ADAMS Accession No. ML18159A313), Southern Nuclear Operating Company, Inc., (SNC) requested that the U.S. Nuclear Regulatory Commission (NRC) amend the combined license (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 the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the incorporated plant-specific Design Control Document (DCD) Tier 2\* and associated Tier 2 information and a COL License Condition which references a UFSAR section impacted by one of the proposed changes. Specifically, the requested amendment proposes to revise COL License Condition 2.D.(4)(b), requirement to perform the Natural Circulation test (first plant test) using the steam generators identified in UFSAR, Subsection 14.2.10.3.6, and Passive Residual Heat Removal (PRHR) Heat Exchanger test (first plant test) identified in UFSAR, Subsection 14.2.10.3.7, as part of the Initial Criticality and Low-Power Testing requirements. The proposed changes to the Natural Circulation test will suspend the requirements of COL Appendix A Technical Specification (TS) 3.4.4 during performance of the test. Also the amendment proposes to change the PRHR Heat Exchanger Test to be performed as part of the Power Ascension Testing as specified in COL License

Condition 2.D.(5)(b) instead of as part of the Initial Criticality and Low-Power Testing requirements as currently specified in COL License Condition 2.D.(4)(b).

The supplement dated June 8, 2018, provided additional information that clarified the application, did not expanded the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 13, 2018 (83 FR 6218).

## 2.0 REGULATORY BASIS

The proposed changes revise plant-specific UFSAR Tier 2\* and associated Tier 2 information, and also involves changes to COL License Conditions 2.D.(4)(b) and 2.D.(5)(b).

The NRC staff considered the following regulatory requirements in reviewing the licensee's proposed UFSAR changes:

Title 10 of the *Code of Federal Regulations* (10 CFR) 52.98(c) states that any changes to or departures from information within the scope of the referenced design certification rule are subject to the applicable change processes in that rule; and changes that are not within the scope of the referenced design certification rule are subject to the applicable change processes in 10 CFR Part 50, unless they also involve changes to or noncompliance with information within the scope of the referenced design certification rule. In these cases, the applicable provisions of this section and the design certification rule apply.

10 CFR 50.90 states, in part, that whenever a licensee desires to amend their license, they must file an application for an amendment, fully describe the requested changes, and follow as far as applicable, the form prescribed for the original application.

10 CFR 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 TSs, or requires a license amendment under paragraphs B.5.b or B.5.c of this section.

10 CFR 50, Appendix A, General Design Criterion (GDC) 34 requires in part that a system be provided to remove fission product decay heat and other residual heat from the reactor such that design conditions are not exceeded. The PRHR heat exchanger is credited to perform this function for the AP1000 design.

## 3.0 TECHNICAL EVALUATION

The proposed changes require a departure from plant-specific DCD and UFSAR Tier 2\* and associated Tier 2 information and also involves changes to COL License Conditions. The Tier 2 revisions involve changes to the conditions specified in the COL for VEGP Units 3 and 4. As part of the LAR, the licensee proposed changes to UFSAR Subsection 14.2.10.3.6, Natural Circulation (first plant test), and PRHR Heat Exchanger (first plant test) identified in UFSAR, Subsection 14.2.10.3.7, as part of the Initial Criticality and Low-Power Testing requirements. The proposed changes to the Natural Circulation test would suspend the requirements of COL Appendix A Technical Specification 3.4.4 during performance of the test. Also the amendment proposes to change the PRHR heat exchanger first-plant test to be performed as part of the Power Ascension Testing as specified in COL License Condition 2.D.(5)(b) instead of as part of

the Initial Criticality and Low-Power Testing as currently specified in COL License Condition 2.D.(4)(b).

The proposed changes described above also affect other sections of the UFSAR. To support these changes, the LAR proposed the following changes to Tier 2 information: Table 1.8-202 is revised to renumber the references in the table from UFSAR Subsection 14.2.10.29 to Subsection 14.2.10.4.30; Subsection 1.9.4.2.1, is revised to relocate the PRHR heat exchanger from the low power test description to the power ascension test description; Appendix 1A is revised to relocate the PRHR heat exchanger from the low power test description to the power ascension test description; Subsection 14.2.10.4.29, is renumbered as Subsection 14.2.10.4.30; and Subsection 14.4.5, is revised to renumber the reference to the current Subsection 14.2.10.4.29 to Subsection 14.2.10.4.30. These changes are evaluated in detail below.

### 3.1 STAFF EVALUATION OF PROPOSED CHANGES

#### Natural Circulation (First Plant Test) Using the Steam Generators

UFSAR Subsection 14.2.10.3.9, describes the first plant natural circulation test that is performed after initial fuel load during the power testing, and is initiated in MODE 2 at a reactor power between 3 percent to 5 percent rated thermal power (RTP). However, COL Appendix A TS Limiting Conditions for Operation (LCO) 3.4.4, Reactor Coolant System (RCS) Loop, requires that two RCS loops shall be operable with four reactor coolant pumps (RCPs) in operation with variable speed control bypassed when in MODE 2. Therefore an exception to Appendix A TS 3.4.4 is required to allow removing all four RCPs from operation to perform the Natural Circulation (first plant test) using the steam generators in MODE 2 at a reactor power between 3 percent to 5 percent RTP. In order to be able to perform this test the LAR proposed a change to COL License Condition 2.D.(4)(b) to allow suspension of TS 3.4.4.

The staff compared the first plant Natural Circulation Test as detailed in this LAR with the complete loss of forced reactor coolant flow design basis analysis presented in UFSAR Section 15.3.2, "Complete Loss of Forced Reactor Coolant Flow." The staff notes that the analysis detailed in UFSAR Section 15.3.2 involves a complete loss of forced reactor coolant flow from full power, which bounds the  $\leq 5$  percent initial power in the conditions described in the LAR. As detailed in permissive P-10, the "reactor coolant pump underspeed" and "low primary coolant loop flow" trip setpoints are automatically enabled above 10 percent power and would therefore protect the core in the event that the reactor power were to inadvertently increase to 10 percent RTP. Therefore, the analysis summarized in UFSAR Section 15.3.2 bounds the conditions related to the first plant Natural Circulation Test as described in the LAR. Additionally, as noted in UFSAR Section 5.4.2.1, "Design Bases," and as supported by the safety analysis in UFSAR Section 15.3.2, the prior evaluation by the staff that reviewed those sections and found that the RCS is capable of providing sufficient natural circulation without any RCP running remains valid.

Because the existing safety analysis remains applicable, the staff finds the proposed TS one-time exception to revise COL License Condition 2.D.(4)(b) to allow suspension of the requirements of TS 3.4.4 during the performance of the Natural Circulation (First Plant Test) to be acceptable.

#### Passive Residual Heat Removal (PRHR) Heat Exchanger (First Plant Test)

UFSAR Subsection 14.2.10.3.7 describes the first plant testing of the PRHR heat exchanger. The proposed change to Subsection 14.2.10.3.7 will allow the PRHR heat exchanger test to be

performed separately from the UFSAR Subsection 14.2.10.3.6 first plant natural circulation test, and to be relocated to a new UFSAR Tier 2\* Subsection 14.2.10.4.29. Subsequent changes are proposed by this LAR to renumber the existing UFSAR Subsection 14.2.10.4.29 to Subsection 14.2.10.4.30, and make additional changes to UFSAR Table 1.8-202, UFSAR Subsection 1.9.4.2.1 and 14.4.5, and UFSAR Appendix 1A to maintain consistency and support the changes associated with the PRHR heat exchanger test. The LAR also proposed changes to COL License Condition 2.D.(4)(b) and 2.D.(5)(b) to allow this test to be performed as part of Power Ascension Testing.

This change will also set the test conditions to the plant conditions which the PRHR heat exchanger and the in-containment reactor water storage tank (IRWST) were designed to encounter (see VEGP UFSAR Section 15.2.6, "Loss of AC Power to the Plant Auxiliaries," under ADAMS Accession No. ML17172A279). In addition, to prevent the need for an exception to COL Appendix A, TS 3.5.6, the LAR proposed a change to the revised PRHR heat exchanger testing establishing a new upper testing limit for the water temperature in the IRWST from the prior approved temperature limit of 150 °F. This change requires termination of the test before the IRWST average water temperature exceeds 120 °F and is in line with the changes contained in VEGP Unit 3 Amendment 120 and VEGP Unit 4 Amendment 119 regarding the IRWST heatup tests. Under Amendments 119 and 120, VEGP UFSAR Subsections 14.2.5 and 14.2.9.1.3 were modified with the initial IRWST temperature changed from 120 °F to 80 °F.

The staff reviewed the above proposed changes with respect to the prior approved testing requirements along with potential affects to the prior approved safety analysis in VEGP UFSAR Section 15.2.6, "Loss of ac Power to the Plant Auxiliaries." As discussed in LAR-17-041, in Section 2.2 for the technical evaluation of the proposed changes, this first plant only test is one part of a series of preoperational tests for passive core cooling system testing that is described in UFSAR Section 14.2.9.1.3. Additionally, performing the first plant only test during MODE 3 avoids the potential for reactivity changes and associated reactor power changes that could occur if performed during MODE 2 operation. Thus, the staff finds that the proposed changes would not affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. The prior approved safety analysis is still bounding. The proposed changes would not involve nor interface with any system, structure, or component accident initiator or initiating sequence of events related to the accidents evaluated in the AP1000 DCD or VEGP UFSAR. The proposed changes would not adversely affect any design code limit allowable value, design analysis, nor would they adversely affect any safety analysis input or result. Therefore, as discussed, LAR-17-041 does not change the prior staff conclusions in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design, Supplement 2, Volume 1," Section 6.3.6 and NUREG-2124, "Final Safety Evaluation Report Related to the Combined Licenses for Vogtle Electric Generating Plant, Units 3 and 4," Section 6.3.6 that the AP1000 passive core cooling design meets the guidelines of Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition (NUREG-0800) Section 6.3, "Emergency Core Cooling System." For these reasons the staff has determined the proposed revisions are acceptable.

Based on the above, the first plant testing of PRHR heat exchanger continues to support compliance with the requirements of GDC 34 to remove fission product decay heat and other residual heat from the reactor such that design conditions are not exceeded. Therefore, the Staff finds that the proposed changes do not affect conformance with General Design Criteria differently than described in the plant-specific DCD or UFSAR. Based on the staff's review of this LAR, the staff concludes that the safety analysis presented in VEGP UFSAR Chapter 15

remains valid and proposed test changes to UFSAR Tier 2\* and associated Tier 2 information and COL License Conditions presented in LAR 17-041 are acceptable.

### 3.2 SUMMARY

The staff reviewed the licensee's proposed changes in the LAR, that allows the suspension of the requirements of COL Appendix A TS 3.4.4 for the Natural Circulation (first plant test) and relocation of the Passive Residual Heat Removal Heat Exchanger (first plant test) to be performed as part of the Power Ascension Testing requirements. These changes involve material which is specifically referenced in COL License Condition 2.D.(4)(b) and 2.D.(5)(b) for VEGP Units 3 and 4.

Based on the technical evaluations above, the staff finds that the proposed changes to the plant specific UFSAR Tier 2\* and associated Tier 2 information and COL License Conditions, to allow the suspension of the requirements of COL Appendix A TS 3.4.4 for the Natural Circulation (first plant test) to be acceptable. The staff also finds the relocation of the Passive Residual Heat Removal Heat Exchanger (first plant test) to be performed as part of the Power Ascension Testing requirements, which continues to conform to GDC 34; to be acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), on June 28, 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. 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, and 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 (83 FR 6218, published on February 13, 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.

### 6.0 CONCLUSION

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. REFERENCES

1. Request for License Amendment (LAR 17-041): Changes to Natural Circulation and Passive Residual Heat Removal Heat Exchanger Startup Tests, November 17, 2017, (ADAMS Accession No. ML17321B080).
2. Supplement to Request for License Amendment (LAR 17-041S): Changes to Natural Circulation and Passive Residual Heat Removal Heat Exchanger Startup Tests, June 8, 2018, (ADAMS Accession No. ML18159A313).
3. Vogtle Units 3 and 4 Updated Final Safety Analysis Report, Revision 6 and Tier 1, Revision 5, March 12, 2017, (ADAMS Accession No. ML17172A218).
4. AP1000 Design Control Document, Revision 19, June 13, 2011, (ADAMS Accession No. ML11171A500).
5. Vogtle Electric Generating Plant Units 3 and 4, Updated Final Safety Analysis Report, Revision 6, June 15, 2017 (ADAMS Accession No. ML17172A218).
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. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," March 2007.
9. NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design, Supplement 2, Volume 1, September 2011.
10. NUREG-2124, "Final Safety Evaluation Report Related to the Combined Licenses for Vogtle Electric Generating Plant, Units 3 and 4, September 2012.