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ND-18-1147  
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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:  
Reactor Coolant System (RCS) Flow Coastdown (LAR-18-025)**

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 to depart from information in the Updated Final Safety Analysis Report (UFSAR) (which includes the plant-specific Design Control Document (DCD) Tier 2 information) and involves related changes to plant-specific Tier 1 information, with corresponding changes to the 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 DCD Tier 1 material departures.

The requested amendment proposes changes to revise the test acceptance criterion for reactor coolant system flow coastdown to reflect the test conditions rather than safety analysis conditions.

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 review and approval of this license amendment request (LAR) no later than March 2, 2019. Approval by this date will allow sufficient time to implement licensing basis changes necessary to support closure of an Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) item. SNC expects to implement the proposed amendment within thirty days of approval of the LAR.

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 Ms. Amy Chamberlain at (205) 992-6361.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 31<sup>st</sup> of August 2018.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "B. H. Whitley", is written over a horizontal line.

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

- Enclosures
- 1) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment Regarding Reactor Coolant System (RCS) Flow Coastdown (LAR-18-025)
  - 2) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Exemption Request: Reactor Coolant System (RCS) Flow Coastdown (LAR-18-025)
  - 3) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Proposed Changes to Licensing Basis Documents (LAR-18-025)

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**Southern Nuclear Operating Company**

**ND-18-1147**

**Enclosure 1**

**Vogtle Electric Generating Plant (VEGP) Units 3 and 4**

**Request for License Amendment Regarding**

**Reactor Coolant System (RCS) Flow Coastdown**

**LAR-18-025**

(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**

Updated Final Safety Analysis Report (UFSAR) Subsection 14.2.10.1.18 describes the performance of the reactor coolant system (RCS) flow coastdown startup test as part of the initial test program. The objectives of the RCS flow coastdown test include, in part, measuring the rate at which reactor coolant loop flow and pump speed change subsequent to tripping the reactor coolant pumps. The performance criterion for the RCS flow coastdown startup test requires, in part, that the loop flows and pump speed data are obtained for verification of the loss of flow analysis in UFSAR Subsection 15.3.2.

A similar test is also performed as part of the RCS testing under the hot functional preoperational test conditions described in UFSAR 14.2.9.1.1. The preoperational test results are used to close the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) identified in Tier 1 Table 2.1.2-4, Item 8b (Combined License (COL) item Number 2.1.02.08b), using the coastdown curve acceptance criterion identified in Tier 1 Figure 2.1.2-2, and the test is reconfirmed during startup test conditions as identified above.

This License Amendment Request (LAR) proposes a change to UFSAR 15.3.2-1 which reflects the full power safety analysis RCS flow coastdown curve. This LAR also proposes a change to the similar figure included as the COL Appendix C ITAAC Number 2.1.02.08b referenced acceptance criterion as Figure 2.1.2-2 (and the corresponding plant-specific Tier 1 figure.) A change is proposed to these curves to reflect the latest coastdown curves and to revise the ITAAC-related RCP coastdown curve such that it is based upon the same conservative pump characteristics as those used in the safety analyses but scaled to the actual hot functional test conditions used for the preoperational testing.

This LAR proposes changes to the UFSAR materials and the involved plant-specific ITAAC provided as Appendix C to the COL (and the corresponding revision to the plant-specific Tier 1 material). The COL Appendix C figure and the plant-specific Tier 1 figure are jointly referred to as the "ITAAC-related" figure for the rest of this document. This enclosure requests approval of the license amendment necessary to implement these changes.

Enclosure 2 requests the exemption necessary to implement the requested revision to the plant-specific Tier 1 material.

## **2. DETAILED DESCRIPTION and 3. TECHNICAL EVALUATION**

At the time of the AP1000 design certification, the Tier 1 ITAAC-related Figure 2.1.2-2 and Tier 2 safety analysis Figure 15.3.2-1 were identical; however, they should not have been due to the differences between the safety analysis conditions (addressed in Subsection 15.3.2) and the hot

functional test conditions (which the ITAAC-related figure should have provided). For the hot functional test considerations, the coastdown curve is adjusted from 100% power with a full power  $\Delta T$  to hot zero power (HZP) and no-load temperature conditions to reflect the acceptance criterion for RCS flow coastdown testing. This adjustment to the safety analysis curve is used to update the ITAAC-related Figure 2.1.2-2 as part of this change activity.

The curve in the ITAAC-related Figure 2.1.2-2 is based on the model used in the safety analysis, using the same conservative pump characteristics as those used to demonstrate that the safety limits are met. However, the curve for predicted test results should reflect the hot functional test conditions at HZP as opposed to the conditions most limiting for the safety analysis, which are hot full power (HFP) conditions. The pump characteristics used in the safety analysis are ultimately validated with this test. However, the modeled thermal-hydraulic conditions need to be consistent with the hot functional test conditions to obtain an overall system response that correlates the pump characteristics to a coastdown curve at the test conditions.

As previously discussed, the RCP coastdown curve in the ITAAC-related Figure 2.1.2-2 was based on the UFSAR Tier 2 Figure 15.3.2-1 during the AP1000 design certification. The basis for UFSAR Figure 15.3.2-1 is the complete loss of flow (CLOF) analysis documented in UFSAR Subsection 15.3.2 with four cold legs in operation and four RCPs coasting down.

Both proposed figures (UFSAR Figure 15.3.2-1 and the ITAAC-related Figure 2.1.2-2) account for RCP design changes that are incorporated into a revised CLOF analysis:

- i) for revised vendor-supplied RCP homologous curves,
- ii) for revised RCP fluid friction losses, and
- iii) for revised RCP flywheel ring material.

These changes do not represent a substantial change to the CLOF analysis and the results remain acceptable.

The revised RCP characteristics were modeled in the safety analyses and are reflected in the revised coastdown curve proposed for UFSAR Figure 15.3.2-1. The revised safety analyses remain conservative since the acceptance criteria continue to be met.

For hot functional test considerations, the RCP coastdown curve in UFSAR Chapter 15 is used as a basis, but adjusted from 100% power with a full power  $\Delta T$  to HZP to reflect a revised ITAAC-related test acceptance criterion provided in Figure 2.1.2-2.

As noted above, the acceptance criterion documented in the ITAAC-related Figure 2.1.2-2 are established to support testing to confirm that the RCP coastdown parameters modeled in the safety analysis are consistent or conservative with respect to the as-built RCPs. In support of this, a flow coastdown calculation is documented and performed with LOFTRAN using the same pump performance parameters as those used in the CLOF safety analysis, but at the initial conditions of the RCP flow coastdown tests. A review of the test conditions shows that most of the inputs in the CLOF safety analysis are applicable to the startup test for which acceptance criterion is being revised. The primary differences between the CLOF analysis and the startup



test conditions are the initial power level, initial RCS temperature, and steam generator tube plugging (SGTP) level.

Therefore, for the calculation performed to develop the revised RCP coastdown acceptance criterion for ITAAC-related Figure 2.1.2-2, the LOFTRAN input deck from the revised CLOF analysis was used as the starting point and changes were made to initialize the model at HZP and no-load temperature (557°F) conditions. Additionally, the SGTP level was revised from 10% to 0% to better simulate test conditions.

The power level and SGTP level have a negligible impact on the coastdown rate; the initial RCS temperature has the largest impact. The test description lists the initial RCS temperature as “stable at Normal Operating Temperature,” which is 557°F (no-load temperature). As mentioned, these differences between the full power CLOF safety analysis and the plant test conditions were analyzed in LOFTRAN to determine a new normalized RCS loop flow rate and RCP speed as a function of time for use as the proper basis for the RCP coastdown test acceptance criterion.

As the test acceptance criterion documented in Tier 1 Figure 2.1.2-2 continues to be based upon the same conservative pump characteristics as those used in the safety analyses, but appropriately scaled to the actual test conditions, i.e., HZP conditions, the test criterion specified in the ITAAC-related Figure 2.1.2-2 will continue to verify that the coastdown characteristics modeled in the safety analyses (most importantly, the loss of flow analyses (i.e., UFSAR Figure 15.3.2-1)) remain conservative in comparison to the flow coastdown characteristics of the physical plant.

Note that the proposed change to the ITAAC-related Figure 2.1.2-2 also changes the y-axis from “Core Coolant Mass Flow (Fraction of Nominal)” to “Core Mass Flow Rate (FOI).” A note is added to the revised figure to indicate “FOI” stands for “Fraction of Initial.” This change is made to clarify that the plot is a fraction of the initial flow in the analysis, and there is no technical consequence to the supporting analysis or to the RCP coastdown as a result of this axis labeling change.

#### List of Proposed Licensing Basis Changes:

- UFSAR Figure 15.3.2-1 – Replace figure for revised analysis results
- COL Appendix C Figure 2.1.2-2 (and the corresponding plant-specific Tier 1 figure) – Replace figure for revised analysis results (modified to reflect test conditions) and add note to bottom of figure to address use of “FOI”

#### Summary:

In summary, for hot functional test considerations, the RCP coastdown curve is adjusted from 100% power with a full power  $\Delta T$  to HZP in the revised figure detailing the acceptance criterion for RCS flow coastdown testing. While this change activity does not impact the RCP design requirements or hardware, it does involve updates to the licensing basis and is addressed by

supporting safety analyses. The UFSAR Figure 15.3.2-1 safety analysis curve is used as the basis to revise the ITAAC related Figure 2.1.2-2 curve by adjusting the safety analysis curve based on the hot functional test conditions.

The proposed changes do not require a change to procedures or method of control that adversely affects the performance of the RCPs design functions as described in the UFSAR. The physical design of the RCPs, including the as-installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus, there are no changes to procedures or method of control required to address the proposed changes to the licensing basis. The objectives of the RCS flow coastdown test include, in part, measuring the rate at which reactor coolant loop flow and pump speed change subsequent to tripping the reactor coolant pumps. The performance criteria for the RCS flow coastdown startup test requires, in part, that the loop flows and pump speed data are obtained for verification of the loss of flow analysis in UFSAR Subsection 15.3.2. The proposed changes maintain the design function of the RCPs.

An impact review determined these proposed changes do not affect or require any change to the plant Probabilistic Risk Assessment (PRA) presented in UFSAR Chapter 19, including the Fire PRA, results and insights (e.g., core damage frequency and large release frequency). The proposed changes maintain the design function of the RCPs and the physical design and operation of the RCPs, including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus, there are no changes to the PRA required to address the proposed changes to the licensing basis. No new postulated failures of the RCPs are required in the PRA model. Therefore, there are no changes required to initiating event frequencies and system logic models of the PRA, including the Seismic Margins Analysis. The existing PRA conclusions remain valid.

There are no radiation zone changes or radiological access control changes required due to the proposed changes. The physical design and operation of the RCPs, including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus, there are no changes required to the radiation protection design features described in UFSAR Section 12.3.

There are no fire area changes required because of these proposed changes. The physical design and operation of the RCPs, including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed, and thus, there are no changes required to the fire protection analysis described in UFSAR Appendix 9A.

There is no change to the risk-significant designation of structures, systems and components (SSCs) within the Design Reliability Assurance Program as described in UFSAR Table 17.4-1, as the physical design and operation of the RCPs, including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed.

The proposed changes do not affect the containment, control, channeling, monitoring, processing or releasing of radioactive and non-radioactive materials. No effluent release path is affected.

The types and quantities of expected effluents are not changed. Therefore, radioactive or nonradioactive material effluents are not affected.

The proposed changes do not affect plant radiation zones, controls under 10 CFR 20, or expected amounts and types of radioactive materials, as the physical design and operation of the RCPs, including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR are not changed. Therefore, individual and cumulative radiation exposures do not change.

The proposed changes do not affect the results of the aircraft impact assessment described in UFSAR Subsection 19F.4.

### **3. TECHNICAL EVALUATION (Incorporated into Section 2 above)**

### **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). These proposed changes involve revisions to COL Appendix C, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC); therefore, these proposed changes require 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 VII.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 this section. The proposed change to the Tier 2 information involves a change to COL Appendix C (and the corresponding plant-specific Tier 1) ITAAC information. Therefore, NRC Approval is required prior to making the change to Tier 2 information.

10 CFR 50, Appendix A, General Design Criterion (GDC) 10, "Reactor design," requires the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

10 CFR 50, Appendix A, General Design Criterion (GDC) 15, "Reactor coolant system design." The reactor coolant system and associated auxiliary, control, and protection systems shall 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.

#### **4.2 Precedent**

None.

#### **4.3 Significant Hazards Consideration**

Southern Nuclear Operating Company (SNC) is requesting an amendment to Combined License (COL) Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively. The proposed changes revise the Updated Final Safety Analysis Report (UFSAR) Tier 2 to reflect revised complete loss of flow (CLOF) analysis results in UFSAR Figure 15.3.2-1 and involve a change to the corresponding Combined Licenses (COLs) Appendix C, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Figure 2.1.2-2 (and the corresponding plant-specific Tier 1 figure), to reflect information pertinent to the expected results of the hot functional test conditions.

The safety analysis result curve, UFSAR Figure 15.3.2-1, is adjusted to obtain the results expected at startup test conditions, and this adjusted curve is proposed to replace the existing COL Appendix C Figure 2.1.2-2 (and the corresponding plant-specific Tier 1 figure). For the hot functional test considerations, the safety analysis curve is adjusted from 100% power with a full power  $\Delta T$  to hot zero power (HZP) to obtain an appropriate curve as acceptance criterion for the RCS flow coastdown testing.

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(c), "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 changes do not adversely 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. The proposed changes do not adversely affect the physical design and operation of the RCPs including as-installed inspections, testing, and maintenance requirements, as described in the UFSAR. Therefore, the operation of the RCPs is not adversely affected. A CLOF event is identified as an event that is sensitive to RCP coastdown. However, the proposed changes do not adversely affect the probability of a CLOF occurring. Therefore, the probabilities of the accidents previously evaluated in the UFSAR are not affected.

The proposed changes do not adversely affect the ability of the RCPs to perform its design functions. The design of the RCPs continues to meet the same regulatory acceptance criteria, codes, and standards as required by the UFSAR. The proposed changes do not adversely affect the prevention and mitigation of

other abnormal events, e.g., anticipated operational occurrences, earthquakes, floods and turbine missiles, or their safety or design analyses. Therefore, the consequences of the accidents evaluated in the UFSAR are not affected.

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 would not introduce a new failure mode, fault, or sequence of events that could result in a radioactive material release. The proposed changes do not alter the design, configuration, or method of operation of the plant beyond standard functional capabilities of the equipment. Therefore, this activity does 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 which results in significant fuel cladding failures.

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.

Safety margins are applied at many levels to the design and licensing basis functions and to the controlling values of parameters to account for various uncertainties and to avoid exceeding regulatory or licensing limits. The proposed changes maintain existing safety margins, and in some cases, provide additional margin. The proposed changes maintain the capabilities of the RCPs to perform its design functions. Therefore, the proposed changes satisfy the same design functions in accordance with the same codes and standards as stated in the UFSAR. These changes do not adversely affect any design code, function, safety analysis, safety analysis input or results, or design/safety margin. No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed changes, and no margin of safety is reduced.

Therefore, the proposed changes do not involve a significant reduction in the 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 proposed 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. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determined that the proposed change does not involve a Significant Hazards Consideration.

### **5. ENVIRONMENTAL CONSIDERATIONS**

This review supports a request to amend the Updated Final Safety Analysis Report (UFSAR) and the involved Combined License (COL) and plant-specific Tier 1 information to allow departure from an element of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) certification information. The proposed amendment specifies the information required to modify the licensing requirements for the reactor coolant system flow coastdown testing.

Sections 2 and 3 of this license amendment request provide the details of the proposed changes.

A review has determined that the proposed changes require an amendment to the COL. However, a review has determined that the anticipated effects on facility construction and operation following implementation of 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 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 in the requested amendment would not adversely affect the design or function of any structure, system, or component (SSC). 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 adversely affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not adversely 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 proposed 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 in the requested amendment would not adversely affect the design or function of any structure, system, or component (SSC). Plant radiation zones (in UFSAR Section 12.3) are not affected, and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure. Therefore, the proposed 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 exemption is not required.

## 6. REFERENCES

None.

**Southern Nuclear Operating Company**

**ND-18-1147**

**Enclosure 2**

**Vogtle Electric Generating Plant (VEGP) Units 3 and 4**

**Exemption Request:**

**Reactor Coolant System (RCS) Flow Coastdown**

**LAR-18-025**

(This Enclosure consists of 8 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 a revision to the reactor coolant system (RCS) flow coastdown curve to align the curve with the predicted results during hot functional test conditions.

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 the proposed revision to Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)-related Figure 2.1.2-2 to reflect the predicted flow coastdown during hot functional test conditions.

## 2.0 Background

The Licensee is the holder of Combined License (COL) 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.

Updated Final Safety Analysis Report (UFSAR) Subsection 14.2.10.1.18 describes the performance of the reactor coolant system (RCS) flow coastdown startup test as part of the initial test program. The objectives of the RCS flow coastdown test include, in part, measuring the rate at which reactor coolant loop flow and pump speed change, subsequent to tripping the reactor coolant pumps (RCPs). The performance criterion for the RCS flow coastdown startup test requires, in part, that the loop flows and pump speed data are obtained for verification of the loss of flow analysis in UFSAR Subsection 15.3.2.

A similar test is also performed as part of the RCS testing under the hot functional preoperational test conditions described in UFSAR 14.2.9.1.1. The preoperational test results are used to close the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) identified in Tier 1 Table 2.1.2-4, Item 8b (Combined License (COL) item Number 2.1.02.08b), using the coastdown curve acceptance criterion identified in Tier 1 Figure 2.1.2-2, and the test is reconfirmed during startup test conditions as identified above.

The License Amendment Request (LAR) in Enclosure 1 proposes a change to UFSAR Figure 15.3.2-1 which reflects the above discussed RCS flow coastdown curve. The LAR also proposes a change to the similar figure included in the plant-specific Tier 1

ITAAC Table 2.1.2-4, item 08b, referenced acceptance criterion as Figure 2.1.2-2. A change is proposed to this curve to reflect the revised coastdown curve and to revise the ITAAC-related RCP coastdown curve so that it is based upon the same conservative pump characteristics as those used in the safety analyses but scaled to the actual hot functional test conditions, i.e., hot zero power (HZP) conditions used for the preoperational testing. An exemption is required for the change to the Tier 1 figure.

### 3.0 Technical Justification of Acceptability

UFSAR Figure 15.3.2-1 reflects the expected results for RCS flow coastdown under safety analysis conditions. However, the plant-specific Tier 1 ITAAC-related Figure 2.1.2-2 should reflect the predicted results under hot functional test conditions. At the time of the AP1000 design certification, these two figures were identical.

Since the test conditions cannot fully reflect the safety analysis parameters, the predicted coastdown curve is adjusted from 100% power with a full power  $\Delta T$  to HZP and no-load temperature conditions for the curve that details the ITAAC-related hot functional test acceptance criterion for the RCS flow coastdown. This adjustment to the curve is used to update the plant-specific Tier 1 Figure 2.1.2-2 as part of this change activity.

The plant-specific Tier 1 Figure 2.1.2-2 (and the corresponding COL Appendix C figure) is based on the model used in the safety analysis, using the same conservative pump characteristics as those used to demonstrate that the safety limits are met; however, the ITAAC-related acceptance criterion curve should reflect hot functional test conditions at HZP as opposed to the conditions most limiting for the safety analysis, which are hot full power (HFP) conditions since the hot functional conditions are the conditions under which the test is to be conducted. The pump characteristics used in the safety analysis are to be validated with this test. However, the thermal-hydraulic conditions modeled need to be consistent with the test conditions to obtain an overall system response that correlates the pump characteristics to a coastdown curve at HZP conditions.

As previously discussed, the RCP coastdown curve in plant-specific Tier 1 Figure 2.1.2-2 is based on UFSAR Tier 2 Figure 15.3.2-1 in the current licensing basis, an artifact of AP1000 design certification. The basis for UFSAR Figure 15.3.2-1 is the complete loss of flow (CLOF) analysis documented in UFSAR Subsection 15.3.2 with four cold legs in operation and four RCPs coasting down.

Both figures account for RCP design changes that are incorporated into the revised CLOF analysis:

- i) for revised vendor-supplied RCP homologous curves,
- ii) for revised RCP fluid friction losses, and
- iii) for revised RCP flywheel ring material.

These changes do not represent a substantial change to the CLOF analysis and the results remain acceptable.

Additional details and technical justification supporting this request for exemption is provided in Sections 2 and 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 information to depart from the AP1000 certified (Tier 1) design information. The plant-specific Tier 1 information 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 the Tier 1 information. Therefore, the affected plant-specific Tier 1 information will continue to serve its required purpose.

The revised testing acceptance criterion reflected the expected pump coastdown curves at the pertinent test conditions and as such do not represent any adverse impact to the design function of the RCS which will continue to protect the health and safety of the public in the same manner. The revised acceptance criterion does not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor does it modify or remove any design, 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 Tier 1 information. The proposed exemption does not adversely 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 change is to revise the ITAAC-related RCS flow coastdown curve in plant-specific Tier 1 Figure 2.1.1-2 to reflect the pertinent test conditions rather than the conservative safety analysis conditions reflected in UFSAR Chapter 15.

The proposed changes do not adversely affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. The proposed changes do not involve nor interface with any SSC accident initiator or initiating sequence of events related to the accidents evaluated and therefore, do 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 have been determined to not adversely impact the design function of the SSCs, 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 Tier 1 information 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 Tier 1 information, 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 Tier 1 information by reflecting pertinent test conditions in the ITAAC-related RCS flow coastdown curve in Figure 2.1.1-2 rather than the conservative safety analysis conditions reflected in UFSAR Chapter 15. The revised test acceptance criterion does not impact the design requirements of the RCS. Because the SSC 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 activity 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 the 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 change to the plant-specific Tier 1 information is necessary to reflect the test appropriate acceptance criterion. The exemption request meets the requirements of 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**

**ND-18-1147**

**Enclosure 3**

**Vogtle Electric Generating Plant (VEGP) Units 3 and 4**

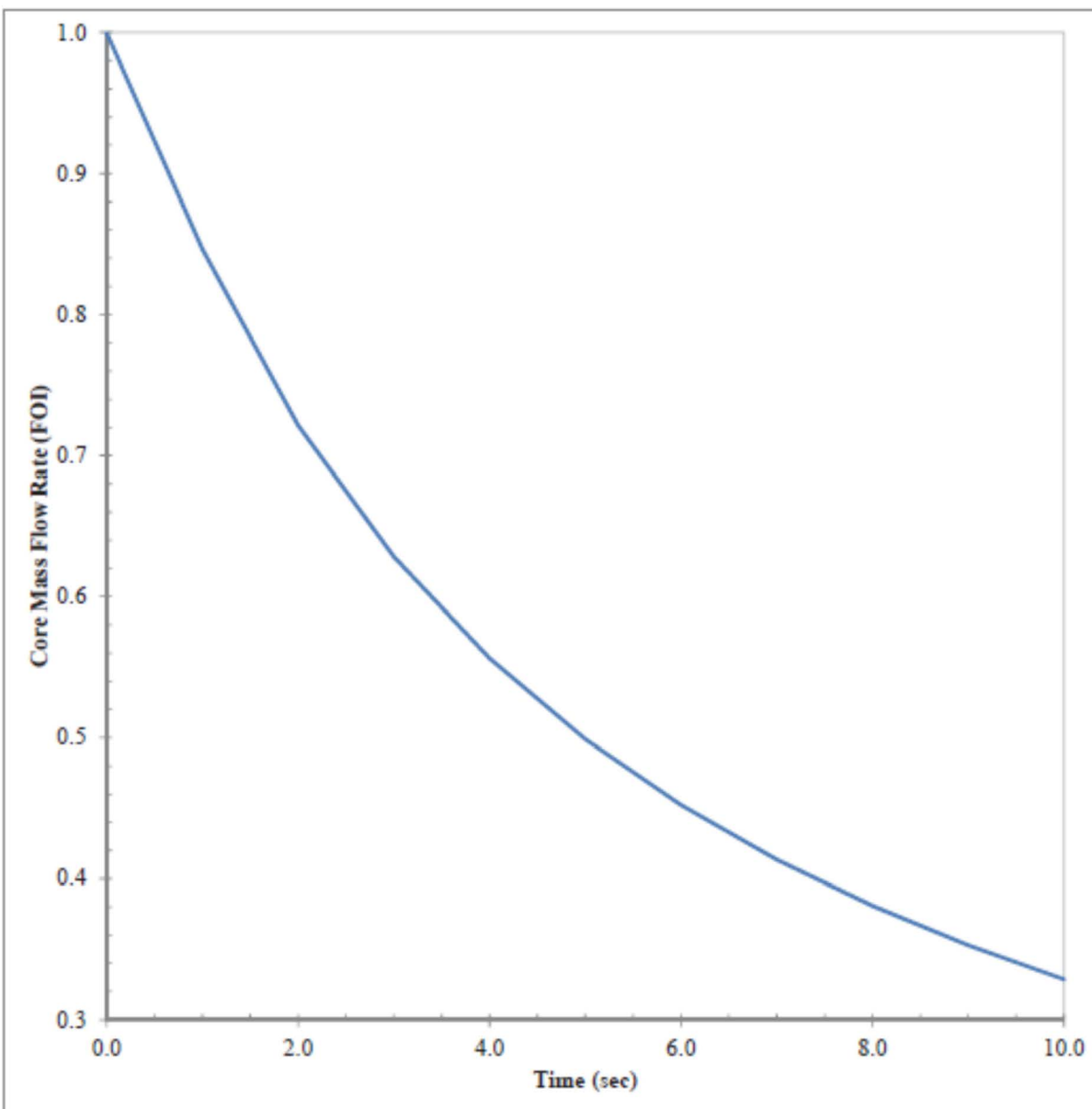
**Proposed Changes to Licensing Basis Documents**

**(LAR-18-025)**

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

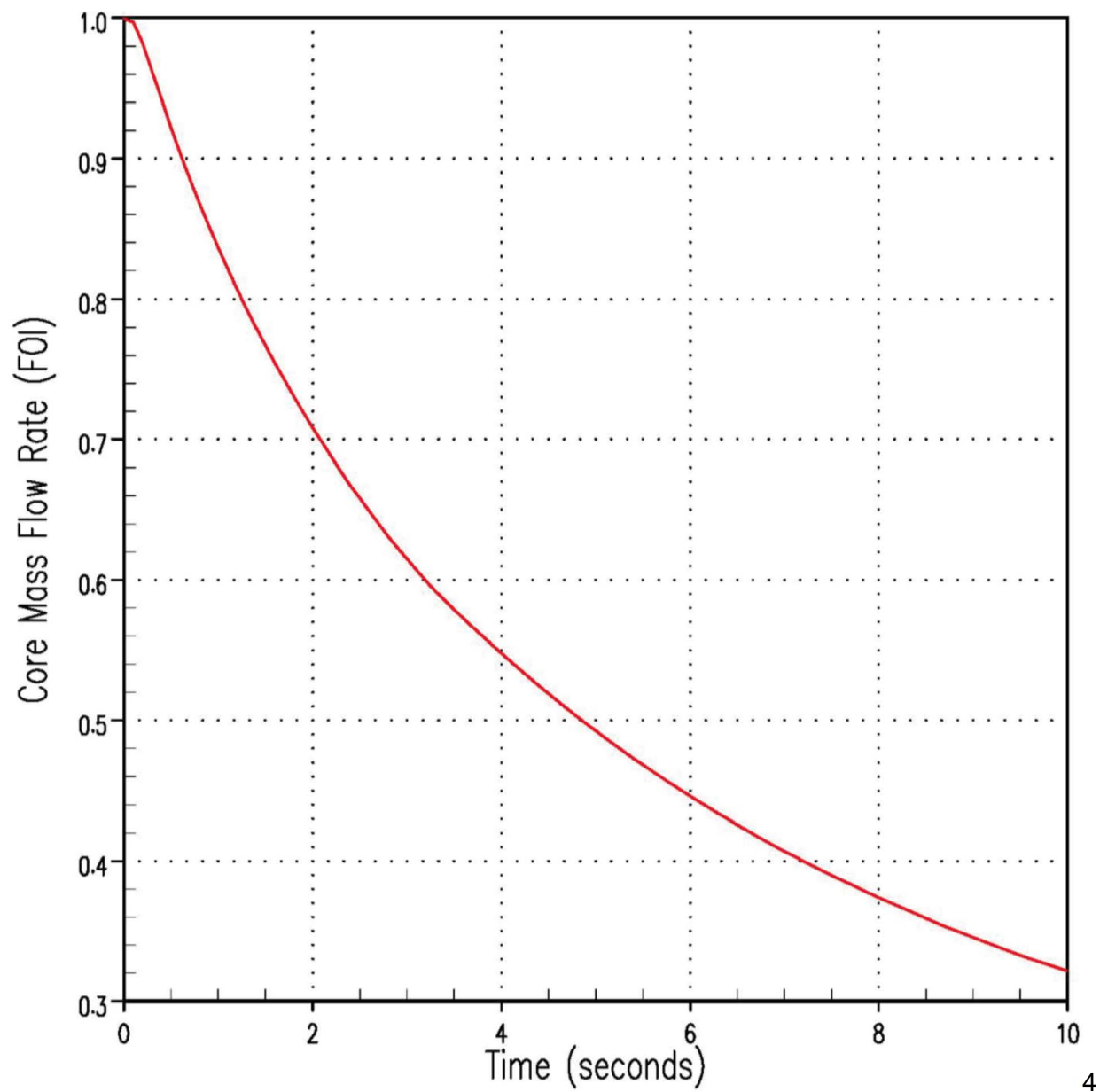


**Revise COL Appendix C Figure 2.1.2-2, Flow Transient for Four Cold Legs in Operation, Four Pumps Coasting Down, and corresponding plant-specific Tier 1 Figure 2.1.2-2, as shown below.**



Note: FOI = Fraction of Initial

**Revise UFSAR Figure 15.3.2-1, Core Mass Flow Transient for Four Cold Legs in Operation, Four Pumps Coasting Down, as shown below.**



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