Southern Nuclear

B. H. Whitley
Director
Regulatory Affairs

Southern Nuclear
Operating Company, Inc.
42 Inverness Center Parkway
Birmingham, AL 35242
Tel 205.992.7079
Fax 205.992.5296

May 18, 2018

Docket Nos.: 52-025
52-026

ND-18-0643
10 CFR 50.90
10 CFR 52.63

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

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-16-030R1S2)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC), the licensee for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, requested an amendment to Combined License (COL) Numbers NPF-91 and NPF-92, for VEGP Units 3 and 4, respectively, by SNC letter ND-16-2452, dated December 9, 2016 [ADAMS Accession Number ML16344A411]. This license amendment request (LAR), LAR-16-030, would modify design details of the containment recirculation cooling system (VCS) and the radiologically controlled area ventilation system (VAS). 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 was also requested for the plant-specific DCD Tier 1 material departures.

SNC LAR-16-030 was subsequently withdrawn from NRC review as requested by SNC letter ND-17-1179, dated June 28, 2017 [ML17179A261], and revised and resubmitted as LAR-16-030R1, by letter ND-17-1499, dated August 31, 2017 [ML17243A444]. SNC Letter ND-18-0097, dated March 23, 2018 [ML18082B369], submitted LAR-16-030R1S1 in response to a Request for Additional Information (RAI) from the NRC Staff [ML18018B155].

Enclosures 1 through 3 were provided with the revised LAR, LAR-16-030R1. Enclosures 4 through 6 were provided with the supplement to the revised LAR, LAR-16-030R1S1.

Enclosure 7 supplements LAR-16-030R1S1 by addressing additional clarification questions transmitted from the NRC Staff by electronic mail (email) on April 5, 2018 [ML18095A202], to support review of LAR-16-030R1. These questions were clarified on a public conference call on April 26, 2018.

The information provided in this LAR supplement does not impact the scope, technical content, or conclusions of the Technical Evaluation, Regulatory Evaluation (including the Significant Hazards Consideration Determination), or Environmental Considerations of the revised LAR provided in letter ND-17-1499, Enclosure 1, nor does it impact the Exemption Request provided in ND-17-1499, Enclosure 2. SNC has consulted with the NRC Project Manager responsible for this LAR, and it was confirmed that the submittal date of this RAI response is not expected to adversely impact approval of this LAR by the date requested in ND-17-1499.

This letter contains no regulatory commitments. This letter has been reviewed and confirmed to not contain security-related information.

In accordance with 10 CFR 50.91, SNC is notifying the State of Georgia of this LAR supplement by transmitting a copy of this letter and enclosure to the designated State Official.

Should you have any questions, please contact Mr. Adam Quarles at (205) 992-7031.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 18th of May 2018.

Respectfully submitted,

Brian H. Whitley
Director, Regulatory Affairs
Southern Nuclear Operating Company

Enclosures: 1 - 3) (previously submitted with the revised LAR, LAR-16-030R1, in SNC letter ND-17-1499)

4 - 6) (previously submitted with the first supplement to the revised LAR, LAR-16-030R1S1, in SNC letter ND-18-0097)

7) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Response to NRC Clarification Questions Regarding the LAR-16-030R1 Review (LAR-16-030R1S2)

cc:

Southern Nuclear Operating Company / Georgia Power Company
Mr. S. E. Kuczynski (w/o enclosure)
Mr. D. G. Bost (w/o enclosure)
Mr. M. D. Meier (w/o enclosure)
Mr. D. H. Jones (w/o enclosure)
Mr. J. B. Klecha
Mr. G. Chick
Mr. D. L. McKinney (w/o enclosure)
Mr. T. W. Yelverton (w/o enclosure)
Mr. B. H. Whitley
Ms. C. A. Gayheart
Mr. C. R. Pierce
Ms. A. G. Aughtman
Mr. D. L. Fulton
Mr. M. J. Yox
Mr. J. Tupik
Mr. W. A. Sparkman
Ms. A. C. Chamberlain
Ms. A. L. Pugh
Mr. F. J. Redwanz
Document Services RTYPE: VND.LI.L00
File AR.01.02.06

Nuclear Regulatory Commission
Mr. W. Jones (w/o enclosure)
Ms. J. Dixon-Herrity
Mr. C. Patel
Ms. J. M. Heisserer
Mr. B. Kemker
Mr. G. Khouri
Ms. S. Temple
Mr. F. Brown
Mr. T.E. Chandler
Ms. P. Braxton
Mr. T. Brimfield
Mr. C. J. Even
Mr. A. Lerch

State of Georgia
Mr. R. Dunn

Oglethorpe Power Corporation
Mr. M. W. Price
Mr. K. T. Haynes
Ms. A. Whaley

Municipal Electric Authority of Georgia
Mr. J. E. Fuller
Mr. S. M. Jackson

Dalton Utilities
Mr. T. Bundros

Westinghouse Electric Company, LLC
Mr. L. Oriani (w/o enclosure)
Mr. G. Koucheravy (w/o enclosure)
Mr. M. Corletti
Mr. M. L. Clyde
Ms. L. Iller
Mr. D. Hawkins
Mr. J. Coward

Other
Mr. S. W. Kline, Bechtel Power Corporation
Ms. L. A. Matis, Tetra Tech NUS, Inc.
Dr. W. R. Jacobs, Jr., Ph.D., GDS Associates, Inc.
Mr. S. Roetger, Georgia Public Service Commission
Ms. S. W. Kernizan, Georgia Public Service Commission
Mr. K. C. Greene, Troutman Sanders
Mr. S. Blanton, Balch Bingham
Mr. R. Grumbir, APOG
NDDocumentinBox@duke-energy.com, Duke Energy
Mr. S. Franzone, Florida Power & Light

Southern Nuclear Operating Company

ND-18-0643

Enclosure 7

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Response to NRC Clarification Questions Regarding the LAR-16-030R1 Review

(LAR-16-030R1S2)

(Enclosure 7 consists of five pages, including this cover page.)

The following are clarification questions provided by the NRC Staff regarding the review of Southern Nuclear Operating Company (SNC) License Amendment Request (LAR) 16-030R1, which was submitted by SNC letter ND-17-1499 on August 31, 2017, and LAR-16-030R1S1, which was submitted by SNC letter ND-18-0097 on March 23, 2018.

1. Clarification Questions Regarding Question 1

The purpose of these questions are to ensure that the ventilation system is designed appropriately to provide reasonable assurance that the requirements of 10 CFR Part 20 are being met (mainly 10 CFR 20.1101(b), 10 CFR 20.1701, and 10 CFR 20.1702). In particular 10 CFR 20.1701 and 10 CFR 20.1702 require that process and engineering controls be used to the extent practicable to minimize airborne activity. High airborne activity concentrations in the fuel handling area could significantly increase occupational radiation exposure and/or result in the need to take protective actions that could complicate the refueling process. The Vogtle UFSAR commits to maintain the dose rate to operators on the refueling platform to 2.5 millirem per hour.

a. The licensee's response includes daughter products in secular equilibrium in the fuel handling area airborne activity source term, provided in Table 12.2-25, but does not provide any information regarding other daughter products not in secular equilibrium (except to explain that other nuclides with sufficiently short half-lives and with a minimal production or in-growth source term after shutdown, produce negligible contribution). Please explain if the design criteria of less than 1.0 DAC will be met with the inclusion of missing daughter radionuclides or justify not including them.

b. For most radionuclides the airborne activity source term, provided in Table 12.2-25, is higher than what would be anticipated during normal refueling operations (e.g., the plant would not be expected to routinely operate at 0.25% failed fuel and the partition factors for some radionuclides are likely conservative). However, the tritium concentration provided in Table 12.2-25 is near what is anticipated during normal plant operations (i.e. the tritium concentration is not effected by the amount of failed fuel and the partition coefficient for tritium appears realistic).

If an individual were to breathe in the tritium concentration in Table 12.2-25 alone (not considering any other radionuclides) for a work week, it would be slightly above 0.6 the annual limit on intake. Consistent with the definition of an airborne activity area in 10 CFR 20.1003, if an area exceeds 1.0 DAC or an area is such that if an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake or 12 DAC-hours, then the area is an airborne activity area. Therefore, the licensee's response indicates that, based on their proposed design, there is a reasonable likelihood that the fuel handling area may be classified an airborne activity area during normal operations, including refueling, based on the anticipated source term. Please explain how the proposed design is consistent with the previously mentioned requirements and how the dose to workers will be acceptable during refueling.

SNC Response to Clarification Questions Regarding Question 1

a. Consideration of additional decay products is included in the analysis that supports LAR-16-030R1S1, although it is acknowledged that these considerations were not discussed in the information provided within the SNC response to the previous RAI on the subject.

   Among the considerations and justification for modeling the progeny as described are:

   i) The RCS and core source terms already account for the buildup of progeny and the relatively short times after shutdown would not result in significant progeny buildup for decay products of nuclides with moderate to long half-lives,

   ii) Decay product nuclides that exist in nuclide groups that differ from that of the parent would almost universally benefit from lower fuel escape rate coefficients and partition factors (for example – noble gas nuclides that decay to halogens or particulates) decreasing the contribution of these nuclides to airborne radioactivity and DAC values, and

   iii) The DAC is dominated by a limited number of nuclides (H-3, which has no modeled progeny, and I-131, which is shown in the LAR-16-030R1S1 supporting analysis to not significantly increase in concentration due to progeny buildup when considering contributions from nuclides not in secular equilibrium). For these reasons, no additional modeling of decay products was performed beyond that described previously.

b. Beyond using this upper bound estimate for the concentration of tritium within the reactor coolant system in the LAR-16-030R1S1 supporting analysis, the conservative spatial treatment of the evaporation rate listed in UFSAR Table 12.2-24 also biases the calculated tritium airborne concentrations in the FHA upwards compared to expected conditions (more explicitly stated, the supporting analysis for LAR-16-030R1S1 assigns all of the evaporation for containment and the FHA to the FHA). An approximation of the magnitude of this conservatism, considering only the surface areas, is that this multiplies the tritium release by a factor of about 3.

Changes to LAR text in ND-17-1499, Enclosure 1, and Proposed Changes to the Licensing Basis Documents in ND-17-1499, Enclosure 3

No changes are required as a result of this clarification.

2. Clarification Questions Regarding Question 2, Part 2

In LAR-16-030, Revision 1, the licensee proposes reducing the nominal spent fuel pool (SFP) purification flow rate. Less purification flow typically leads to an increase in SFP water activity. The licensee also proposed removing a statement from UFSAR Subsection 9.1.3.1.4, specifying that an activity level in the water of approximately 0.005 microcuries per gram for the dominant gamma emitting isotopes at the time of refueling, corresponds to the design objective of 2.5 mrem/hour specified in the UFSAR. The 2.5 mrem/hour criteria specified in

the UFSAR is used to show that radiation exposure during refueling operations remains ALARA.

In Question 2, Part 2, the staff requested that the licensee provide a revised source term and specify how the changes affect the dose to operators. In the response, the licensee specified that different assumptions were used to develop the SFP water source term, than were used to calculate the dose rate for airborne activity. The licensee also provided information indicating that 0.001 microCi/cc of Cobalt-60 and 0.07 microCi/cc of Chromium-51 would result in approximately 2.5 mrem/hour, but it is unclear how these concentrations apply to the revised design (including a mixture of all relevant radionuclides). The information provided does not demonstrate that the dose to operators on the refueling platform remains below 2.5 mrem/hour. Information is needed that describes the SFP water source term and assumptions made to develop the source term to show that the dose criteria of 2.5 mrem/hour described in the UFSAR is still being met.

SNC Response to Clarification Questions Regarding Question 2, Part 2

Westinghouse design information and guidance on controls for the spent fuel pool conveyed in Westinghouse's radiation design manual include consideration of liquid concentrations of various nuclides that could contribute to dose rates at the surface. This information will be provided to SNC as part of turnover and will be available to the operating plant staff. The controls state that the sum of fractional limits approach should be used to ensure dose rates at the pool surface do not exceed 2.5 mrem/hr. Additional shielding calculations confirm and implement the criteria.

As stated in the guidance:

> If radionuclides A, B, C and D are present in concentrations C_A, C_B, C_C and C_D, then the concentrations in the water should be limited so that the following relationship exists,
>
> $$\frac{C_A}{MAC_A} + \frac{C_B}{MAC_B} + \frac{C_C}{MAC_C} + \frac{C_D}{MAC_D} \leq 1$$
>
> where,
>
> MAC_i represents the maximum allowable concentration that corresponds to a surface dose rate of 2.5 mrem/hr for that particular nuclide.

This design information provides sufficient clarity, along with operating experience and the flowrates provided by the AP1000 design, that achieving dose rates of below 2.5 mrem/hr at the surface of the spent fuel pool is feasible and realistic for the plant design.

Changes to LAR text in ND-17-1499, Enclosure 1, and Proposed Changes to the Licensing Basis Documents in ND-17-1499, Enclosure 3

No changes are required as a result of this clarification.

3. Clarification Questions Regarding the Response to Question 4, Part 1.

The staff is seeking to understand how the response is consistent with the licensing basis. In addition, the staff would like to understand how the airborne activity source term for the Auxiliary Building was calculated in order to verify its adequacy.

The response is unclear and appears to be inconsistent with UFSAR Figure 9.4.3-1. In Part a, the licensee states that the only Annex Building rooms that exhaust through the radiologically controlled area VAS towards the plant vent are 40357, 40551, and 40552. However, UFSAR Figure 9.4.3-1 shows that in addition to rooms 40357, 40551, and 40552, the Radwaste Building Access Corridor (40362), Corridor (unnamed, possibly room 40415), and the staging and storage area room (40550) are also in the Annex Building, are part of the radiologically controlled area VAS, and are exhausted to the plant vent. If the Radwaste Building Access Corridor, Corridor (unnamed), and the staging and storage area rooms do not exhaust through the plant vent as shown in UFSAR Figure 9.4.3-1, please indicate to where do they exhaust? Is the exhaust from these areas still monitored for radioactivity, as shown in UFSAR Figure 9.4.3-1? Does UFSAR Figure 9.4.3-1 need to be revised?

SNC Response to Clarification Questions Regarding Question 4, Part 1

The response to these clarification questions were provided orally by SNC in a Public meeting on April 26, 2018, and the NRC staff concluded that no written response was required.