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

July 28, 2017

Docket Nos.: 52-025
52-026

ND-17-1251
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
Request for License Amendment and Exemption:
Reactor Vessel Head Vent Capacity (LAR 17-025)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(f) 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, requests an amendment to Combined License (COL) Numbers NPF-91 and NPF-92, for VEGP Units 3 and 4, respectively. The requested amendment proposes to depart from approved AP1000 Design Control Document (DCD) Tier 2 information (text, tables and figures) as incorporated into the Updated Final Safety Analysis Report (UFSAR) as plant-specific DCD information, and also proposes to depart from involved plant-specific Tier 1 information (and associated COL Appendix C 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 also requested for the plant-specific Tier 1 material departures.

The requested amendment proposes changes to update Reactor Coolant System (RCS) requirements for reactor vessel head vent (RVHV) mass flow rate.

Enclosure 1 provides the description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration Determination), and environmental considerations for the proposed changes in the License Amendment Request (LAR).

Enclosure 2 provides the background and supporting basis for the requested exemption.

Enclosure 3 provides the proposed changes to the VEGP 3&4 licensing basis documents.

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

SNC requests staff approval of this license amendment by February 1, 2018, to support preparation of procedures for preoperational testing of the Passive Core Cooling System. SNC expects to implement this proposed amendment (through incorporation into the licensing basis documents; e.g., the UFSAR) within 30 days of approval of the requested changes. The requested approval date for the Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 license amendment request for this topic is July 27, 2018.

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

Should you have any questions, please contact Mr. Corey Thomas at (205) 992-5221.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th of July, 2017.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Brian H. Whitley

Director, Regulatory Affairs

Southern Nuclear Operating Company

BHW/BCT/ljs

Enclosures: 1) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment: Reactor Vessel Head Vent Capacity (LAR-17-025)

2) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Exemption Request: Reactor Vessel Head Vent Capacity (LAR-17-025)

3) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Proposed Changes to Licensing Basis Documents (LAR-17-025)

cc:

Southern Nuclear Operating Company / Georgia Power Company
Mr. S. E. Kuczynski (w/o enclosures)
Mr. M. D. Rauckhorst
Mr. D. G. Bost (w/o enclosures)
Mr. M. D. Meier (w/o enclosures)
Ms. P. Reister
Mr. D. H. Jones (w/o enclosures)
Mr. D. L. McKinney (w/o enclosures)
Mr. T.W. Yelverton (w/o enclosures)
Mr. B. H. Whitley
Mr. J.J. Hutto
Mr. C. R. Pierce
Ms. A. G. Aughtman
Mr. D. L. Fulton
Mr. M. J. Yox
Mr. E. W. Rasmussen
Mr. T. R. Takats
Mr. W. A. Sparkman
Ms. A. C. Chamberlain
Mr. M. K. Washington
Ms. A. L. Pugh
Mr. J. D. Williams
Document Services RTYPE: VND.LI.L00
File AR.01.02.06

Nuclear Regulatory Commission
Mr. W. Jones (w/o enclosures)
Ms. J. Dixon-Herrity
Mr. C. Patel
Mr. W. C. Gleaves
Ms. R. Reyes
Ms. J. M. Heisserer
Mr. B. Davis
Mr. P. Kallan
Mr. G. Khouri
Ms. S. Temple
Ms. V. Ordaz
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. R. Easterling (w/o enclosures)
Mr. G. Koucheravy (w/o enclosures)
Mr. C. D. Churchman (w/o enclosures)
Mr. P. A. Russ
Mr. M. L. Clyde
Mr. C. A. Castell
Ms. K. Chesko
Mr. J. Hopkins
Mr. D. Hawkins

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
Mr. N. R. Kellenberger, South Carolina Electric & Gas Company
Mr. D. Kersey, South Carolina Electric & Gas Company
NDDocumentinBox@duke-energy.com, Duke Energy
Mr. S. Franzone, Florida Power & Light

Southern Nuclear Operating Company

ND-17-1251

Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Request for License Amendment:

Reactor Vessel Head Vent Capacity

(LAR-17-025)

(Enclosure 1 consists of 10 pages, including this cover page.)

Table of Contents

Pursuant to 10 CFR 52.98(f) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC, or the "Licensee") hereby requests an amendment to Combined License (COL) Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively.

1. SUMMARY DESCRIPTION

The requested amendment revises COL Appendix C, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), and corresponding plant-specific Tier 1 ITAAC with concurrent revisions to the Updated Final Safety Analysis Report (UFSAR) to update Reactor Coolant System (RCS) requirements for reactor vessel head vent (RVHV) mass flow rate.

The RVHVs are used to provide emergency letdown and avoid long term pressurizer overfill during events which increase inventory in the RCS. COL Appendix C and the corresponding plant-specific Tier 1 give the required RVHV mass flow rate to accomplish this safety-related function. A revised plant safety analysis based on the AP1000 design pressure of 2500 psia has been performed and identified the need to update these required values. The updated analysis has the RVHV opening at a different RCS pressure and requires a higher minimum mass flow rate through the RVHV line to accomplish the emergency letdown function.

The requested amendment requires changes to COL Appendix C and corresponding changes to plant-specific Tier 1 information and the UFSAR. This enclosure requests approval of the license amendment necessary to implement the COL Appendix C and UFSAR changes. Enclosure 2 requests the exemption necessary to implement the involved changes to the plant-specific Tier 1 information.

2. DETAILED DESCRIPTION AND TECHNICAL EVALUATION

Design Overview

The Reactor Coolant System (RCS), which includes a reactor vessel, removes heat from the reactor core and transfers it to the secondary side of the steam generators for power generation. A reactor vessel head vent (RVHV) line is attached via a single pipe on the reactor vessel head. The RVHV line branches into two parallel flow paths, each with two redundant isolation valves in series to isolate the discharge piping from the reactor coolant pressure boundary. A flow restricting orifice is located downstream of the second valve in each of the flow paths. The two flow paths reconnect, and the common header discharges to the in-containment refueling water storage tank (IRWST). UFSAR Figure 5.4-8 contains a graphical representation of the RVHV piping.

The RVHVs perform three main functions:

1. Vent air from the RCS during refill operations after an outage
2. Vent non-condensable gas from the reactor vessel following an inadequate core cooling event. (Emergency Head Vent)

3. Remove excess inventory from the RCS to prevent pressurizer overfill during an inadvertent core makeup tank (CMT) actuation or similar event (Emergency Letdown). The RVHV is designed to limit the emergency letdown flow rate to within the capabilities of the normal makeup system.

The RVHVs can be operated from the dedicated safety panel and via component level soft controls in the Main Control Room (MCR). Operator action is required to initiate emergency letdown to mitigate the design basis events which cause RCS mass additions. These design basis events include inadvertent actuation of the CMT, chemical and volume control system (CVS) malfunctions that increase RCS inventory, and a loss of normal feedwater (which causes CMT actuation).

The RVHV system satisfies American Society of Mechanical Engineers (ASME) Code classifications, safety classifications, single-failure criteria, and environmental qualification. The piping and equipment from the vessel head vent up to and including the second isolation valve are designed and fabricated in accordance with ASME Code Section III, Class 1 requirements. The remainder of the piping and equipment are designed and fabricated in accordance with ASME Code, Section III, Class 3 requirements. The supports and support structures conform to the applicable requirements of the ASME Code. The Class 1 piping used for the reactor vessel head vent is 1-inch schedule 160 with two sections of 6-inch schedule 160 pipe. In accordance with ASME Section III, it is analyzed following the procedures of NC-3600 for Class 2 piping. The piping stresses meet the requirements of ASME Code, Section III, NC-3600, with a design temperature of 650°F and a design pressure of 2485 psig.

Per UFSAR Subsection 5.4.12.4.1, the preoperational test program includes a test of the capacity of each RVHV flow path. This test, along with an associated analysis, is used to verify that the head vent flow capacity is adequate to support the emergency letdown function and prevent pressurizer overfill. Further, COL Appendix C Table 2.1.2-4 inspections, tests, analyses, and acceptance criteria (ITAAC) No. 2.1.02.08e requires inspection of the as-built RVHV valves and inlet and outlet piping (i.e., the as-built configuration is compared to the as-designed configuration) to ensure the vent path flow rate is bounded by the safety analysis.

Change Description

Proper operation of the head vent is required to prevent pressurizer overfill during the design basis events described above. Therefore, the RVHV must support a mass flow rate to adequately reduce pressurizer water level and prevent it from becoming water solid. The current required capacity of the head vent flow path is 8.2 pounds mass per second (lbm/sec) at an RCS pressure of 1250 pounds per square inch absolute (psia). A revised AP1000 safety analysis has been performed in which the valves open at 2500 psia. The safety analysis concludes that 9.0 lbm/sec is required at this pressure to adequately support the emergency letdown function. Based on the updated analysis, if the RVHV capacity is 9.0 lbm/sec when the RCS pressure is 2500 psia, there will be sufficient capacity in the system to prevent the pressurizer from overfilling.

COL Appendix C Table 2.1.2-4 ITAAC No. 2.1.02.08e, UFSAR Subsection 5.4.12.4.1, and UFSAR Table 5.4-18 are proposed to be updated to reflect the required RVHV mass flow rate

of 9.0 lbm/sec at a pressure of 2500 psia, consistent with the current AP1000 plant safety analysis.

The safety analysis and the safety analysis model credit an emergency letdown mass flow rate of 9.0 lbm/sec at an RCS pressure of 2500 psia. At these conditions, long term pressurizer overfill is prevented. An RCS RVHV calculation note shows that the expected mass flow rate through the emergency letdown path will be 12.34 lbm/sec. Therefore, the safety analysis calculation, and the corresponding mass flow rate and RCS pressure values used in the proposed licensing basis changes, is conservative and bounded by the expected mass flow rate.

10 CFR 50.46a provides requirements and criteria for high point vents for the reactor vessel head. Using a different required flow rate does not impact the physical design of the RVHV flow path or its compliance with these criteria. This change does not lead to an increase in the probability of a loss of coolant accident, nor does it cause the RVHV to exceed the capability of the normal makeup system. Using a higher required mass flow rate, and the associated RCS pressure, does not impact the ability of the vent system to withstand the dynamic loads encountered during venting operations.

The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Plant radiation zones (addressed in UFSAR Section 12.3) are not affected, and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure. Therefore, the requested amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Licensing Basis Change Descriptions

To support this activity, the following licensing basis changes are proposed:

COL Appendix C (and plant-specific Tier 1)

Table 2.1.2-4 ITAAC No. 2.1.02.08e acceptance criteria is revised to reflect a RVHV flow capacity of at least 9.0 lbm/sec at an RCS pressure of 2500 psia.

UFSAR (Tier 2)

1. Subsection 5.4.12.4.1 is revised to reflect a RVHV flow capacity of at least 9.0 lbm/sec at an RCS pressure of 2500 psia.

2. Table 5.4-18 is revised to reflect a RVHV flow capacity of at least 9.0 lbm/sec at an RCS pressure of 2500 psia.

3. TECHNICAL EVALUATION

See section 2.

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a Combined License (COL). This activity involves a departure from COL Appendix C information and corresponding plant-specific Tier 1 information; therefore, this activity requires an amendment to the COL. Accordingly, NRC approval is required prior to making the plant-specific changes in this license amendment request.

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 Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section. The proposed change to UFSAR (Tier 2) design information involves changes to plant-specific Tier 1 (and corresponding changes to COL Appendix C) information, and thus requires NRC approval for the Tier 2 and involved Tier 1 departures.

10 CFR Part 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. 10 CFR 52, Appendix D, VIII.A.4 requires a Tier 1 change shall not result in a significant decrease in the level of safety otherwise provided by the design. The plant design change and its associated Tier 1 information change do not adversely affect any safety-related structure, system, and component (SSC) function, design analysis or safety analysis, and do not adversely affect the reactor vessel head vent function or analyses. Therefore, the requested changes will not result in a decrease in the level of safety otherwise provided by the design.

10 CFR 50.46a provides requirements and criteria for high point vents for the reactor vessel head. Using a different required flow rate does not impact the physical design of the reactor vessel head vent (RVHV) flow path or its compliance with these criteria.

10 CFR 50 Appendix A, GDC 15 requires the reactor coolant system and associated auxiliary, control, and protection systems to be designed with sufficient margin to assure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences. The proposed changes to the acceptance criteria for the RVHV flow rate are consistent with this criterion.

The proposed changes have been evaluated to determine whether applicable regulations continue to be met. It was determined that the proposed changes conform to 10 CFR 50 Appendix A GDC, as described in the plant-specific DCD or UFSAR.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration Determination

The requested amendment would revise COL Appendix C and the corresponding plant-specific Tier 1 information related to the reactor vessel head vent (RVHV) emergency letdown flow rate requirements.

The RVHV is used to provide emergency letdown and avoid long term pressurizer overfill during events which increase inventory in the Reactor Coolant System (RCS). COL Appendix C (plant-specific Tier 1) Table 2.1.2-4 ITAAC No. 2.1.02.08e gives the required RVHV mass flow rate to accomplish this safety-related function. This information is also given in UFSAR Subsection 5.4.12.4.1 and UFSAR Table 5.4-18. A revised plant safety analysis based on the AP1000 design pressure of 2500 psia has been performed that has the RVHV opening at a different RCS pressure and requires a different mass flow rate through the RVHV line to adequately accomplish the emergency letdown function. Therefore, COL Appendix C (plant-specific Tier 1) is proposed to be updated to reflect the new mass flow rate through the RVHV line and the associated system pressure.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment,” as discussed below:

4.3.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: <u>No</u>

UFSAR Subsections 15.2.7, 15.5.1, and 15.5.2 describe analyses performed for an increase in reactor coolant inventory due to a loss of normal feedwater flow, and for malfunctions of the chemical and volume control system and the core makeup tanks. In each of these evaluated accidents, it is assumed that the operators are alerted to the event due to a high pressurizer water level and take subsequent action to open the reactor vessel head vent valves. When the head vent is opened, the pressurizer water level increase slows and eventually decreases.

Changing the required mass flow rate from 8.2 lbm/sec at a Reactor Coolant System (RCS) pressure of 1250 psia to 9.0 lbm/sec at an RCS pressure of 2500 psia for the reactor vessel head vent (RVHV) flow path does not change the probability of these events occurring. The valves are used to mitigate the events. They are not an initiator of these accidents, or any other accident previously evaluated. Changing the required mass flow rate does not change the consequences of these accidents. The proposed flow rate change is made to be consistent with the latest AP1000 safety analysis. This change does not lead to an increase in the probability of a loss of coolant accident, nor does it cause the RVHV to exceed the capability of the normal makeup system. The changes

described above continue to ensure the design is capable of providing adequate flow rate for emergency letdown and the prevention of long term pressurizer overfill.

Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

4.3.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed changes impact the acceptance criteria for RVHV mass flow rate. The required mass flow rate is changed from 8.2 lbm/sec at an RCS pressure of 1250 psia to 9.0 lbm/sec at an RCS pressure of 2500 psia to align with the events evaluated in the current safety analysis. The proposed changes do not result in a new accident initiator and do not impact a current accident initiator.

Therefore, the requested amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.3.3 Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The proposed changes impact the acceptance criteria for RVHV mass flow rate. The required mass flow rate is changed from 8.2 lbm/sec at an RCS pressure of 1250 psia to 9.0 lbm/sec at an RCS pressure of 2500 psia. The proposed changes are made to reflect the updated AP1000 plant safety analysis; the changes are conservative and bound the expected performance of the as-built equipment.

COL Appendix C (plant-specific Tier 1) is proposed to be updated to reflect the new mass flow rate through the RVHV line and the associated system pressure. COL Appendix C (plant-specific Tier 1) is updated to reflect the latest safety analysis, which credits an emergency letdown mass flow rate of 9.0 lbm/sec at an RCS pressure of 2500 psia. At these conditions, long term pressurizer overfill is prevented. RCS calculations show that the expected mass flow rate through the emergency letdown path is 12.34 lbm/sec. Therefore, the safety analysis calculation, and the corresponding mass flow rate and RCS pressure values used in the proposed changes, is conservative and bounded by the expected mass flow rate.

Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusions

Based on the considerations discussed above, (1) there is reasonable assurance that 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. The above evaluations demonstrate that the requested changes can be accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in a margin of safety. Therefore, it is concluded that the requested amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5. ENVIRONMENTAL CONSIDERATIONS

The proposed changes affect the Combined License (COL) concerning the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) and plant-specific Tier 1 ITAAC for the reactor vessel head vent (RVHV) mass flow rate. The required mass flow rate is changed from 8.2 lbm/sec at a Reactor Coolant System (RCS) pressure of 1250 psia to 9.0 lbm/sec at a RCS pressure of 2500 psia to align with the events evaluated in the current AP1000 safety analysis.

This review has determined that the proposed change would require an amendment from the COL; however, a review of the anticipated construction and operational effects of the proposed amendment has determined that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration Determination, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment." The Significant Hazards Consideration Determination determined that (1) the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the proposed amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant

radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the design functions or operational features credited with controlling the release of effluents during plant operation. Therefore, the requested amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed changes do not adversely affect walls, floors, or other structures that provide shielding. Plant radiation zones are not affected, and there are no changes to the controls required by 10 CFR Part 20 that preclude a significant increase in occupational radiation exposure. Therefore, the requested amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the proposed amendment, it has been determined that anticipated construction and operational effects of the proposed amendment do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed amendment is not required.

6. REFERENCES

None.

Southern Nuclear Operating Company

ND-17-1251

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Exemption Request:

Reactor Vessel Head Vent Capacity

(LAR-17-025)

(Enclosure 2 consists of 7 pages, including this cover page.)

1.0 PURPOSE

Southern Nuclear Operating Company (the Licensee) requests a permanent exemption from the provisions of 10 CFR 52, Appendix D, Section III.B, Design Certification Rule for the AP1000 Design, Scope and Contents, to allow a departure from elements of the certification information in Tier 1 of the generic AP1000 Design Control Document (DCD). The regulation, 10 CFR 52, Appendix D, Section III.B, requires an applicant or licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in DCD Tier 1. The Tier 1 information for which a plant-specific departure and exemption is requested is related to changing the Reactor Coolant System (RCS) requirements for reactor vessel head vent (RVHV) mass flow rate.

This request for exemption will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow a departure from Tier 1 information due to a proposed change to the acceptance criteria in plant-specific Tier 1 Table 2.1.2-4 Item 8.e). The change proposes to revise the required RVHV mass flow rate from 8.2 lbm/sec at an RCS pressure of 1250 psia to 9.0 lbm/sec at an RCS pressure of 2500 psia to align with the events evaluated in the current AP1000 safety analysis.

This request will provide for the application of the requirements for granting exemptions from design certification information, as specified in 10 CFR Part 52, Appendix D, Section VIII.A.4, 10 CFR 52.63, §52.7, and §50.12.

2.0 BACKGROUND

The Licensee is the holder of Combined License Nos. NPF-91 and NPF-92, which authorize construction and operation of two Westinghouse Electric Company AP1000 nuclear plants, named Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively.

The RVHVs are used to provide emergency letdown and avoid long term pressurizer overfill during events which increase inventory in the RCS. Plant-specific DCD Tier 1 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Table 2.1.2-4 Item 8.e) currently gives the required RVHV mass flow rate to accomplish this safety-related function. The Acceptance Criteria states:

> A report exists and concludes that the capacity of the reactor vessel head vent is sufficient to pass not less than 8.2 lbm/sec at 1250 psia in the RCS.

A revised safety analysis based on AP1000 has been performed and has the RVHV opening at a different RCS pressure and requires a higher minimum mass flow rate through the RVHV line to accomplish the emergency letdown function.

3.0 TECHNICAL JUSTIFICATION OF ACCEPTABILITY

The requested exemption will allow the Licensee to depart from generic AP1000 DCD Tier 1 Table 2.1.2-4 by revising the acceptance criteria of Item 8.e). The proposed change would revise the required RVHV mass flow rate from 8.2 lbm/sec at 1250 psia in the RCS to 9.0 lbm/sec at 2500 psia in the RCS in order to align with the current AP1000 plant safety analysis.

The RVHV requirements are described in UFSAR Subsection 5.4.12. The primary function of the RVHV is for use during plant startup to properly fill the RCS and vessel head. The RVHV system is also designed to provide an emergency letdown path that can be used to prevent long-term pressurizer overfill following loss of heat sink events. The RVHV is designed to limit the emergency letdown flow rate to within the capabilities of the normal makeup system.

Proper operation of the RVHV is required to prevent pressurizer overfill during the design basis events described above. As a result, the RVHV valves must support a mass flow rate to adequately reduce pressurizer water level and prevent it from becoming water solid. As previously stated, the current RVHV mass flow rate values are based on an outdated safety analysis. Specifically, the older plant safety analysis assumed the RVHV opened at an RCS pressure of 1250 psia. An updated safety analysis based on the AP1000 plant design has been performed in which the valves open at 2500 psia. The updated safety analysis concludes that 9.0 lbm/sec is required at this pressure to adequately support the emergency letdown function. Based on the updated analysis, if the RVHV capacity is 9.0 lbm/sec when the RCS pressure is 2500 psia, there will be sufficient capacity in the system to prevent the pressurizer from overfilling.

An RCS RVHV calculation note shows that the expected mass flow rate through the emergency letdown path will be 12.34 lbm/sec. Therefore, the safety analysis calculation, and the corresponding mass flow rate and RCS pressure values used in the proposed licensing basis changes, is conservative and bounded by the expected mass flow rate.

Detailed technical justification supporting this request for exemption is provided in Section 2 of the associated License Amendment Request in Enclosure 1 of this letter.

4.0 JUSTIFICATION OF EXEMPTION

10 CFR Part 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. Because the Licensee has identified changes to the Tier 1 information as discussed in Enclosure 1 of the accompanying License Amendment Request, an exemption from the certified design information in Tier 1 is needed.

10 CFR Part 52, Appendix D, and 10 CFR 50.12, §52.7, and §52.63 state that the NRC may grant exemptions from the requirements of the regulations provided six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special

circumstances are present [§50.12(a)(2)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, App. D, VIII.A.4].

The requested exemption satisfies the criteria for granting specific exemptions, as described below.

1. **This exemption is authorized by law**

   The NRC has authority under 10 CFR 52.63, §52.7, and §50.12 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR 50.12 and §52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

   Accordingly, this requested exemption is "authorized by law," as required by 10 CFR 50.12(a)(1).

2. **This exemption will not present an undue risk to the health and safety of the public**

   The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to plant-specific Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information. The plant-specific DCD Tier 1 will continue to reflect the approved licensing basis for VEGP Units 3 and 4, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the DCD. Therefore, the affected plant-specific DCD Tier 1 ITAAC will continue to serve their required purpose.

   The proposed changes will not impact the ability of the components to perform their design functions. There is no change to plant systems or the response of systems to postulated accident conditions. There is no change to the predicted radioactive releases due to postulated accident conditions. The plant response to previously evaluated accidents or external events is not adversely affected, and the change described does not create any new accident precursors. Therefore, no adverse safety impact that would present any additional risk to the health and safety of the public is present. The change in the RVHV mass flow rate requirement in the plant-specific Tier 1 DCD continues to provide the detail necessary to support the performance of the associated ITAAC.

   Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. The exemption is consistent with the common defense and security

The requested exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow the licensee to depart from elements of the plant-specific DCD Tier 1 design information. The proposed exemption does not alter the design, function, or operation of any structures or plant equipment that are necessary to maintain a safe and secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR 50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection defines special circumstances as when "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."

The rule under consideration in this request for exemption is 10 CFR 52, Appendix D, Section III.B, which requires that a licensee referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The VEGP Units 3 and 4 COLs reference the AP1000 Design Certification Rule and incorporate by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the AP1000 design certification, and to require compliance with the design certification information in Appendix D.

The proposed change would revise the acceptance criteria for required RVHV mass flow rate from 8.2 lbm/sec at 1250 psia in the RCS to 9.0 lbm/sec at 2500 psia in Tier 1 Table 2.1.2-4 Item 8.e) to align with the current AP1000 plant safety analysis. The proposed changes do not impact the ability of any structures, systems, or components to perform their functions or negatively impact safety. Accordingly, this exemption from the certification information will enable the Licensee to safely construct and operate the AP1000 facility consistent with the intent of the scope and contents of the design certified by the NRC in 10 CFR Part 52, Appendix D.

Therefore, special circumstances are present, because application of the current certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

5. **The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption**

   Given that the requested changes are based on an updated AP1000 safety analysis, it is expected that other AP1000 licensees will incorporate these changes and therefore no reduction in standardization is anticipated. Nevertheless, if other AP1000 licensees do not elect to request this exemption, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the key design functions associated with this request will continue to be maintained. This exemption request proposing the revision of the required acceptance criteria for required RVHV mass flow rate in the RCS in Tier 1 Table 2.1.2-4 Item 8.e) demonstrates that there is a minimal change from the generic AP1000 DCD, minimizing the reduction in standardization and consequently the safety impact from the reduction.

   Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

6. **The design change will not result in a significant decrease in the level of safety**

   The requested exemption does not adversely impact the level of safety because the changes associated with this exemption request will not adversely affect the ability of any systems or equipment to perform their design functions, there are no new failure modes introduced by these changes and the level of safety provided by the current systems and equipment is maintained. It is concluded that the design change associated with this proposed exemption will not result in a significant decrease in the level of safety.

5.0 RISK ASSESSMENT

A risk assessment was not determined to be applicable to address the acceptability of this proposal.

6.0 PRECEDENT EXEMPTIONS

None identified.

7.0 ENVIRONMENTAL CONSIDERATION

The Licensee requests a departure from elements of the certified information in Tier 1 of the generic AP1000 DCD. The Licensee has determined that the proposed departure would require a permanent exemption from the requirements of 10 CFR 52, Appendix D, Section III.B, Design Certification Rule for the AP1000 Design, Scope and Contents, with

respect to installation or use of facility components located within the restricted area, as defined in 10 CFR Part 20, or which changes an inspection or a surveillance requirement; however, the Licensee evaluation of the proposed exemption has determined that the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Based on the above review of the proposed exemption, the Licensee has determined that the proposed activity does not involve (i) a significant hazards consideration determination, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed 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), an environmental impact statement or environmental assessment of the proposed exemption is not required.

Specific details of the environmental considerations supporting this request for exemption are provided in Section 5 of the associated License Amendment Request provided in Enclosure 1 of this letter.

8.0 CONCLUSION

The proposed changes to Tier 1 information are necessary and the exemption request was confirmed to meet the requirements of 10 CFR 52.63, “Finality of standard design certifications,” 10 CFR 50.12, “Specific exemptions,” and 10 CFR 52 Appendix D, “Design Certification Rule for the AP1000 Design.” Specifically, the exemption request meets the criteria of 10 CFR 50.12(a)(1) in that the request is authorized by law, presents no undue risk to public health and safety, and is consistent with the common defense and security. Furthermore, approval of this request does not result in a significant decrease in the level of safety, presents special circumstances, does not present a significant decrease in safety as a result of a reduction in standardization, and meets the eligibility requirements for categorical exclusion.

9.0 REFERENCES

None.

Southern Nuclear Operating Company

ND-17-1251

Enclosure 3

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to the Licensing Basis Documents

(LAR-17-025)

Note:
Added text is shown as bold **Blue Underline**
Deleted text is shown as bold ~~**Red Strikethrough**~~

(Enclosure 3 consists of 2 pages, including this cover page.)

COL Appendix C (and plant-specific Tier 1) Table 2.1.2-4, Inspections, Tests, Analyses, and Acceptance Criteria

Revise Table 2.1.2-4, ITAAC 2.1.02.08e [plant-specific Tier 1 item 8.e)], as shown below:

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
8.e) The RCS provides emergency letdown during design basis events.	Inspections of the reactor vessel head vent valves and inlet and outlet piping will be conducted.	A report exists and concludes that the capacity of the reactor vessel head vent is sufficient to pass not less than ~~8.2~~ **9.0** lbm/sec at ~~1250~~ **2500** psia in the RCS.

Updated Final Safety Analysis Report (UFSAR) Subsection 5.4.12.4.1, Flow Testing

Revise Subsection 5.4.12.4.1, as shown below:

Initial verification of the capacity of the reactor vessel head vent valves is performed during the plant initial test program. A low pressure flow test and associated analysis is conducted to determine the capacity of each reactor vessel head vent flow path. The reactor coolant system is at cold conditions with the pressurizer full of water. The normal residual heat removal pumps are used to provide injection flow into the reactor coolant system, discharging through the reactor vessel head vent valves. The measured flow rate at low pressure is such that the head vent flow capacity is at least ~~8.2~~ **9.0** lbm/sec at an RCS pressure of ~~1250~~ **2500** psia.

UFSAR Table 5.4-18, Reactor Vessel Head Vent System Design Parameters

Revise Table 5.4-18, 5th row, as shown below:

Head vent capacity, lbm/sec (assuming a single failure, RCS pressure at ~~1250~~ **2500** psia)	~~8.2~~ **9.0**