Southern Nuclear Operating Company

ND-19-0947

Enclosure 3

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Exemption Request:

Removal of the Preoperational Passive Residual Heat Removal Heat Exchanger Natural Circulation Test (LAR-19-017)

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

1.0 Purpose

Southern Nuclear Operating Company (SNC, the Licensee) requests a permanent exemption from the provisions of 10 CFR Part 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 Part 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 an Inspections, Tests, Analysis and Acceptance Criteria (ITAAC) for the passive residual heat removal (PRHR) heat exchanger heat removal performance test.

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 Part 52, Appendix D, Section VIII.A.4 to allow a departure from generic Tier 1 information due to a proposed change which would revise ITAAC 2.2.03.08b.01 to require the heat removal performance test of the PRHR heat exchanger under forced flow conditions.

2.0 Background

As described in UFSAR Section 14.2, the objectives of the preoperational testing program include demonstrating that the plant has been constructed as designed and that the systems will perform consistent with the plant design. Preoperational testing of the Passive Core Cooling System (PXS) is described in UFSAR subsection 14.2.9.1.3. The purpose of this testing is to verify that the as-installed components and their associated piping and valves perform the safety functions described in UFSAR Section 6.3. One of these safety functions is emergency core decay heat removal.

The UFSAR currently requires three preoperational tests to verify the PXS emergency core decay heat removal function; the tests are described here in the order they appear in the UFSAR. During hot functional testing of the reactor coolant system (RCS), the temperature of the PRHR heat exchanger's supply and return lines will be recorded to verify that natural circulation flow will initiate. Secondly, the heat transfer capability of the PRHR heat exchanger will be verified by measuring the natural circulation flow rate and the heat exchanger inlet and outlet temperatures while the RCS is cooled to ≤ 420°F. This testing will be performed during hot functional testing with the RCS initial temperature ≥ 540°F and the reactor coolant pumps not running. Lastly, proper operation of the passive residual heat removal heat exchanger and its heat transfer capability will be verified by initiating and operating the heat exchanger with all four reactor coolant pumps running. This testing will be performed during hot functional testing with the RCS at an elevated initial temperature ≥ 350°F. The heat exchanger heat transfer rate will then be determined by measuring the heat exchanger flow rate and its inlet and outlet temperatures while the RCS is cooled to ≤ 250°F.

The second test described above, the PRHR heat exchanger heat removal performance testing, is also required by ITAAC 2.2.03.08b.01. This exemption request proposes to

replace the PRHR heat exchanger natural circulation test described in ITAAC 2.2.03.08b.01 with the PRHR heat exchanger natural circulation test.

3.0 Technical Justification of Acceptability

The proposed change to remove the preoperational PRHR heat exchanger natural circulation test from the ITP is not adverse as additional methods are available to demonstrate that the PRHR heat exchanger will perform its design and license bases functions. These methods include completion of ITAAC in COL Appendix C, Table 2.2.3-4, and completion of the preoperational tests described in UFSAR Subsection 14.2.9.1.3 Items (e) and (g). ITAAC related to the PRHR heat exchanger design requirements and the PXS design functionality will confirm that the design of the PRHR heat exchanger and PXS meets the AP1000 standard design as described in the UFSAR. The preoperational tests defined in UFSAR Subsection 14.2.9.1.3 Items (e) and (g) will confirm that the PRHR heat exchanger can remove heat by verifying natural circulation flow can initiate and by confirming proper operation and heat transfer capability of the heat exchanger during a forced flow test, respectively. The heat removal performance test of the PRHR heat exchanger under forced flow conditions will replace the PRHR heat exchanger natural circulation test in ITAAC 2.2.03.08b.01.

ITAAC in COL Appendix C, Table 2.2.3-4, require components in the PXS, including those involved in the PRHR heat exchanger testing and related structures, systems, and components (SSCs), to be evaluated prior to operation. The ITAAC include construction, design, and testing requirements. Completion of the ITAAC will verify that the PRHR heat exchanger and related PXS SSCs were installed at VEGP Units 3 and 4 according to the standard plant AP1000 design as described in the VEGP Units 3 and 4 UFSAR and that the PRHR heat exchanger will perform its safety-related design function.

UFSAR Subsection 14.2.9.1.3 Item (e) requires that the PRHR heat exchanger supply and return line piping water temperatures be recorded, during hot functional testing of the RCS, to verify that natural circulation flow can be initiated. This preoperational test will confirm that the PRHR heat exchanger can meet its design requirement to initiate natural circulation flow.

UFSAR Subsection 14.2.9.1.3 Item (g) requires that proper operation of the PRHR heat exchanger and its heat transfer capability be demonstrated by conducting a forced flow test. This preoperational test will confirm that the PRHR heat exchanger, as a component, meets its design requirement to transfer core-generated heat to the in-containment refueling water storage tank. The heat removal performance test of the PRHR heat exchanger under forced flow conditions will replace the PRHR heat exchanger natural circulation test in ITAAC 2.2.03.08b.01.

UFSAR Appendix 1A discusses conformance with US NRC Regulatory Guides. Regulatory Guide (RG) 1.68, *Initial Test Program for Water-Cooled Nuclear Power Plants*, describes the general scope and depth that the NRC considers acceptable for demonstrating compliance with NRC regulations as they pertain to the ITP; the AP1000 design has conformance statements for Revisions 2 and 3. The AP1000 design conformance statement for Appendix A.4.t of the RG discusses how the requirements are met, including; "... provisions to perform the pre-operational tests of the passive RHR heat exchanger..." The requirement and compliance statement will be met by the remaining PRHR heat exchanger preoperational tests. The physical aspects required to initiate natural circulation flow will be confirmed by the preoperational test described in UFSAR

Subsection 14.2.9.1.3 Item (e) and the heat transfer capability of the PRHR heat exchanger will be confirmed by the preoperational test described in UFSAR Section 14.2.9.1.3 Item (g).

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

4.0 Justification of Exemption

10 CFR Part 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. 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 Part 52, Appendix D, Section III.B would allow a change 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, 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 intended purpose.

The revision to the ITAAC on PRHR heat exchanger heat removal performance testing does not represent an adverse impact to the design functions supported by the equipment, or the associated systems, structures and components, and will continue to protect the

health and safety of the public in the same manner. The revision of the ITAAC 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 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 Part 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 Part 52, Appendix D, Section III.B would allow the licensee to depart from elements of the plant-specific 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 Part 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 purpose of ITAAC is to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provision of the Act, and the Commission's rules and regulations. The proposed exemption would revise the ITAAC on PRHR heat exchanger heat removal performance testing. The proposed revision does not change the design functions of the associated systems and components as described in the licensing basis documents. Accordingly, this exemption from the certification information enables the Licensee to safely construct and operate the facility consistent with the design certified by the NRC in 10 CFR Part 52, Appendix D. Moreover, other ITAAC and the proposed ITAAC will provide reasonable assurance that the facility

has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission's rules and regulations.

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 change to the plant-specific Tier 1 information and the understanding that the change supports the design function of the supported equipment, 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 equipment 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 by revising ITAAC on PRHR heat exchanger heat removal performance testing. The revision does not change the design requirements of the associated equipment and the other ITAAC and proposed ITAAC will provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission's rules and regulations. Because these functions continue to be met and verified, 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 Part 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 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 Tier 1 is necessary to revise ITAAC on PRHR heat exchanger heat removal performance testing. 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 Part 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 decrease in the level of safety, satisfies the underlying purpose of the AP1000 Design Certification Rule, and does not present a decrease in safety as a result of a reduction in standardization.

9.0 References

None