

April 26, 2018

Docket Nos.: 52-025
52-026

ND-18-0542
10 CFR 50.90
10 CFR 52.63

U.S. Nuclear Regulatory Commission
ATTN: 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:
Containment Sump Level Instrumentation (LAR-18-014)**

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) requests an amendment to the combined licenses (COLs) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4 (License Numbers NPF-91 and NPF-92, respectively). The requested amendment proposes changes to COL Appendix C, with corresponding changes to the associated plant-specific Tier 1 information, and involves associated Tier 2 information in the Updated Final Safety Analysis Report (UFSAR) (which includes the plant-specific Design Control Document (DCD) Tier 2 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 DCD Tier 1 material departures.

The requested amendment proposes changes to COL Appendix C (and plant-specific Tier 1) to reflect a new design of containment sump level sensors which affects the acceptance criterion for the detected containment sump level change test and the associated minimum detectable unidentified leakage rate in plant-specific DCD Tier 2 information.

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

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

Enclosure 3 identifies the requested changes and provides markups depicting the requested changes to the VEGP Units 3 and 4 licensing basis documents.

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

SNC requests NRC staff approval of the license amendment by October 26, 2018, to support installation and termination of the containment sump level transmitters in the auxiliary building.

Delayed approval of this license amendment could result in a delay in containment sump level transmitter installation and subsequent dependent construction activities. SNC expects to implement this proposed amendment within 30 days of approval of the requested changes.

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

Should you have any questions, please contact Mr. Ryan Henderson at (205) 992-6426.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 26th of April 2018.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Wesley A. Sparkman', written over a horizontal line.

Wesley A. Sparkman
Licensing Manager, Regulatory Affairs
Southern Nuclear Operating Company

- Enclosures
- 1) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment: Containment Sump Level Instrumentation (LAR-18-014)
 - 2) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Exemption Request: Containment Sump Level Instrumentation (LAR-18-014)
 - 3) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Proposed Changes to Licensing Basis Documents (LAR-18-014)

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Southern Nuclear Operating Company

ND-18-0542

Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Request for License Amendment:

Containment Sump Level Instrumentation

(LAR-18-014)

(This Enclosure consists of 11 pages, including this cover page)

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Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) 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 proposed changes would revise the Combined Licenses (COLs) in regard to the detected level change in the containment sump during testing and the minimum detectable leak rate as a result of the changes to the containment sump level sensors and the containment sump free volume. The proposed changes verify the ability of the instrumentation to detect an RCS leak of 0.5 gpm. The ability to detect a 0.5 gpm RCS leak meets applicable regulatory guide requirements committed to in the UFSAR and provides the ability to meet Technical Specification requirements for RCS LEAKAGE and main steam line leakage.

The requested amendment requires a change to COL Appendix C and corresponding plant-specific Tier 1 information and involves Updated Final Safety Analysis Report (UFSAR) plant-specific Design Control Document (DCD) Tier 2 information. This enclosure requests approval of the license amendment necessary to implement this change and its involved UFSAR change.

2. DETAILED DESCRIPTION

As described in UFSAR Subsection 5.2.5, "Detection of Leakage Through Reactor Coolant Pressure Boundary," reactor coolant pressure boundary (RCPB) leakage provides a means of detecting, and to the extent practical, identifying the source and quantifying the reactor coolant leakage. Leakage detection monitoring is also maintained in support of the use of leak-before-break criteria for high-energy pipe in containment.

UFSAR Figure 5.2-1 depicts the overall leak detection approach. Per UFSAR Subsection 5.2.5.3, methods of detecting unidentified leakage inside containment include containment sump level, reactor coolant system inventory balance, and containment atmosphere radiation. Other methods that can be employed include containment atmosphere pressure, temperature, and humidity; containment water level; and visual inspection.

A leak in the reactor coolant system (RCS) or from the main steam lines inside containment would result in water flowing into the containment sump. Three containment sump level channels (WLS-034, WLS-035, and WLS-036) monitor the containment sump for increases in water level. The data display and processing system (DDS) computes the leakage rate and the plant control system (PLS) provides an alarm in the main control room if the average change in leak rate during any given measurement interval exceeds 0.5 gallons per minute (gpm) for unidentified leakage. The sensitivity of the containment sump level channels is such that they can provide operators with an early warning signal so that they can take corrective actions before the plant exceeds technical specification limits.

The containment sump level channels also provide the PLS control signal for the start and stop of the containment sump pumps when the water level reaches the high and low setpoints, and for the opening and closing of the containment isolation valves (WLS-PL-V055 and WLS-PL-V057) on the discharge line from the containment sump to the waste holdup tank. These signals are overridden by containment isolation signals from the protection and safety monitoring system (PMS) and diverse actuation system (DAS).

As described in UFSAR Subsection 5.2.5.3.1, the containment sump level instruments are the primary method of RCPB leak detection after a safe shutdown earthquake (SSE). The sensors are seismic Category I and the local, outside containment displays for these sensors are qualified to be operable after an SSE. The instrument type currently specified for the containment sump water level channels is an ultrasonic level sensor. The ultrasonic level instruments commercially available are not designed for the conditions to which the containment sump level instruments must be qualified. It has been determined that the probability that component samples will pass the seismic qualification testing is low. Additionally, in the years since the AP1000 design was conceived, level instrument manufacturers have moved away from advancing the design of ultrasonic level instruments, making the prospects for developing a product that can meet the qualification requirements uncertain.

In addition, the inspections, tests, analyses, and acceptance criteria (ITAAC) for the containment sump level monitoring channels requires that the instruments demonstrate the capability to detect a manual input to the sump such that the water level rises by 1.75 ± 0.1 inches. The water level rise of 1.75 inches is the level rise equivalent to the introduction of 0.5 gpm of leakage from the RCPB for one hour. As shown on UFSAR Figure 11.2-2, there are two sump pumps (WLS-MP02A/B) submerged in the containment sump. The water level rise for the containment sump level ITAAC is based on an estimated equipment envelope of these sump pumps. As the procurement of these components commenced, a more detailed equipment outline has been determined for these pumps. The pumps procured do not displace the same volume as assumed in the development of the original acceptance criterion (it changes the containment sump free volume). Therefore, the existing acceptance criterion is not limiting, and should be changed to reflect the procured equipment.

The design of the containment sump level sensors is being changed from ultrasonic to guided wave radar instruments. The ultrasonic level transmitter sensor emits a high-frequency sound pulse that is reflected off the surface of the product being measured. The ultrasonic sensor listens for the echo created when a sound wave is reflected by the product surface. The guided wave radar technology sensor emits a high-frequency electromagnetic pulse. The pulse is transmitted along a probe that is submerged in the fluid being measured. The pulse is reflected back to the sensor from the point where the air meets the fluid being measured. The minimum resolution (accuracy) of the new sump level instruments detailed in the licensing basis is expected to be affected by the instrument change (i.e., increased).

Licensing Basis Change Descriptions:

The changes to the sump level monitoring instruments and the change to the containment sump free volume changes the sump level monitoring system minimum detectable leak rate described in UFSAR Subsection 5.2.5.3.1 from 0.03 gpm to no greater than 0.19 gpm. There is also a clarification change to the sentence to add "rate" to the "minimum detectable leak" as the value stated is a rate.

The changes also require changes to ITAAC 2.3.10.07a.ii Acceptance Criteria to reflect the change in design of the sump level monitoring system. The Acceptance Criteria is proposed to be changed from sump level channels WLS-034, WLS-035, and WLS-036 being capable of detecting a change of 1.75 ± 0.1 inches to the sump level channels being capable of detecting a change of 1.34 ± 0.5 inches.

3. TECHNICAL EVALUATION

Vogtle Units 3&4 COL Appendix A Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.4.7 requires that RCS operational LEAKAGE be limited to 0.5 gallons per minute (gpm) unidentified LEAKAGE. LCO 3.7.8 requires that main steam line leakage through the pipe walls inside containment be ≤ 0.5 gpm.

One aspect of determining unidentified RCS LEAKAGE is through the use of the containment sump water level channels. An ITAAC exists to confirm that the containment sump water level channels would be able to detect an RCS leak by adding a known volume of water to the sump and measuring the rise in water level. When the ITAAC was first written, the calculation assumed an envelope for the submersible sump pumps larger than what was ultimately procured. The smaller pump results in a larger cross-sectional area available in the containment sump; this means that a smaller increase in level is required to detect the same volume of water and that the ITAAC Acceptance Criteria is no longer conservative (i.e., the level sensor needed to be able to detect a smaller increase in level).

Therefore, based on the free volume expected in the containment sump, a 0.5 gpm leak rate in containment results in the containment sump level changing at 0.0223 inches per minute. After an hour, the level would have risen approximately 1.34 inches which equates to approximately 6.25% of usable height of the containment sump. The sump usable height is the height from the bottom of the sump to core melt heat sink holes drilled in the tank. Note that the ITAAC level change of 1.34" is based on calculational maximization of sump cross-sectional area used in the level change that would be caused by the detectable leak size of 0.5 gpm for one hour. The required testing level change obtained will be between $1.34" + 0.5" = 1.84"$ and $1.34" - 0.5" = 0.84"$ which bounds testing accuracy (e.g., test water source flow rate, measurement and testing equipment accuracies, etc.), sump as-built dimensions, and actual sump usable cross-sectional area. The ability to detect a leak of this size within an hour is required in Regulatory Guide 1.45 (RG 1.45), "Reactor Coolant Pressure Boundary Leakage Detection Systems," as committed to in the licensing basis. The guided wave radar sensor is capable of detecting this change in level in an hour.

Based on the sensor resolution, water volume uncertainty, and uncertainty of the as-built sump dimensions, an uncertainty of ± 0.5 inches is bounding for the expected testing conditions. Therefore, the revised ITAAC Acceptance Criteria (1.34 ± 0.5 inches) appropriately reflects a conservative representation of the expected containment sump configuration, complies with applicable regulatory guidance and Technical Specifications for detecting leaks, and is within the capability of guided wave radar sensors to detect and is expected to meet seismic qualification requirements.

10 CFR 50, Appendix A, General Design Criterion 30 (GDC-30), requires means for detecting and, to the extent practical, identifying the source of reactor coolant LEAKAGE. RG 1.45 describes sump level and flow monitoring as acceptable methods for selecting leakage detection systems. RG 1.45 specifies that the plant should use leakage detection systems with a response time of no greater than 1 hour for a leakage rate of 1 gpm. RG 1.45 also states that leakage to the primary reactor containment from unidentified sources should be collected and the flow rate monitored with an accuracy of 1 gpm or better. The guided wave radar level instrument will be capable of a resolution of ± 0.5 inches or better. By converting this level to mass at normal containment pressure and temperature, it can then be converted to volumetric flow at RCS

pressure and temperature to determine the equivalent RCS leak detection flow rate. The change to guided wave radar sump level instruments results in a minimum detectable leak flow rate of 0.19 gpm which is below the 1 gpm guidance. A 0.19 gpm minimum detectable leak rate results in a detectable containment sump level change in approximately 30 minutes. Therefore, the proposed change to the minimum detectable leak rate from 0.03 gpm to a detectable leak rate no greater than 0.19 gpm maintains compliance with GDC 30 and the guidance of RG 1.45.

The changes to the minimum detectable leak rate and resolution of the containment sump level monitoring instruments have no adverse effect on the design function of the instruments to detect unidentified leakage in containment and to provide signals to start and stop the WLS sump pumps and to open and close the containment isolation valves on the discharge line from the containment sump to the waste holdup tank.

The sump is adequately sized to accept greater than 60 gallons of water between pumping cycles. The change in sump level monitoring instruments has no adverse effect on the ability to detect a 0.5 gpm leak in containment, and therefore, has no adverse effect on design criteria for leak-before-break.

The types and quantities of expected effluents are not changed, and no effluent release path is adversely affected by the proposed changes. Therefore, radioactive or non-radioactive material effluents are not affected by the proposed changes.

Plant radiation zones (as described in UFSAR Section 12.3), controls under 10 CFR 20, and expected amounts and types of radioactive materials are not affected by the proposed changes. Therefore, individual and cumulative radiation exposures do not change.

The change does not result in any change in access to the containment sump water level channels in the auxiliary or containment buildings and does not result in an adverse effect on the site emergency plan since leak detection capability is maintained within regulatory guidance and the technical specifications. Therefore, there is no adverse effect on safety and security, including the site emergency plan, as a result of the proposed changes.

Summary

The proposed change is to the containment sump water level instrumentation and its expected RCS leakage detection capability. The above proposed changes would not adversely affect any safety-related equipment or function, design function, radioactive material barrier or safety analysis.

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). The proposed change involves a change to COL Appendix C (and plant-specific DCD Tier 1) Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) information. Therefore, NRC approval is required prior to making the plant-specific proposed change 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 involves a change to plant-specific DCD Tier 1 (and COL Appendix C) ITAAC information. Therefore, NRC approval is required prior to making the change to Tier 2 information.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 2, "Design bases for protection against natural phenomena," requires that systems, structures, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions. The proposed change to the containment sump water level sensors ensures that a sensor can be procured which detects the required level rise and associated leak rate while meeting the required seismic qualification. Therefore, the proposed change complies with the requirements of GDC 2.

10 CFR Part 50, Appendix A, GDC 30, "Quality of reactor coolant pressure boundary," requires that the components which are part of the reactor coolant pressure boundary be designed, fabricated, erected, and tested to the highest quality standards practical and that means be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage. The proposed change to the containment sump water level sensors maintains the capability to detect unidentified reactor coolant leakage within rates required by the Technical Specifications and Regulatory Guide 1.45, as committed to in the UFSAR (plant-specific DCD). Therefore, the proposed change complies with the requirements of GDC 30.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration

The proposed change is to the containment sump water level instrumentation and its expected reactor coolant system (RCS) leakage detection capability.

The requested amendment proposes a change to Updated Final Safety Analysis Report (UFSAR) Tier 2 information, which involves a change to COL Appendix C and corresponding plant-specific Tier 1 information.

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: No.

The proposed change is to the containment sump water level instrumentation and its expected RCS leakage detection capability. The affected equipment is not safety-related, but the containment sump water level sensors are seismically qualified. The change in containment sump level monitoring instruments has no adverse effect on the ability to detect a 0.5 gpm leak in containment, and therefore, has no adverse effect on design criteria for leak-before-break. The change does not affect the operation of any systems or equipment that initiate an analyzed accident or alter any structures, systems, and components (SSC) accident initiator or initiating sequence of events.

Because the containment sump water level monitoring channels are still capable of detecting a 0.5 gpm leak in containment, the change to the SSC has no effect on plant operations. 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 normal operation or postulated accident conditions.

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 change does not affect the operation of any systems or equipment that may initiate a new or different kind of accident, or alter any SSC such that a new accident initiator or initiating sequence of events is created. The proposed change to the containment sump water level instrumentation and its expected RCS leakage detection capability has no adverse effect on the ability to detect a 0.5 gpm leak in containment. The containment sump level instrumentation functions are unchanged and leak-before-break design criteria are not adversely affected.

Loss of coolant accidents for a spectrum of pipe sizes and locations are already postulated in UFSAR Chapter 15, Section 15.6. Breaks in the main steam lines inside containment are also analyzed in UFSAR Chapter 15, Section 15.1. Unidentified leakage detection and operator action in response to unidentified leakage are not postulated for any of the design basis accident analyses described in UFSAR Chapter 15.

Therefore, the proposed 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 described change to the containment sump water level instrumentation and its expected RCS leakage detection capability is proposed to verify that the ability to detect a 0.5 gpm leak in containment is maintained. The proposed change does not alter any safety-related equipment, applicable design codes, code compliance, design function, or safety analysis. By ensuring that the chosen equipment can detect a 0.5 gpm leak in containment with the described accuracy, guidance in Regulatory Guide 1.45, Revision 0, as committed to in the UFSAR, and requirements in the Technical Specifications are met which ensures that leak-before-break design criteria are not adversely affected. Consequently, no safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed change, thus the margin of safety is not reduced.

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

In conclusion, 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. Pursuant to 10 CFR 50.92, the requested change does not involve a Significant Hazards Consideration.

5. ENVIRONMENTAL CONSIDERATIONS

The details of the proposed change are provided in Sections 2 and 3 of this license amendment request.

The proposed change would revise the containment sump water level instrumentation and its expected reactor coolant system (RCS) leakage detection capability.

The proposed change requires changes to Updated Final Safety Analysis Report (UFSAR) information, which involves a change to the COL Appendix C and corresponding plant-specific Tier 1 information.

This review has determined that the proposed change requires an amendment to the COL. However, a review of the anticipated construction and operational effects of the requested amendment has determined that the requested 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, 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 determined that (1) the requested amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the requested amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the requested amendment does not involve 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.

(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 change in the requested amendment to the containment sump water level instrumentation and its expected RCS leakage detection capability ensures that the capability to detect a 0.5 gpm leak inside containment is not affected. The proposed change is 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 change does 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. Therefore, it is concluded that 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 change to the containment sump level instrumentation and its expected RCS leakage detection capability ensures that the capability to detect a 0.5 gpm leak inside containment is not affected. 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.

Based on the above review of the requested amendment, it has been determined that anticipated construction and operational effects of the requested 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 individual or cumulative occupational radiation exposure. Accordingly, the requested 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 exemption is not required.

ND-18-0542

Enclosure 1

Request for License Amendment: Containment Sump Level Instrumentation (LAR-18-014)

6. REFERENCES

None.

Southern Nuclear Operating Company

ND-18-0542

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Exemption Request:

Containment Sump Level Instrumentation

(LAR-18-014)

(This Enclosure 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 being requested includes revisions related to the testing of the containment sump level channels.

This request for exemption provides the technical and regulatory basis to demonstrate that 10 CFR 52.63, §52.7, and §50.12 requirements are met and will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow departures from generic Tier 1 information due to proposed changes to Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Table 2.3.10-4 ITAAC Item 7.a) ii) for the test acceptance criteria of the containment sump level channels.

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.

As described in UFSAR Subsection 5.2.5, reactor coolant pressure boundary (RCPB) leakage detection monitoring provides a means of detecting and, to the extent practical, identifying the source and quantifying the reactor coolant leakage. Leakage detection monitoring is also maintained in support of the use of leak-before-break criteria for high-energy pipe in containment.

A leak in the reactor coolant system (RCS) or from the main steam lines inside containment would result in water flowing into the containment sump. Three containment sump level channels (WLS-034, WLS-035, WLS-036) monitor the containment sump for increases in water level. The data display and processing system (DDS) computes the leakage rate and the plant control system (PLS) provides an alarm in the main control room if the average change in leak rate during any given measurement interval exceeds 0.5 gallons per minute (gpm) for unidentified leakage.

The design of the sensor of the containment sump level channel was changed from ultrasonic to guided wave radar in order to be able to meet the seismic Category I requirement and provide reliable resolution. In addition, because of changes to the available cross-sectional area inside of the containment sump, the water level rise equivalent to an RCS leak of 0.5 gpm for one hour changed.

Plant-specific DCD Tier 1 Table 2.2.3-4 specifies the ITAAC related to the liquid radwaste system (WLS). The test and acceptance criteria of Tier 1 Table 2.2.3-4 ITAAC Item 7.a) ii) verifies the ability of the containment sump level channels to register a level rise of 1.75 ± 0.1 inches. Due to the change to the sensor and the change to the containment sump

available cross-sectional area, the test acceptance criteria is proposed to be changed to 1.34 ± 0.5 inches.

3.0 Technical Justification of Acceptability

The proposed change to the test acceptance criteria for the registered level rise in the containment sump by the containment sump level channels verifies the ability of the instrumentation to detect an RCS leak of 0.5 gpm. The ability to detect a 0.5 gpm RCS leak meets applicable regulatory guide requirements committed to in the UFSAR and provides the ability to meet Technical Specification requirements for RCS LEAKAGE and main steam line leakage. This also supports the leak-before-break design criteria assumptions.

The proposed change to the containment sump level channel sensor does not have any adverse effect on the design function of the capability to detect unidentified leakage in containment and to provide signals to WLS components. The proposed change does not affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. No safety-related structure, system, or component (SSC) or function is involved.

Detailed technical justification supporting this request for exemption is provided in Section 3 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. Since SNC 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 elements of the 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 its required purpose.

The change for the test acceptance criteria of the containment sump level channels does not represent any adverse impact to the design function of the related systems, structures and components and will continue to protect the health and safety of the public in the same manner. The change for the test acceptance criteria of the containment sump level channels does not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor do they modify or remove any design or operational controls or safeguards intended to mitigate any existing on-site hazards. Furthermore, the proposed change would not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in fuel cladding failures. Accordingly, this change does not present an undue risk from any existing or proposed equipment or systems.

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 is 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 exemption would change the test acceptance criteria for the containment sump level channels.

The proposed change for the test acceptance criteria of the containment sump level channel, discussed in Section 2.0 of this Enclosure, maintains the required design function of the containment sump level channels to detect an unidentified 0.5 gpm RCS leak. The proposed change does not affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. No safety-related structure, system, or component (SSC) or safety-related function is involved. The proposed change does not involve nor interface with any SSC accident initiator or initiating sequence of events related to the accidents evaluated and therefore does not have an adverse effect on any SSC's design function. Accordingly, this exemption from the certification information will enable the Licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic 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.

Based on the nature of the changes to the plant-specific Tier 1 information and the understanding that these changes support the design function of the containment sump level channels, it is expected that this exemption may be requested by other AP1000 licensees and applicants. However, a review of the reduction in standardization resulting from the departure from the standard DCD determined that even if other AP1000 licensees and applicants do not request this same departure, the special circumstances will continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the structures associated with this request will continue to be maintained. Furthermore, the justification provided in the license amendment request and this exemption request and the associated mark-ups demonstrate that there is a limited change from the standard information provided in the generic AP1000 DCD, which is offset by the special circumstances identified above.

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 exemption revises the plant-specific DCD Tier 1 information test acceptance criteria for the containment sump level channels as discussed in Section 2.0 of this Enclosure. The change for the test acceptance criteria of the containment sump level channels does not change the design functions of the containment sump level channels. Because these functions continue to be met, there is no reduction 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

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 change does 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 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 are necessary to change the test acceptance criteria on the containment sump level channels. The exemption request meets the requirements of

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Enclosure 2

Exemption Request: Containment Sump Level Instrumentation (LAR-18-014)

10 CFR 52.63, *Finality of design certifications*, 10 CFR 52.7, *Specific exemptions*, 10 CFR 50.12, *Specific exemptions*, and 10 CFR 52 Appendix D, *Design Certification Rule for the AP1000*. 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, satisfies the underlying purpose of the AP1000 Design Certification Rule, and does not present a significant decrease in safety as a result of a reduction in standardization.

9.0 References

None

Southern Nuclear Operating Company

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Enclosure 3

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to Licensing Basis Documents

(LAR-18-014)

**Insertions Denoted by Blue Underline and Deletions by ~~Red~~ Strikethrough
Omitted text is identified by three asterisks (* * *)**

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

Revise COL Appendix C Table 2.3.10-4 and corresponding Plant-Specific Tier 1 Table 2.3.10-4, as shown below.

Table 2.3.10-4 (cont.)
 Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
***	***	***
<p>7.a) The WLS provides the nonsafety-related function of detecting leaks within containment to the containment sump.</p> <p>***</p>	<p>***</p> <p>ii) Testing will be performed by adding water to the sump and observing display of sump level.</p> <p>***</p>	<p>***</p> <p>ii) A report exists and concludes that sump level channels WLS-034, WLS-035, and WLS-036 can detect a change of 1.34 ± 0.5 1.75 ± 0.1 inches.</p> <p>***</p>

UFSAR Subsection 5.2.5.3.1 “Containment Sump Level Monitor” is revised, as shown below.

Failure of two of the level sensors will still allow the calculation of a 0.5 gpm in-leakage rate within 1 hour. The data display and processing system (DDS) computes the leakage rate and the plant control system (PLS) provides an alarm in the main control room if the average change in leak rate for any given measurement period exceeds 0.5 gpm for unidentified leakage. The minimum detectable leak rate is no greater than 0.19 ~~0.03~~ gpm. Unidentified leakage is the total leakage minus the identified leakage. The leakage rate algorithm subtracts the identified leakage directed to the sump.
