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

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO AMENDMENT NOS. 129 AND 128

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 August 31, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17243A444), as supplemented by letters dated March 23, and May 18, 2018, (ADAMS Accession Nos. ML18082B369 and ML18138A398, respectively), the Southern Nuclear Operating Company (SNC) requested that the Nuclear Regulatory Commission (NRC or Commission) amend Vogtle Electric Generating Plant (VEGP) Units 3 and 4, Combined License (COL) Numbers NPF-91 and NPF-92, respectively. The License Amendment Request (LAR) 16-030R1, titled, "Ventilation System Changes," requested changes to plant-specific Tier 1 and associated COL Appendix C information, as well as plant-specific Tier 2 materials located in the plant-specific Updated Final Safety Analysis Report (UFSAR), all of which are related to design details of the containment recirculation cooling system (VCS) and the radiologically controlled area ventilation system (VAS). The requested amendment involves an exemption necessary to implement the involved changes to the plant-specific DCD Tier 1 information.

Specifically, LAR-16-030R1 proposed revision of Tier 1 information in COL Appendix C (Tables 2.7.5-1, 2.7.5-2, and 2.7.7-3) and associated Tier 2 information in the UFSAR text, tables, and figures related to:

1) Modifying the configuration of the containment recirculation fan coil unit assemblies of the VCS and revising the values for the various design parameters affected by this re-configuration,

2) Adding a fourth pressure differential indicator to the VAS to be located in the auxiliary building component cooling system valve room,

3) Reducing the total ventilation flow provided through the VAS fuel handling area ventilation subsystem as a result of a reduction in heat loads in the areas serviced by the VAS, and

4) Updating the radionuclide specific maximum airborne radioactivity concentrations in the auxiliary building, including the fuel handling area, to reflect the changes in ventilation flow rates as well as other input assumptions.

SNC provided the following description of the VAS:

> [T]he VAS provides ventilation for the fuel handling area of the auxiliary building, and the radiologically controlled portions of the auxiliary and annex buildings, with the exception of the health physics and hot machine shop areas, which are provided with a separate ventilation system. The VAS consists of the auxiliary/annex building ventilation subsystem and the fuel handling area ventilation subsystem. These subsystems provide ventilation to maintain occupied areas and access and equipment areas within their design temperature range, provide outside air for plant personnel, and prevent the unmonitored release of airborne radioactivity to the atmosphere or adjacent plant areas, by maintaining a negative pressure differential relative to the outside atmosphere and non-radiologically controlled areas in the areas serviced. The VAS automatically isolates selected building areas by closing the supply and exhaust duct isolation dampers and starts the containment air filtration system (VFS) when high airborne radioactivity in the exhaust air duct or high positive pressure differential relative to the outside atmosphere and non-radiologically controlled areas is detected. Pressure differential indication and alarms are currently provided via three instruments to control the negative pressure in the fuel handling area of the auxiliary building and in the radiologically controlled areas of the auxiliary and annex buildings.

The VEGP UFSAR, Section 9.4.7.1, Design Basis, provides the following description of the VFS system:

> The containment air filtration system provides the safety-related functions of containment isolation and containment vacuum relief. System equipment and ductwork whose failure could affect the operability of safety-related systems or components are designed to seismic Category II requirements. The remaining portion of the system is non-seismic.

Specifically, the VCS related changes are in the COL Appendix C (and related plant-specific Tier 1) for the Containment Recirculation Fan Coil Unit Assemblies in Table 2.7.7-3 and the Tier 2 information in UFSAR in Subsections 1.2.4.1, 9.4.6.2.1, 9.4.6.2.2, and 9.4.6.2.3, Table 9.4.6-1, and Figures 9.2.7-1 (Sheet 3), and 9.4.6-1. For the addition of the fourth VAS pressure differential instrument, the changes are in COL Appendix C (and related plant-specific Tier 1) Table 2.7.5-1 and Tier 2 inofrmation in UFSAR Subsection 9.4.3.5. The changes to the VAS fuel handling area ventilation subsystem and auxiliary/annex building ventilation subsystem ventilation flow rates, changes were proposed in COL Appendix C (and related plant-specific Tier 1) in Tables 2.7.5-1 and Table 2.7.5-2, Inspections, Tests, Analyses, and Acceptance

Criteria (ITAAC) No. 2.7.05.02.ii, and plant-specific Tier 2 information in UFSAR in Subsections 9.1.3.1.4, 9.4.3.2.1.1, and 9.4.3.2.1.2, and Tables 9.1-3 (Sheets 1 and 2), 12.2-24, 12.2-25, 12.2-26, and 12.2-27. The fuel handling area airborne radioactivity concentration calculation input parameter-related changes were to plant-specific Tier 2 UFSAR Subsection 9.4.3.2.1.1 and Table 12.2-26.

Pursuant to Section 52.63(b)(1) of Title 10 of the *Code of Federal Regulations* (10 CFR), 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." The requested exemption would allow a departure from the corresponding portions of the certified information in Tier 1 of the generic AP1000 Design Control Document (DCD).[1] In order to modify the UFSAR (the plant-specific design control document (PS-DCD)) 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.

The supplements dated March 23 and May 18, 2018, provided additional information that clarified the application, did not expand 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 October 24, 2017 (82 FR 49234).

2.0 REGULATORY EVALUATION

The LAR-16-030R1, titled, "Ventilation System Changes," requested changes to plant-specific Tier 1, and associated COL Appendix C information, as well as plant-specific Tier 2 materials located in the plant-specific UFSAR, all of which are related to design details of the VCS and the VAS. The VAS is described in the AP1000 DCD, Section 9.4.3 as follows:

> The radiologically controlled area ventilation system (VAS) serves the fuel handling area of the auxiliary building, and the radiologically controlled portions of the auxiliary and annex buildings, except for the health physics and hot machine shop areas which are provided with a separate ventilation system (VHS).
> ….
> The radiologically controlled area ventilation system serves no safety-related function and therefore has no nuclear safety design basis. System equipment and ductwork located in the nuclear island whose failure could affect the operability of safety-related systems or components are designed to seismic Category II requirements. The remaining portion of the system is nonseismic.

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

Appendix D, Section VIII.A.4 to 10 CFR Part 52 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

[1] While the licensee 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 plant-specific design control document. 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.

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.

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 Technical Specifications, 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 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. These activities involve a change to COL Appendix C ITAAC information, with corresponding changes to the associated PS-DCD Tier 1 information. Therefore, NRC approval is required prior to making the plant specific proposed changes in this license amendment request.

The specific NRC technical requirements applicable to LAR-16-030R1 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:

GDC 60 requires that there be provisions for controlling the release of radioactive materials in gaseous and liquid effluents and to handle solid radioactive wastes.

GDC 61 requires that fuel storage and handling, radioactive waste, and other systems which may contain radioactivity be designed to assure adequate safety under normal and postulated accident conditions.

3.0 TECHNICAL EVALUATION

3.1 TECHNICAL EVALUATION OF THE REQUESTED CHANGES

The changes proposed to Tier 1 Tables (2.7.7-3, 2.7.5-1, and 2.7.5-2) of the plant-specific Tier 1 and associated Appendix C of the COL, are derived from Tier 2 information, and this Tier 2 information was reviewed during the evaluation of the AP1000 DCD and then incorporated by reference into SNC’s COL application for VEGP Units 3 and 4. In addition, the changes proposed to Tier 2 UFSAR Subsections (9.1.3.1.4, 9.4.3.2.1.1, 9.4.3.2.1.2, 9.4.6.2.1, 9.4.6.2.2, 9.4.6.2.3, 9.4.3.5, and 9.4.2.1.2), Tier 2 Tables (9.1-3, 9.4.6.1, 12.2-24, 12.2-25, 12,2-26, and 12.2-27), and Tier 2 Figures (9.2.7-1 and 9.4.6-1) are the result of needing to modify the configuration of VCS fan coil unit assemblies, add VAS pressure differential indicator, and reduce VAS ventilation flow.

The requested amendment involves departures from the plant-specific DCD Tier 2 UFSAR information, and involves changes to related COL Appendix C information, with corresponding changes to the plant-specific Tier 1 information, and an exemption necessary to implement the involved changes to the plant-specific DCD Tier 1 information. The following paragraphs describe the staff’s approach to review the LAR.

3.1.1. Change to Configuration of the VCS Fan Coil Unit Assemblies

The final design of the VCS has resulted in proposed changes to the layout and sizing of the containment recirculation fan coil unit assemblies and associated ductwork, and changes to the total required design air flow rates and total design cooling and heating requirements. This includes proposed changes to the nominal design values for normal and low speed air flow rates, cooling capacity, chilled water flow rate, heating capacity, hot water flow rate, and supply air temperature for normal power operation for the containment recirculation fan coil unit assemblies.

Two new containment recirculation fan coil unit assemblies (VCS-MS-01C and VCS-MS-01D) are added to the VCS system. This includes proposed changes to the nominal air flow rate from 62,800 cubic feet per minute (cfm) to 77,000 cfm, low speed air flow rate from 37,200 cfm to 122,700 cfm, cooling capacity from 3,804,500 Btu/hr to 4,860,000 Btu/hr, chilled water flow rate from 475 gallons per minute (gpm) to 600 gpm, heating capacity from 2,247,857 British Thermal Units per hour (Btu/hr) to 2,437,000 Btu/hr, and hot water flow rate from 225 gpm to 63 gpm. The nominal supply air temperature provided by the fan coil assemblies during normal operation is changed from 60 degrees F to 70 degrees F.

The VCS provides the following design functions:

1. Control the containment thermal environment during normal operation, refueling and shutdown

2. Maintain a homogeneous containment temperature and pressure during containment integrated leak rate testing, and during a loss of the plant ac electrical system

3. Control the reactor cavity average concrete temperature

The staff verified that the proposed changes do not change the original design functions of the plant. By using four sides of each assembly plenum, the cooling surface area is increased. With the increase in normal supply air temperature, the VCS continues to function to control the reactor cavity area average concrete temperature to less than prescribed limits. Therefore, the staff finds the proposed change acceptable.

3.1.2. Addition of fourth VAS Differential Pressure Instrument

A change is proposed to add a fourth VAS pressure differential instrument, numbered as VAS-033, providing indication, control, and alarm functions for the auxiliary building component cooling water system (CCS) valve room (Room 12561) while the exhaust flow path is aligned to the VFS filtered exhaust. This provides pressure differential monitoring and control for the auxiliary building CCS valve room, which is an area of the auxiliary building that is physically remote and separate from the currently monitored and controlled areas. The existing pressure differential instrument VAS-033 for the auxiliary building middle annulus is renumbered as VAS-034.

The VAS provides the following design functions:

1. Provides ventilation to maintain the equipment rooms within their design temperature range

2. Provides ventilation to maintain airborne radioactivity in the access areas at safe levels

3. Maintains the overall airflow direction from areas of lower potential airborne contamination to areas of higher potential contamination

4. Maintains each building areas at a slightly negative pressure

5. Automatically isolates selected building areas from the outside environment and starting the containment air filtration system when high airborne radioactivity in the exhaust air duct or high ambient pressure differential is detected.

The proposed changes do not affect the design functions as described above. The proposed changes enable pressure differential monitoring and control for the auxiliary building CCS valve room. This provides prevention of the unmonitored release of airborne radioactivity to the atmosphere or adjacent plant areas, by maintaining a negative pressure differential for the auxiliary building CCS valve room relative to the outside atmosphere and non-radiologically controlled areas. Therefore, the staff finds the proposed change acceptable.

3.1.3. Changes in VAS Fuel Handling Area Ventilation Subsystem and Auxiliary/Annex Building Ventilation Subsystem Ventilation Flow Rates

To maintain the required capacity of the Central Chilled Water System (VWS) High Capacity Subsystem at the current design values, manufacturer's equipment data, rather than previous conservative estimates for heat loads in the areas serviced by the VAS, are used for determining required air conditioning tonnage. These changes are the result of optimizing the VWS High Capacity Subsystem and VAS electrical power and functional performance requirements, while minimizing changes to the required capacity of the VWS High Capacity Subsystem. As a result, changes to the required supply and exhaust ventilation flow rates for the VAS were proposed.

In the LAR, SNC stated that based on final calculations of heat loads in the areas serviced by the VAS, the required supply and exhaust airflows for the VAS are changed. This change results in proposed changes to the required VAS nominal design supply air flow rate and total nominal design ventilation flow rates provided through the auxiliary building, including the fuel handling area. As a result, the calculations for determining the radionuclide specific maximum airborne radioactivity concentrations in the auxiliary building, including the fuel handling area, are revised. This calculation revision includes an update to parameters and assumptions used for calculating fuel handling area and auxiliary building airborne radioactivity concentrations based on design finalization of the affected ventilation systems and other changed inputs. This proposed change includes proposed changes to both spent fuel pool (SFP) demineralizers nominal flow rate and SFP filter nominal flow rate from 250 gpm to 200 gpm, auxiliary/annex building ventilation subsystem supply (AHU) normal design ventilation flow rate from 18,000 standard cubic feet per minute (scfm) to 14,000 scfm for each supply air handling unit, Fuel Handling Area Ventilation Subsystem supply AHU normal design ventilation flow rate from 9,500 scfm to 4,900 scfm, fuel handling area free volume from 200,000 cubic feet (ft^3) to 225,450 ft^3, ventilation flow through fuel handling area from 17,000 cfm to 9,500 cfm, SFP purification flow rate from 250 gpm to 150 gpm, evaporation rate of SFP water from 486 lbs/hr to 430 lbs/hr, and VAS auxiliary building fuel handling area exhaust flow rate from 15,300 cfm to 11,900 cfm.

Also, ITAAC Table 2.7.5-2, VAS auxiliary building fuel handling area exhaust flow rate acceptance criteria is changed from "greater than or equal 15,300 cfm" to "greater than or equal

10,710 cfm." The revised ITAAC acceptable flow rate, 10,710 cfm, is 90 percent of total nominal design flow rate, 11,900 cfm. This maintains the existing margin in the current licensing basis.

The proposed changes do not involve a physical change to the plant or changes to the original design function of the plant. Therefore, the VAS will continue to provide its design functions following implementation of the proposed changes. Therefore, the staff finds the proposed change acceptable.

3.1.4. Evaluation of Radiation Protection Related Changes

In LAR-16-030R1, SNC proposed several changes to the auxiliary building and fuel handling area ventilation systems, including changes to ventilation flow rates. In addition, SNC proposed a reduction in the nominal SFP purification flow rate from 250 gallons/minute to 200 gallons/minute; as well as revisions to other parameters and assumptions that effect the calculated airborne activity concentrations in the auxiliary building and fuel handling areas, as provided in the proposed revisions to UFSAR Tables 12.2-24 and 12.2-26. The changes in SFP purification flow rate will result in increases to the SFP radionuclide inventory. In reviewing the proposed and changes in the LAR and the information in the UFSAR, the staff identified concerns with SNC's calculated auxiliary building airborne activity concentration values provided in the proposed revisions to UFSAR Table 12.2-27. The staff's calculated values for various radionuclides were significantly larger than what was calculated by SNC in the proposed UFSAR changes. In addition, the staff determined additional information was needed in the LAR for the staff to completely assess the airborne activity values for the fuel handling area provided in UFSAR Table 12.2-25 and to determine the radiological impacts on reducing the purification flow rate for the SFP. Therefore, the NRC staff conducted a regulatory audit to review calculation associated with the SFP radioactivity source term calculations, fuel handling area airborne radioactivity concentration calculations, and auxiliary building airborne radioactivity concentration calculations. As part of the audit the staff reviewed the calculation packages associated with the auxiliary building and fuel handling area airborne activity concentrations.

As a result of the audit and the review of LAR-16-030R1, the staff issued requests for additional information (RAIs) to SNC related to changes that needed clarification in the LAR and calculation package. First, SNC specified in the LAR that the radionuclides Mn-56, Br-84, Br-85, Kr-89, Rb-88, Te-131, Xe-135m, Xe-137, Xe-138, Ba-137m, and Pr-144 are not expected to exist in the revised auxiliary building fuel handling area airborne activity source term. The staff determined that was inconsistent with the current UFSAR and it did not appear to be accurate, since some of these radionuclides were the daughter products that were present in the source term. In RAI Question 1, the staff requested that SNC provide additional information regarding how SNC determined that the identified radionuclides would not exist.

In LAR-16-030R1, Supplement 1, SNC responded to Question 1. The licensee specified that they re-calculated the airborne activity concentrations for the fuel handling area, provided in UFSAR Table 12.2-25, to account for daughter products in secular equilibrium, taking into account the branching fractions of the decay chain but otherwise considering the daughter product is at the same concentration as the parent and based on other changes specified in the response to Question 2, Part 3. The licensee specified that short lived radionuclides (such as Xenon-137, with a half-life of less than 5 minutes), would be negligible and are not explicitly reported in the calculation. The staff agrees that radionuclides with short half-lives would not be significant because they would decay before significant quantities could form in the air space.

However, SNC's response did not provide any information regarding why daughter radionuclide that are not in secular equilibrium and do not have short half-lives are not considered in the calculation. In LAR-16-030R1, Supplement 2, SNC clarified that they considered all radionuclide daughter products, but that daughter products other than those considered did not have a significant impact on the airborne activity source term. They also indicated that the derived air concentration is dominated by a few radionuclides which are fully accounted for, such as H-3 and I-131. The staff reviewed SNC's response which considered additional radionuclides and included determinations of their significance. The staff could not identify other radionuclides that would be significant, that were not already included. Based on this, the staff found the response to be acceptable, as it relates to the source term for daughter radionuclides.

However, while the response provided adequate justification for the use of daughter radionuclides, the staff noted that the airborne tritium concentration for the fuel handling area, provided in UFSAR Table 12.2-25, is 6.4E-06 microcurie per cubic centimeter. If this concentration of airborne activity is breathed in over a period of one work week, it could result in an airborne radioactivity intake of 0.6 percent of the annual limit on intake. As a result, based on the definition of an airborne radioactivity area provided in 10 CFR 20.1003, the fuel handling area may need to be classified as an airborne radioactivity area during normal refueling, based on the tritium concentration alone. In LAR-16-030R1, Supplement 2, SNC clarified that the evaporation rate used in developing the airborne activity concentration was conservative because it assumed that evaporation from the refueling pool area, inside of containment, as well as the spent fuel pool area in the auxiliary building, were evaporating into the fuel handling area and contributing to the fuel handling area airborne activity source term. The staff reviewed the SNC information and determined that only the evaporation in the spent fuel pool area would contribute to the airborne activity concentrations in the fuel handling area. The licensee specified that this assumption increases the assumed tritium release factor by a factor of approximately 3. Therefore, considering the evaporation that occurs inside of containment in calculating the fuel handling area airborne activity, the staff finds this analysis is conservative. As a result, the staff concludes that the tritium concentrations in the fuel handling area would not result in an airborne radioactivity area during normal refueling. Therefore, the staff finds the response to be acceptable.

In LAR-16-030R1, Supplement 1, SNC proposes lowering the spent fuel pool cooling system purification flow rate 250 gpm to 200 gpm. In addition, for conservative, in the fuel handling airborne activity analysis the purification flow rate is assumed to be 150 gpm (was originally 250 gpm). In the LAR SNC specifies that this has no adverse effect on the results of the calculation of fuel handling airborne activity. However, the staff determined that lowering the purification flow rate could result in higher radionuclide concentrations developing in the pool water and which would subsequently evaporate into the air, resulting in higher airborne activity concentrations than are currently reflected in the UFSAR. Therefore, in RAI Question 2, Part 1, the staff requested that SNC clarify this statement. In the response to Question 2, Part 1, provided in LAR-16-030R1, Supplement 1, SNC clarified that the airborne radionuclide values are effected by the change and that the changes are reflected in the revised UFSAR Table 12.2-24. The staff reviewed this change and finds that this clarification accurately indicates that revising the purification flow rate does have an impact on the calculated airborne concentrations. Therefore, the clarification is acceptable.

As discussed above, in the LAR, SNC assumed that the fuel handling area airborne activity is 150 gpm, which would be expected to result in a higher SFP water activity. In addition, in the LAR, SNC also proposed removing a statement from UFSAR Subsection 9.1.3.1.4 indicating

that an activity level in the water of approximately 0.005 microcurie per gram for the dominant gamma omitting isotopes at the time of refueling would result in a dose rate of 2.5 millirem per hour. UFSAR Subsection 9.1.3.1.4 specifies that personnel on the SFP handling machine during refueling will be exposed to less than 2.5 mrem/hour. The staff reviewed SNC's proposal and determined that since lowering the purification flow rate would be expected to increase SFP water activity and since the information in UFSAR Subsection 9.1.3.1.4, discussed above, is proposed to be removed, the staff requested SNC provide information on the revised SFP activity concentrations in Question 2, Part 2. In LAR-16-030R1, Supplement 2, SNC clarified that the sum of the fraction of all radionuclides will be considered in ensuring that the dose rates at the pool surface do not exceed 2.5 mrem/hour and that shielding calculations confirm and implement the 2.5 mrem/hour criteria. In addition to this, the plant radiation protection program will be in place to control occupational exposure during actual plant operation. Based on submittal, the staff has reasonable assurance that during plant operation the 2.5 mrem/hour criteria will be maintained, consistent with UFSAR Subsection 9.1.3.1.4. As a result, the staff finds the response to be acceptable.

During the audit, the staff noted that the fuel handling area ventilation system airborne activity calculations (which are used to develop the airborne activity calculations in UFSAR Table 12.2-25) were based on a reactor coolant system (RCS) source term derived from an Advanced First Core source term, provided in the calculation package. The staff noted that this RCS source term is significantly lower than the design basis source term in UFSAR Table 11.1-2. Therefore, in Question 2, Part 3, the staff sought clarification on why it was appropriate to use the lower Advanced First Core source term instead of the design basis source term UFSAR Table 11.1-2. In LAR-16-030R1, Supplement 1, SNC responded to Question 2, Part 3 and specified that while the Advanced First Core source term had been used, the UFSAR Table 11.2-1 source term should have been used. Therefore, SNC revised the calculation on fuel handling area airborne activity and the associated source term in UFSAR Table 12.2-25 to base it on the design basis reactor coolant activity provided in UFSAR Table 11.1-2 and a revised estimated volume for the fuel handling area. The staff reviewed this supplemental information and determined that it is appropriate to base the source term on the design basis RCS source term provided in Table 11.1-2 and updated volume. The staff reviewed the proposed change to UFSAR Table 12.2-25, based on the revised source term and found the source term to be calculated correctly, based on the revised parameters, including those provided in UFSAR Table 12.2-24. Therefore, this response and the proposed UFSAR revisions were found to be acceptable.

The staff reviewed the revised auxiliary building airborne radioactivity source term provided in UFSAR Table 12.2-27, in LAR-16-030R1. In reviewing the source term, the staff performed a confirmatory calculation of selected radionuclides using the parameters in the proposed revision to UFSAR Table 12.2-26 (which provides parameters and assumptions used for calculating auxiliary building airborne radioactivity concentrations) and other information in the UFSAR. In performing the calculation, the staff calculated radionuclide concentrations approximately twice as high as those specified in the revised UFSAR Table 12.2-27. Therefore, during the audit, the staff sought clarification on how SNC calculated the values in revised UFSAR Table 12.2-27. SNC clarified that while the UFSAR revision indicates that the primary coolant leakage rate to the primary coolant leakage rate to the auxiliary building is 296 lb/day (1.554 grams/second), the value actually used to calculate the airborne activity concentrations in the auxiliary building is 0.715 grams/second. The value of 0.715 grams/second is derived based on the assumption that some of the leakage is from design basis RCS source term. Therefore, the staff issued Question 3, requesting that SNC update the UFSAR to accurately explain what assumptions were used to calculate the airborne activities in the auxiliary building. In LAR-16-030R1, Supplement 1, SNC proposed to revise UFSAR Table 12.2-26 to add Footnote 3 to the primary

coolant leakage value to explain the assumptions made in the assumed primary coolant leakage and how it is used in calculating the airborne activity values. The staff found that the assumptions made in developing this leakage rate and the increase in the design leakage rate are conservative in regards to what is currently in the UFSAR (the value for leakage was originally 20 lb/day and the new value is essentially 136 lb/day). Therefore, the response and proposed changes to Question 3 are acceptable.

In LAR-16-030R1, SNC proposed revisions to other assumptions and parameters in UFSAR Table 12.2-26, besides the revised leakage rate discussed above. This includes a revision to Footnote 1. Footnote 1 originally indicated, in part, that the exhaust flow used to calculate auxiliary building airborne radioactivity did not consider annex building exhaust. However, in LAR-16-030R1, SNC proposed to revise Footnote 1 to specify that the exhaust flow from annex building rooms 40357, 40551, and 40552, were excluded from the auxiliary building airborne radioactivity calculation. Therefore, the staff sought clarification for why only those annex building rooms were being excluded, since UFSAR Figure 9.4.3-1 (Sheet 2 of 3) shows that in addition to rooms 40357, 40551, and 40552, three additional rooms in the annex building (the radwaste building access corridor, corridor (unnamed), and the staging and storage area) are also serviced by the VAS (The staff notes that the VAS includes essentially three trains with a common intake and exhaust point. UFSAR Figure 9.4.3-1 shows that 2 trains service rooms in the auxiliary building while the third train services 6 rooms in the annex building). Therefore, staff issued Question 4, Part 1, requesting that SNC explain why only the exhaust flow from rooms 40357, 40551, and 40552 was excluded. To clarify if the volume of the annex building rooms were considered in the auxiliary building airborne activity concentration, the staff also issued Question 4, Part 2, to clarify what flashing fractions are being used for different types of radionuclides.

In the response to Question 4, Part 1, provided in LAR-16-030R1, Supplement 1, and a public conference call held on April 26, 2018, SNC clarified that the three annex building rooms that were not identified in Footnote 1, did not exhaust directly to the plant vent and instead were exhausted to the plant vent indirectly through the other rooms. As a result, SNC clarified that the total annex building exhaust flow associated with the auxiliary building radiologically controlled area, is through rooms 40357, 40551, and 40552. Therefore, the staff determined that Footnote 1 is accurate. In addition, SNC clarified that none of the annex building volume was considered in the free air volume specified in the revised UFSAR Table 12.2-26, which is appropriate for calculating auxiliary building airborne activity concentrations. As a result, Question 4, Part 1, is resolved.

In the response to Question 4, Part 2, provided in LAR-16-030R1, Supplement 1, SNC proposed to update UFSAR Table 12.2-26 to specify that a flashing fraction of 1.0 is used for noble gases and tritium, and that 0.1 is used for all other radionuclides. SNCs proposed flashing fraction of 1.0 assumes that all noble gases and tritium in the leaked fluid would go airborne and contribute to the airborne activity source term. Since this maximizes the source terms of noble gases and tritium, it is acceptable. The assumed flashing fraction of 0.1 for other radionuclides is reasonable for Iodine, because most of the fluid outside of containment would not exceed 212 degrees F, and Regulatory Guide 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors,” specifies that a flashing fraction of 0.1 is appropriate for Iodine in fluid that does not exceed 212 degrees Fahrenheit. For particulates, the actual flashing fraction would be expected to be less than 0.1, therefore, the value assumed by SNC is conservative. As a result, the staff found the response and proposed UFSAR revisions to be acceptable.

As discussed above, in LAR-16-030R1, SNC proposed changes to the maximum airborne radioactivity concentrations in the auxiliary building. Specifically the staff noted a change to primary coolant leakage assumption to the auxiliary building. The staff sought to clarify any expected impacts on the normal effluent releases to the public through the change in assumed specific maximum airborne radioactivity concentrations since this is an assumption that could result in an increase to the assumed source terms for normal effluent releases. As a result, the staff issued Question 5. In LAR-16-030R1, Supplement 1, SNC responded to Question 5 stating that these assumption changes were only for the design basis source term, which would not impact the source terms used for the normal effluent releases. The staff evaluated this clarification and agrees with the response to Question 5. In review of the change to the amount of effluents that would be released offsite, the staff determined that the proposed change has no impact on offsite releases. The staff concluded that this change proposes no increase in the normal effluent release source term, release pathways, and makes no changes to the monitoring of the effluent, and therefore results in no change to the offsite doses. Therefore since there are no change to the normal effluent offsite releases, the staff finds the proposed changes in LAR-16-030R1 acceptable.

As a result of the above, the staff determined that the ventilation system changes, and the associated changes made to auxiliary building and fuel handling area source terms and related assumptions, are acceptable. In addition, the staff determined that the changes made to the spent fuel pool purification flow rate are acceptable. The NRC staff has reviewed SNC's analysis provided in LAR-16-030R1 as submitted and supplemented and finds that the proposed changes meet the requirements of GDC 60 and GDC 61. Based on these findings, the NRC staff concludes that there is reasonable assurance that the regulatory requirements will continue to be met. Therefore, the staff finds the proposed change acceptable.

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 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 SNC 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 and relates to detailed information presented in the ITAAC table and supporting tables for the system-based ITAAC related to the VCS and VAS. The result of this exemption would be that SNC could implement modifications to plant-specific Tier 1 DCD information and associated Appendix C, the UFSAR as well as plant-specific Tier 2 DCD information. 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-16-030R1. 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 the public health and safety, and are consistent with the common defense and security; and (2) special circumstances are present. Specifically, 10 CFR 50.12(a)(2) lists six circumstances for which an exemption may be granted. It is necessary for one of these bases to be present in order for the 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 subparagraph 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

The requested exemption would allow SNC to implement the amendment described above. This exemption 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 and the requirements of 10 CFR 52.63(b)(1). 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 NRC 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 generic 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. Six special circumstances are described in 10 CFR 50.12(a)(2). The underlying purpose of the Tier 1 information is to ensure that a licensee will safely construct and operate a plant based on the certified information found in the AP1000 DCD, which was incorporated by reference into the VEGP Units 3 and 4 licensing basis. The proposed changes described in the above technical evaluation do not impact the ability of any SSCs to perform their functions or negatively impact safety.

Special circumstances are present in the particular circumstances discussed in LAR-16-030R1 because the application of the specified Tier 1 information is not necessary to achieve the underlying purpose of the rule. The proposed changes described above maintain the design functions of the nonsafety-related ventilation systems and the SSCs in areas served by these systems. This change does not impact the ability of any SSCs to perform their functions or negatively impact safety. Furthermore, the proposed changes to the information in Tier 1 Tables 2.7.5-1, 2.7.5-2 and 2.7.7-3 are consistent with format and content of other similar information currently provided in these Tier 1 tables. This exemption request and associated revisions to the Tier 1 information and corresponding changes to COL 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 COL Appendix C that are being proposed in the LAR. The justification provided in LAR-16-030R1, 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 design functions of the system associated with this request will continue to be maintained because the associated revisions to the Tier 1 information support the design function of the VAS and VCS. 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 changes discussed above. The exemption request proposes to depart from the certified design by allowing changes discussed above in the technical evaluation. The changes for consistency will not impact the functional capabilities of this system. The proposed changes will not adversely affect the ability of the VAS and VCS to perform its design functions, and the level of safety provided by the current systems and equipment therein 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, the Georgia State official was notified of the proposed issuance of the amendment on May 15, 2018. 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. 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 (82 FR 49234) October 24, 2017. 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 SNC’s facility. Therefore, the staff grants SNC an exemption from the Tier 1 information as requested.

The staff has concluded, based on the considerations discussed in Section 3.2 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. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, “Revised Request for License Amendment and Exemption: Ventilation System Changes (LAR-16-030R1),” August 31, 2017 (ADAMS Accession No. ML17243A444).

2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, “Supplement to Request for License Amendment and Exemption Regarding Ventilation

System Changes (LAR-16-030R1S1)," March 23, 2018 (ADAMS Accession No. ML18082B369).

3. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, "Supplement to Request for License Amendment and Exemption: Ventilation System Changes (LAR-16-030R1S2)," May 18, 2018 (ADAMS Accession No. ML18138A398).

4. U.S. NRC, "Regulatory Audit of LAR 16-030, Revision 1, Ventilation System Changes," October 26, 2017 (ADAMS Accession No. ML17303B112).

5. Vogtle Units 3 and 4 Updated Final Safety Analysis Report, Revision 6 and Tier 1, Revision 5, March 12, 2017 (ADAMS Accession No. ML17172A218).

6. AP1000 Design Control Document, Revision 19, June 13, 2011 (ADAMS Accession No. ML11171A500).

7. Combined License NPF-91 for Vogtle Electric Generating Plant Unit 3, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A106).

8. Combined License NPF-92 for Vogtle Electric Generating Plant Unit 4, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A135).

9. U.S. Nuclear Regulatory Commission," Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," NUREG-1793, Vol. 1, Chapter 5, September 2004 (ADAMS Accession No. ML043450354).

10. Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000