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SOUTHERN NUCLEAR
A SOUTHERN COMPANY

May 5, 2016

Docket Nos.: 52-025
52-026

ND-16-0328
10 CFR 50.90
10 CFR 52.63

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

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Request for License Amendment and Exemption:
Passive Core Cooling System (PXS) Design Changes to Address Potential Gas Intrusion
(LAR-16-004)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC), the licensee for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, requests an amendment to Combined License (COL) Numbers NPF-91 and NPF-92, for VEGP Units 3 and 4, respectively. The requested amendment requires changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the incorporated plant-specific Design Control Document (PS-DCD) Tier 2 information, and involves changes to related 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 the passive core cooling system (PXS), the normal residual heat removal system (RNS) and containment air filtration system (VFS) piping layout and routing design information. Enclosure 1 provides the description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration determination), and environmental considerations for the proposed changes in the License Amendment Request (LAR). Enclosure 2 provides the background and supporting basis for the requested exemption. Enclosure 3 identifies the requested changes and provides markups depicting the requested changes to the PS-DCD Tier 1, COL Appendix C, and Tier 2 figures and tables.

This letter contains no regulatory commitments.

SNC requests staff approval of this license amendment and exemption by September 13, 2016 to support installation of piping and closure of the Inspection, Tests, Analyses and Acceptance Criteria (ITAAC) related to the piping layouts. Delayed approval of this licensing request could result in delay of the associated construction activity and subsequent dependent construction activities. SNC expects to implement the proposed amendment (through incorporation into the licensing basis documents; e.g., the UFSAR, Tier 1, and COL Appendix C) within 30 days of the approval of the requested changes.

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

Should you have any questions, please contact Mr. Jason Redd at (205) 992-6435.

Mr. Brian H. Whitley states that: he is the Regulatory Affairs Director of Southern Nuclear Operating Company; he is authorized to execute this oath on behalf of Southern Nuclear Operating Company; and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Brian H. Whitley

BHW/WES/ljs

Sworn to and subscribed before me this 5th *day of* May, *2016*

Notary Public: Lisa Myrick Spears

My commission expires: June 18, 2019

Enclosures: 1) License Amendment Request; Passive Core Cooling System (PXS) Design Changes to Address Potential Gas Intrusion (LAR-16-004)
2) Exemption Request for Passive Core Cooling System (PXS) Design Changes to Address Potential Gas Intrusion (LAR-16-004)
3) Proposed Changes to Licensing Basis Documents (LAR-16-004)

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Southern Nuclear Operating Company

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

ND-16-0328

Enclosure 1

License Amendment Request

Passive Core Cooling System (PXS) Design Changes to Address Potential Gas Intrusion (LAR-16-004)

(This Enclosure contains 18 pages, including this cover)

Table of Contents

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 revise the Combined Licenses (COLs) concerning the design details of the safety-related passive core cooling system (PXS), the nonsafety-related normal residual heat removal system (RNS), and the nonsafety-related containment air filtration system (VFS).

Completion of PXS piping layout and routing during design finalization, and completion of the as-designed piping analysis and leak-before-break (LBB) evaluation to meet the LBB design criteria described in Updated Final Safety Analysis Report (UFSAR) Subsection 3.6.3.2, resulted in changes to UFSAR Appendices 3B and 3E including UFSAR Table 3B-1, Figure 3B-14, Figure 3B-15, and Figure 3E-4 Sheet 2, and associated changes to COL Appendix C (and plant-specific Design Control Document (DCD) Tier 1) Table 2.2.3-2, involving PXS piping lines PXS-L123A, PXS-L123B, PXS-L125A, PXS-L125B, PXS-L133A, PXS-133B, PXS-L134A, PXS-L134B, PXS-L019A, and PXS-L019B. In addition, changes to COL Appendix C (and plant-specific DCD Tier 1) information were identified during design finalization to Table 2.3.6-2 for RNS piping lines RNS-L019A and RNS-L019B, and to Table 2.2.1-2 for VFS piping line VFS-L832.

The requested amendment requires changes to the UFSAR in the form of departures from the plant-specific DCD Tier 2 information (as detailed in Section 2), and involves changes to related plant-specific DCD Tier 1 information, with corresponding changes to the associated COL Appendix C information. This enclosure requests approval of the license amendment necessary to implement the Tier 2 and COL Appendix C changes. Another enclosure requests the exemption necessary to implement the involved changes to the plant-specific DCD Tier 1 information.

2. Detailed Description and Technical Evaluation

COL Appendix C and plant-specific DCD Tier 1 include tables with listings of piping with their respective line numbers and associated attributes that are part of the piping design. The design characteristics are required to be verified by Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). During detailed design and design review, piping line and piping line attribute changes were identified that necessitate changes to COL Appendix C (and plant-specific DCD Tier 1) Tables 2.2.3-2, 2.3.6-2, and 2.2.1-2.

2.1 Addition of LBB Evaluation for PXS Piping Lines

As described in COL Appendix C and plant-specific DCD Tier 1 Subsection 2.2.3 and further described in UFSAR Section 6.3, the safety-related PXS provides emergency core cooling during design basis events. The PXS provides the following safety-related design functions:

1. The PXS provides containment isolation of the PXS piping lines penetrating the containment;

2. The passive residual heat removal (PRHR) heat exchanger provides core decay heat removal during design basis events;
3. The core makeup tanks (CMTs), accumulators, in-containment refueling water storage tank (IRWST), and containment recirculation provide reactor coolant system (RCS) makeup, boration, and safety injection during design basis events; and
4. The PXS provides pH adjustment of water flooding the containment following design basis accidents.

The PXS provides the following applicable nonsafety-related design functions:

1. The PXS is designed to be sufficiently reliable to support the probabilistic risk analysis goals for core damage frequency (CDF) and large release frequency (LRF). In assessing the reliability for probabilistic risk analysis purposes, more realistic analysis is used for both the PXS performance and for plant response.
2. In the event of a small loss of coolant accident, the PXS limits the increase in peak clad temperature and core uncovery within design basis assumptions. For pipe ruptures of less than eight-inch nominal diameter size, the PXS is designed to prevent core uncovery with best estimate assumptions.
3. The PRHR heat exchanger and the IRWST are designed to delay significant steam release to the containment for at least one hour.
4. The PXS is capable of supporting the required testing and maintenance, including capabilities to isolate and drain equipment.

UFSAR Subsection 3.6.3 describes the application of LBB design criteria to permit the elimination of pipe rupture dynamic effects considerations for PXS piping lines. Design guidelines aid in the design of piping systems that satisfy the requirements for mechanistic pipe break, with the required design criteria described in UFSAR Subsection 3.6.3.2. Dynamic effects of postulated breaks are evaluated for analyzable sections of high-energy piping systems that do not use the mechanistic pipe break methods. Mechanistic pipe break evaluations demonstrate that for piping lines meeting the criteria, sudden catastrophic failure of the pipe is not credible. It is demonstrated that piping that satisfies the criteria leaks at a detectable rate from postulated flaws prior to growth of the flaw to a size that would fail. The evaluation considers applied loads resulting from normal conditions, anticipated transients, and a postulated safe shutdown earthquake (SSE). Evaluations of the mechanistic pipe break criteria are commonly called LBB evaluations.

UFSAR Table 3.6-1 lists the PXS as a high-energy fluid system considered for protection of essential systems, and UFSAR Table 3.6-2 lists the postulated pipe ruptures and the subcompartments that contain the PXS piping lines evaluated for LBB. The LBB bounding analysis curves are developed for each applicable piping system.

The LBB bounding analysis methods and curves are described in UFSAR Appendix 3B. These curves give the design guidance to satisfy the stress limits and LBB acceptance criteria. The highest stressed point (critical location) determined from the piping stress analysis is compared to the bounding analysis curve. The points on or under the bounding analysis curve satisfy the requirements for LBB.

COL Appendix C and plant-specific DCD Tier 1 Table 2.2.3-2 identify the PXS piping lines required to be: 1) designed and constructed in accordance with ASME Code Section III requirements, 2) evaluated to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2, and 3) designed to withstand combined normal and seismic design basis loads without a loss of functional capability.

UFSAR Table 3B-1 provides the LBB bounding analysis systems and parameters, including the PXS piping line numbers and material, temperature, and pressure parameters considered in the LBB analysis, and UFSAR Figures 3B-14, 3B-15, and 3B-18 show the LBB bounding analysis stress curves for the PXS piping lines applicable to this activity.

High-energy ASME Code Section III piping evaluated to the LBB design criteria described in UFSAR Subsection 3.6.3.2 is identified in UFSAR Appendix 3E. UFSAR Figure 3E-4 identifies the PXS piping lines evaluated.

The PXS injection lines include design features to address the potential gas accumulation and intrusion mechanisms discussed in NRC Generic Letter (GL) 2008-01(Reference 1). In the AP1000 design, the PXS relies upon passive methods such as gravity driven injection and thermodynamics to inject core makeup and borated water and cool the core in the event of an accident. Consequently, gas voids in the injection lines potentially affect safety injection performance by altering the pressure differentials that allow the passive methods of the system to operate. Thus, the design of the safety injection lines from the IRWST, accumulators, and CMTs, and the containment sump recirculation to IRWST lines, were evaluated for the potential of gas accumulation in each of those lines that could stop the safety system from operating properly and delay injection. This evaluation determined the PXS design should include four pipe stubs with maintenance vents and associated valves with lines routing to tee into the CMT vent line that is then routed to the reactor coolant drain tank (RCDT), with remote pipe stub gas void indications, at the outlets of each of the IRWST passive injection squib valves.

Completion of PXS piping layout and routing during design finalization for the pipe stubs at the outlets of each of the IRWST passive injection squib valves, and completion of the as-designed piping analysis and LBB evaluation to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2, resulted in changes to UFSAR Appendices 3B and 3E including UFSAR Table 3B-1, Figure 3B-14, Figure 3B-15, and Figure 3E-4 Sheet 2, and the following changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2:

1. PXS piping line PXS-L123A is moved to the line numbers evaluated for LBB under line name IRWST injection line A to direct vessel injection (DVI) line A;
2. PXS piping line PXS-L123B is moved to the line numbers evaluated for LBB under line name IRWST injection line B to DVI line B;
3. PXS piping lines PXS-L133A and PXS-L134A are added under the line name IRWST injection line A to DVI line A as ASME Code Section III, evaluated for LBB, and not requiring functional capability; and
4. PXS piping lines PXS-L133B and PXS-L134B are added under the line name IRWST injection line B to DVI line B as ASME Code Section III, evaluated for LBB, and not requiring functional capability.

The design of the pipe stubs at the outlets of each of the IRWST passive injection squib valves includes branch tees to 8-inch nominal PXS piping lines PXS-L123A, PXS-L123B, PXS-L125A, and PXS-L125B with 8-inch nominal vertical vent lines PXS-L133A, PXS-L133B, PXS-L134A, and PXS-L134B containing redundant nonsafety-related void sensing instrumentation. The vent is connected through 3/8-inch orifices and manual maintenance valves to lines that tee into the CMT vent line routed to the RCDT. Because of the importance of detecting gas voids to the passive safety injection process in the event a maintenance venting error would occur, the pipe stub configuration was added as a continuous indication of the operability of the IRWST injection lines.

During design finalization, the piping layout and routing of the 8-inch nominal PXS piping lines PXS-L123A, PXS-L123B, PXS-L125A, PXS-L125B and the 8-inch nominal branch tees with 8-inch nominal vertical vent lines PXS-L133A, PXS-L133B, PXS-L134A, and PXS-L134B were determined, and the as-designed piping analysis and LBB evaluation were completed. These design activities determined that the 8-inch nominal PXS piping lines PXS-L123A, PXS-L123B, PXS-L125A, and PXS-L125B are required during IRWST injection as the primary PXS flowpath during low pressure IRWST injection. Therefore, these piping lines are required to maintain functional capability during normal and SSE loads. However, the 8-inch nominal vertical vent lines PXS-L133A, PXS-L133B, PXS-L134A, and PXS-L134B are not required during injection, as their design function provides adequate venting of the system prior to injection being initiated.

Because PXS piping lines PXS-L123A, PXS-L123B, PXS-L125A, PXS-L125B, PXS-L133A, PXS-L133B, PXS-L134A, and PXS-L134B are in the pressure boundary of the IRWST injection flowpath, they were evaluated and determined to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2 to permit the elimination of pipe rupture dynamic effects considerations. Therefore, these piping lines meet the requirements of 10 CFR 50 Appendix A General Design Criteria (GDC) 4 without consideration of the effects of a postulated piping rupture. It is demonstrated that piping that satisfies the criteria leaks at a detectable rate from postulated flaws prior to growth of the flaw to a size that would fail. The evaluation considers applied loads resulting from normal conditions, anticipated transients, and a postulated SSE.

2.2 Addition of Functional Capability Requirement and Clarification of Boundary for PXS Piping Lines

Completion of PXS piping layout and routing during design finalization, and completion of the as-designed piping analysis and LBB evaluation to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2, resulted in changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2 to delete PXS piping lines PXS-L019A and PXS-L019B from their current rows, and to clarify the boundary of the piping system included in those piping lines by adding as new rows with line names “RNS A discharge line to PXS from RNS check valve RNS-PL-V017A to DVI line A” and “RNS B discharge line to PXS from RNS check valve RNS-PL-V017B to DVI line B,” respectively. In addition, these piping lines are used during long-term core cooling as the flow path for long-term, post-accident makeup to the RCS through the PXS. Therefore, these piping lines are required to be identified as requiring functional capability during normal and SSE loads, resulting in changing COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2 to identify PXS piping lines PXS-L019A and PXS-L019B as requiring functional capability.

Because PXS piping lines PXS-L019A and PXS-L019B are in the pressure boundary of the long-term core cooling injection flowpath, they were evaluated and determined to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2 to permit the elimination of pipe rupture dynamic effects considerations. Therefore, these piping lines meet the requirements of 10 CFR 50 Appendix A GDC 4 without consideration of the effects of a postulated piping rupture. It is demonstrated that piping that satisfies the criteria leaks at a detectable rate from postulated flaws prior to growth of the flaw to a size that would fail. The evaluation considers applied loads resulting from normal conditions, anticipated transients, and a postulated SSE.

The proposed changes to the PXS continue to meet the same regulatory acceptance criteria, codes, and industry standards specified in the UFSAR. The proposed changes comply with the requirements of GDC 4 as stated in the UFSAR.

Based on the above, the proposed changes do not affect any of the PXS safety-related or nonsafety-related design functions described in the UFSAR.

The piping layout and routing determined during design finalization, and completion of the as-designed piping analysis and LBB evaluation for the applicable PXS piping lines, result in proposed changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2, which identify whether the PXS piping lines are designed in accordance with ASME Code Section III, are evaluated and determined to meet LBB design criteria described in UFSAR Subsection 3.6.3.2 for the elimination of consideration of the dynamic effects of piping rupture, and are determined to be required to be designed to withstand combined normal and seismic design basis loads without a loss of their functional capability. The ITAAC in COL Appendix C and plant-specific DCD Tier 1 Table 2.2.3-4 continue to confirm the Structures, Systems, and Components (SSCs) related to this activity are constructed in accordance with the design certification. The proposed changes to the design information presented in COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2 are at a level of detail consistent with the other information currently presented. As previously stated, the proposed changes do not adversely affect the ability to meet the design functions of the PXS, and do not involve a significant decrease in the level of safety provided by the PXS. Therefore, the proposed changes to information provided in the COL Appendix C (and plant-specific DCD Tier 1) Section 2.2.3 Design Description tables continue to meet the UFSAR Section 14.3 Certified Design Material (CDM) criteria and provide the detail necessary to implement the corresponding ITAAC that address these tables.

2.3 Clarification of Boundary for RNS Piping Lines

As described in COL Appendix C and Plant-Specific DCD Tier 1 Subsection 2.3.6, and further described in UFSAR Subsection 5.4.7, the nonsafety-related RNS removes heat from the core and RCS, and provides RCS low temperature over-pressure (LTOP) protection at reduced RCS pressure and temperature conditions after shutdown. The RNS also provides a means for cooling the IRWST during normal plant operation.

The RNS provides the following safety-related design functions:

1. The RNS preserves containment integrity by isolation of the RNS piping lines penetrating the containment.
2. The RNS provides a flow path for long-term, post-accident makeup to the RCS through the PXS.

COL Appendix C and Plant-Specific DCD Tier 1 Table 2.3.6-2 identify RNS piping lines required to be: 1) designed and constructed in accordance with ASME Code Section III requirements, 2) evaluated to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2, and 3) designed to withstand combined normal and seismic design basis loads without a loss of functional capability.

Completion of RNS and PXS piping layout and routing during design finalization, and completion of the as-designed piping analysis and LBB evaluation to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2, resulted in changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.3.6-2 to clarify the boundary of the piping system included in those piping lines by changing the line names to “RNS Discharge Lines, from RCS Pressure Boundary Isolation Valves RNS-PL-V015A and RNS-PL-V015B to RCS Pressure Boundary Isolation Valves RNS-PL-V017A and RNS-PL-V017B.” In addition, COL Appendix C (and plant-specific DCD Tier 1) Table 2.3.6-2 is revised to remove PXS piping lines PXS-L019A and PXS-L019B, as these piping lines are addressed in the changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2 discussed previously.

RNS-L019A and RNS-L019B are piping lines located between outboard reactor coolant pressure boundary valves RNS-PL-V015A and RNS-PL-V015B and inboard reactor coolant pressure boundary valves RNS-PL-V017A and RNS-PL-V017B, respectively. These piping lines are used during long-term core cooling as the flow path for long-term, post-accident makeup to the RCS through the PXS. The change in the description of the RNS piping lines reflects that the piping lines do not continue beyond valves RNS-PL-V017A and RNS-PL-V017B as RNS piping lines to the respective RCS DVI lines, where the piping designation changes to PXS. There is no change proposed to the LBB evaluation or functional capability requirements for these piping lines.

Based on the above, the proposed changes do not affect any of the RNS safety-related or nonsafety-related design functions described in the UFSAR.

Because the change is only to clarify the description of RNS piping lines RNS-L019A and RNS-L019B in COL Appendix C (and plant-specific DCD Tier 1) Table 2.3.6-2 and not to add them, there is no impact to the ITAAC in COL Appendix C and plant-specific DCD Tier 1 Table 2.3.6-4. Therefore, the proposed changes to information provided in the COL Appendix C (and plant-specific DCD Tier 1) Section 2.3.6 Design Description tables continue to meet the UFSAR Section 14.3 CDM criteria and provide the detail necessary to implement the corresponding ITAAC that address these tables.

2.4 Clarification of ASME Code Section III Requirements for VFS Piping Lines

As described in COL Appendix C and Plant-Specific DCD Tier 1 Subsection 2.7.6, and further described in UFSAR Subsection 9.4.7, the nonsafety-related VFS provides intermittent flow of outdoor air to purge and filter the containment atmosphere of airborne radioactivity during normal plant operation, and continuous flow during hot or cold plant shutdown conditions to reduce airborne radioactivity levels for personnel access. The VFS can also provide filtered exhaust for the radiologically controlled area ventilation system (VAS) during abnormal conditions.

The VFS provides the safety-related design functions of preserving containment integrity by isolation of the VFS piping lines penetrating containment and providing vacuum relief for the containment vessel. The containment system (CNS) is the collection of boundaries that separates the containment atmosphere from the outside environment during design basis

accidents. The VFS piping lines penetrating containment between the containment isolation valves both inside and outside containment are included in the CNS penetration boundary.

COL Appendix C and Plant-Specific DCD Tier 1 Table 2.2.1-2 identify the VFS piping lines that are a part of the CNS required to be designed and constructed in accordance with ASME Code Section III requirements.

Completion of VFS piping layout and routing during design finalization resulted in changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.1-2 to add VFS piping line VFS-L832 under line name Containment Purge Discharge from Containment, to identify the piping line as ASME Code Section III as it is part of the CNS penetration boundary.

VFS-L832 is a piping line located between the containment purge exhaust containment penetration and the parallel outside containment isolation valve VFS-PL-V010 and outside containment vacuum relief valves VFS-PL-V800A and VFS-PL-V800B. VFS-L832 is part of the CNS penetration boundary. This change reflects a current piping line in the VFS.

Based on the above, the proposed changes do not affect any of the VFS safety-related or nonsafety-related design functions described in the UFSAR.

Because the change is only to add the existing VFS piping line VFS-L832 to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.1-2, the change provides completeness of the scope for the ITAAC in COL Appendix C and plant-specific DCD Tier 1 Table 2.2.1-3. Therefore, the proposed changes to information provided in the COL Appendix C (and plant-specific DCD Tier 1) Section 2.2.1 Design Description tables continue to meet the UFSAR Section 14.3 CDM criteria and provide the detail necessary to implement the corresponding ITAAC that address these tables.

Technical Evaluation of Other Impacts

The proposed changes do not require a change to procedures or method of control that adversely affects the performance of the PXS, RNS, VFS, or CNS safety-related and nonsafety-related design functions as described in the UFSAR. The piping layout or routing determined during design finalization, and completion of the as-designed piping analysis and LBB evaluation for the piping lines where applicable, does not change the design functions or operations of the affected systems, and thus there are no changes to procedures or method of control required to address the proposed changes to the licensing basis. The proposed changes maintain the design functions of the IRWST injection to the reactor vessel following DBAs; long-term, post-accident makeup to the RCS through the PXS; and containment isolation for the VFS and CNS.

An impact review determined these proposed changes do not affect or require any change to the AP1000 Probabilistic Risk Assessment (PRA) presented in UFSAR Chapter 19, including the Fire PRA, results and insights (e.g., CDF and LRF). The piping layout or routing determined during design finalization, and completion of the as-designed piping analysis and LBB evaluation for the piping lines where applicable, does not change the design functions of the affected systems, and thus there are no changes to the AP1000 PRA required to address the proposed changes to the licensing basis. The proposed changes maintain the design functions of the IRWST injection to the reactor vessel following DBAs; long-term, post-accident makeup to the RCS through the PXS; and containment isolation for the VFS and CNS. There are no new postulated failures of the PXS, RNS, VFS, or CNS required in the PRA model. Therefore, there are no changes required to initiating event

frequencies and system logic models of the PRA. The existing PRA risk significance investment protection determination for the PXS, RNS, VFS, or CNS is not affected.

There are no fire area changes required because of these proposed changes. The proposed changes do not result in changes to fire loading as no combustible materials were added or affected. The piping layout or routing determined during design finalization, and completion of the as-designed piping analysis and LBB evaluation for the piping lines where applicable, does not change the design functions or operations of the affected systems, and thus there are no changes required to the fire protection analysis in UFSAR Appendix 9A.

There are no radiation zone changes required because of these proposed changes. The proposed changes do not result in additional sources of radiation or changes to assumed radiation shielding inside or outside containment where the affected PXS, RNS, and VFS piping lines are located. Therefore, there are no changes to the AP1000 evaluation of radiation zones required to address the proposed changes to the licensing basis. The proposed changes do not affect plant radiation zones, controls under 10 CFR 20, and expected amounts and types of radioactive materials. Therefore, individual and cumulative radiation exposures do not change.

There is no change to the risk-significant designation of SSCs within the Design Reliability Assurance Program (D-RAP) as described in UFSAR Table17.4-1, as the affected PXS, RNS, and VFS piping lines are not modified such that a change is required to the SSCs identified as risk-significant. The affected PXS, RNS, and VFS piping lines are not modified such that a Defense-in-Depth (DID) (Investment Protection) function is adversely affected.

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 non-radioactive material effluents are not affected.

Licensing Basis Change Descriptions

The following licensing basis changes are proposed:

1. As a result of these changes, the UFSAR is revised as follows:
   a) UFSAR Table 3B-1 is revised to:
      - Move PXS piping lines PXS-L125A and PXS-L125B from the Direct Vessel Injection Line to RV subsystem row to the Core Makeup Tank (Injection Line, RV Side of Isolation Valve, Core Makeup Tank Side of Isolation Valve), Direct Vessel Injection (Accumulator Connection to Cold Trap), IRWST Injection subsystem row; and
      - Add PXS piping lines PXS-L123A, PXS-L123B, PXS-L133A, PXS-L133B, PXS-L134A, and PXS-L134B to the Core Makeup Tank (Injection Line, RV Side of Isolation Valve, Core Makeup Tank Side of Isolation Valve), Direct Vessel Injection (Accumulator Connection to Cold Trap), IRWST Injection subsystem row.
   b) UFSAR Figures 3B-14 and 3B-15 are revised to:
      - Move PXS piping lines PXS-L125A and PXS-L125B from Figure 3B-14 to Figure 3B-15; and

- Add PXS piping lines PXS-L123A, PXS-L123B, PXS-L133A, PXS-L133B, PXS-L134A, and PXS-L134B to Figure 3B-15.

c) UFSAR Figure 3E-4 Sheet 2 is revised to:

- Add PXS piping lines PXS-L133A, PXS-L133B, PXS-L134A, and PXS-L134B as ASME Code Section III piping that are candidates for LBB evaluation; and
- Add PXS piping lines PXS-L123A and PXS-L123B downstream of valves PXS-V123A and PXS-V123B respectively as ASME Code Section III piping that are candidates for LBB evaluation.

2. COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2 is revised to:

   a) Move PXS piping line PXS-L123A to the line numbers evaluated for LBB under line name IRWST injection line A to DVI line A;

   b) Move PXS piping line PXS-L123B to the line numbers evaluated for LBB under line name IRWST injection line B to DVI line B;

   c) Add piping lines PXS-L133A and PXS-L134A under the line name IRWST injection line A to DVI line A as ASME Code Section III, evaluated for LBB and not requiring functional capability; and

   d) Add PXS piping lines PXS-L133B and PXS-L134B under the line name IRWST injection line B to DVI line B as ASME Code Section III, evaluated for LBB, and not requiring functional capability.

3. COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2 is revised to delete PXS piping lines PXS-L019A and PXS-L019B from their current rows, and to add as new rows with line names “RNS A discharge line to PXS from RNS check valve RNS-PL-V017A to DVI line A” and “RNS B discharge line to PXS from RNS check valve RNS-PL-V017B to DVI line B,” respectively. In addition, PXS piping lines PXS-L019A and PXS-L019B are revised to Yes for functional capability and continue to have requirements for ASME Code Section III and evaluated for LBB..
4. COL Appendix C (and plant-specific DCD Tier 1) Table 2.3.6-2 is revised to change the line name of RNS piping lines RNS-L019A and RNS-L019B to “RNS Discharge Lines, from RCS Pressure Boundary Isolation Valves RNS-PL-V015A and RNS-PL-V015B to RCS Pressure Boundary Isolation Valves RNS-PL-V017A and RNS-PL-V017B.” In addition, PXS piping lines PXS-L019A and PXS-L019B are removed from COL Appendix C and plant-specific DCD Tier 1 Table 2.3.6-2.
5. COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.1-2 is revised to add VFS piping line VFS-L832 under line name Containment Purge Discharge from Containment, to identify the piping line as ASME Code Section III piping.

Summary

Design finalization for PXS piping lines which are design features to address the potential gas accumulation and intrusion mechanisms discussed in NRC GL 2008-01, and design finalization for the PXS piping lines from the RNS to the RCS DVI lines, results in proposed changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.3-2. The proposed changes maintain and update the necessary information in the table to ensure the SSCs related to this activity are constructed in accordance with the design certification as verified by COL Appendix C and plant-specific DCD Tier 1 Table 2.2.3-4 ITAAC.

Design finalization for RNS piping lines results in proposed changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.3.6-2. The proposed changes maintain and update the necessary information in the table to ensure the SSCs related to this activity are constructed in accordance with the design certification as verified by COL Appendix C and plant-specific DCD Tier 1 Table 2.3.6-4 ITAAC.

Design finalization for VFS piping lines and CNS results in proposed changes to COL Appendix C (and plant-specific DCD Tier 1) Table 2.2.1-2. The proposed changes maintain and update the necessary information in the table to ensure the SSCs related to this activity are constructed in accordance with the design certification as verified by COL Appendix C and plant-specific DCD Tier 1 Table 2.2.1-3 ITAAC.

Although there are COL Appendix C (and plant-specific DCD Tier 1) changes, the resulting reduction in standardization caused by these changes does not cause a decrease in safety.

The proposed changes do not adversely affect any safety-related equipment or function, design function, radioactive material barrier or safety analysis.

3. Technical Evaluation (Incorporated into Section 2, above)

4. Regulatory Evaluation

4.1. Applicable Regulatory Requirements/Criteria

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 this section. This license amendment request proposes changes to the UFSAR. These changes involve revision to COL Appendix C (and plant-specific DCD Tier 1) information, and thus require NRC approval for the Tier 1 and involved Tier 2 departures.

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. This activity involves a change to COL Appendix C (and plant-specific DCD Tier 1). Therefore, NRC approval is required prior to making the plant-specific proposed changes in this license amendment request.

10 CFR 50 Appendix A, General Design Criteria 4, *Environmental and dynamic effects design bases*, states: "Structures, systems, and components important to safety shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping." The affected PXS and RNS piping lines were evaluated, and meet the LBB criteria described in the UFSAR Subsection 3.6.3.2. Therefore, protection from the dynamic effects of a postulated piping rupture is not required, and thus this criterion remains satisfied.

10 CFR 50 Appendix A, General Design Criteria 16, *Containment design*, states: "Reactor containment and associated systems shall be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require." The proposed changes to the VFS piping lines that are a part of the CNS maintain the capability to establish an essentially leak-tight barrier in compliance with regulatory requirements, thus this criterion remains satisfied.

10 CFR 50 Appendix A, General Design Criteria 35, *Emergency core cooling*, states: "A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts." The proposed changes to the PXS and RNS piping lines maintain the safety-related and nonsafety-related design functions of the PXS and RNS, including providing adequate core cooling to ensure that regulatory requirements are met, thus this criterion remains satisfied.

10 CFR 50 Appendix A, General Design Criteria 36, *Inspection of emergency core cooling system*, states: "The emergency core cooling system shall be designed to permit appropriate periodic inspection of important components, such as spray rings in the reactor pressure vessel, water injection nozzles, and piping, to assure the integrity and capability of the system." The proposed changes to the PXS and RNS piping lines maintain the capability to inspect the affected piping in compliance with regulatory requirements, thus this criterion remains satisfied.

10 CFR 50 Appendix A, General Design Criteria 37, *Testing of emergency core cooling system*, states: "The emergency core cooling system shall be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system." The proposed changes to the PXS and RNS piping lines maintain the capability to test the affected piping in compliance with regulatory requirements, thus this

criterion remains satisfied.

10 CFR 50 Appendix A, General Design Criteria 50, *Containment design basis*, states: "The reactor containment structure, including access openings, penetrations, and the containment heat removal system shall be designed so that the containment structure and its internal compartments can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any loss-of-coolant accident. This margin shall reflect consideration of (1) the effects of potential energy sources which have not been included in the determination of the peak conditions, such as energy in steam generators and as required by § 50.44 energy from metal-water and other chemical reactions that may result from degradation but not total failure of emergency core cooling functioning, (2) the limited experience and experimental data available for defining accident phenomena and containment responses, and (3) the conservatism of the calculational model and input parameters." The proposed changes to the VFS piping lines that are a part of the CNS maintain the capability of the design so that the containment structure can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any loss-of-coolant accident in compliance with regulatory requirements, thus this criterion remains satisfied.

10 CFR 50 Appendix A, General Design Criteria 54, *Piping systems penetrating containment*, states: "Piping systems penetrating primary reactor containment shall be provided with leak detection, isolation, and containment capabilities having redundancy, reliability, and performance capabilities which reflect the importance to safety of isolating these piping systems. Such piping systems shall be designed with a capability to test periodically the operability of the isolation valves and associated apparatus and to determine if valve leakage is within acceptable limits." The proposed changes to the VFS piping lines that are a part of the CNS maintain the requirements for leak detection, isolation, and containment capabilities having redundancy, reliability, and performance capabilities which reflect the importance to safety of isolating these piping systems in compliance with regulatory requirements, thus this criterion remains satisfied.

4.2 Precedent

None.

4.3 Significant Hazards Consideration Determination

The proposed changes would revise the Combined License (COL) in regards to detailed design of the passive core cooling system (PXS), the normal residual heat removal system (RNS), and the containment air filtration system (VFS). The requested amendment requires changes to Updated Final Safety Analysis Report (UFSAR) Tier 2 information, which involve changes to COL Appendix C (and plant-specific DCD Tier 1) information.

Completion of PXS, RNS, and VFS piping layout and routing during design finalization, and completion of the as-designed piping analysis and leak-before-break (LBB) evaluation, resulted in identifying piping lines required to be described in the licensing basis as ASME

Code Section III, evaluated to meet the LBB design criteria described in UFSAR Subsection 3.6.3.2, or designed to withstand combined normal and seismic design basis loads without a loss of functional capability. As a result, changes are required to UFSAR Appendices 3B and 3E and COL Appendix C (and plant-specific DCD Tier 1) information for applicable PXS, RNS, and VFS piping lines.

An evaluation to determine whether a significant hazards consideration is involved with the requested 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 changes do not affect the operation of any systems or equipment that initiate an analyzed accident or alter any structures, systems, and components (SSCs) accident initiator or initiating sequence of events. The proposed changes result from identifying PXS, RNS, and VFS piping lines required to be described in the licensing basis as ASME Code Section III, evaluated to meet the LBB design criteria, or designed to withstand combined normal and seismic design basis loads without a loss of functional capability. Neither planned or inadvertent operation nor failure of the PXS, RNS, or VFS is an accident initiator or part of an initiating sequence of events for an accident previously evaluated. Therefore, the probabilities of the accidents evaluated in the UFSAR are not affected.

The proposed changes do not have an adverse impact on the ability of the PXS, RNS, or VFS to perform their design functions. The design of the PXS, RNS, and VFS continues to meet the same regulatory acceptance criteria, codes, and standards as required by the UFSAR. In addition, the changes ensure that the capabilities of the PXS, RNS, and VFS to mitigate the consequences of an accident meet the applicable regulatory acceptance criteria, and there is no adverse effect on any safety-related SSC or function used to mitigate an accident. The changes do not 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 do 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 changes result from identifying PXS, RNS, and VFS piping lines required to be described in the licensing basis as ASME Code Section III, evaluated to meet the LBB design criteria, or designed to withstand combined normal and seismic design basis loads without a loss of functional capability. These proposed changes do not adversely affect any other PXS, RNS, VFS, or SSC design functions or methods of operation in a manner that results in a new failure mode, malfunction, or sequence of events that affect safety-related or nonsafety-related 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 that results in significant fuel cladding failures.

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

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

Response: No

The proposed changes maintain existing safety margins. The proposed changes ensure that PXS, RNS, and VFS design requirements and design functions are met. The proposed changes maintain existing safety margin through continued application of the existing requirements of the UFSAR, while adding additional design features to ensure the PXS, RNS, and VFS perform the design functions required to meet the existing safety margins. 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, design analysis, safety analysis input or result, or design/safety margin. Because no safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed changes, no margin of safety is reduced. Therefore, the requested amendment does not involve a significant reduction in a margin of safety.

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

5. Environmental Considerations

This review supports a request to amend the Combined License (COL) and to allow departure from various elements of the certification information in the Updated Final Safety Analysis Report (UFSAR) Tier 2 of the plant-specific Design Control Document (DCD), and involve changes to COL Appendix C and departures from plant-specific DCD Tier 1. The requested amendment addresses completion of passive core cooling system (PXS), normal residual heat removal system (RNS), and containment air filtration system (VFS) piping layout and routing during design finalization, and completion of the as-designed piping analysis and leak-before-break (LBB) evaluation, resulting in identifying specific PXS, RNS, and VFS piping lines required to be described in the licensing basis as ASME Code Section III, evaluated to meet the LBB criteria, or designed to withstand combined normal and seismic design basis loads without a loss of functional capability. These design and licensing basis changes are collectively called “proposed changes.”

A review has determined that the requested amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20. However, facility construction and operation following implementation of the requested amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a 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), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration Determination, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment.” The Significant Hazards Consideration 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 changes involve identifying specific PXS, RNS, and VFS piping lines required to be described in the licensing basis as ASME Code Section III, evaluated to meet the LBB criteria, or designed to withstand combined normal and seismic design basis loads without a loss of functional capability. Therefore, the proposed changes are unrelated to any aspect of plant construction or operation that introduces any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent

release quantities. Furthermore, the proposed changes do not diminish the functionality of any design or operational features 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 changes affect potentially radioactive systems, and involve areas of the plant that contain radioactive plant systems. However, the proposed changes do not result in additional sources or quantities of radioactive materials being introduced into the affected systems or areas, and do not change assumed radiation shielding where the affected PXS, RNS, and VFS piping lines are located. Therefore, the proposed changes to the description of the PXS, RNS, and VFS piping lines in the licensing basis conform to the original design of the systems, do not change the manner of operating the systems, and thus do not adversely affect individual or cumulative occupational radiation exposure during plant operation. Plant radiation zones are not affected, and there are no changes to the controls required under 10 CFR Part 20 that preclude a significant increase in occupational radiation exposure. Consequently, the proposed changes have no effect on individual or cumulative occupational radiation exposure during plant operation. Therefore, the requested amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

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

6. References

1. U.S. Nuclear Regulatory Commission (NRC) Generic Letter (GL) 2008-01, “Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems,” January 11, 2008.

Southern Nuclear Operating Company

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

ND-16-0328

Enclosure 2

Exemption Request for

Passive Core Cooling System (PXS) Design Changes to Address Potential Gas Intrusion

(LAR-16-004)

(This Enclosure contains 7 pages, including this cover)

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 plant-specific 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 the Appendix, including certified information in DCD Tier 1. Tier 1 includes ITAAC that must be satisfactorily performed prior to fuel load. The design details to be verified by these ITAAC are specified in the text, tables, and figures that are referenced in each individual ITAAC. The Tier 1 information for which a departure and permanent exemption is being requested is related piping line number information specified in Tier 1 Tables for the passive core cooling system (PXS), the normal residual heat removal system (RNS) and containment air filtration system (VFS).

This request for permanent exemption applies the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow departures from plant-specific DCD Tier 1 information due to the following proposed changes to the following ITAAC tables (specific details are provided in Enclosure 1, Section 2 of the accompanying license amendment request).

- Tier 1 Table 2.2.1-2,
    - Add VFS piping line VFS-L832 under line name Containment Purge Discharge from Containment, to identify the piping line as ASME Code Section III piping.
- Tier 1 Table 2.2.3-2
    - Move PXS piping line PXS-L123A to the line numbers evaluated for LBB under line name IRWST injection line A to DVI line A;
    - Move PXS piping line PXS-L123B to the line numbers evaluated for LBB under line name IRWST injection line B to DVI line B;
    - Add piping lines PXS-L133A, and PXS-L134A, under the line name IRWST injection line A to DVI line A as ASME Code Section III, evaluated for LBB, and not requiring functional capability;
    - Add PXS piping lines PXS-L133B and PXS-L134B under the line name IRWST injection line B to DVI line B as ASME Code Section III, evaluated for LBB, and not requiring functional capability; and
    - Delete PXS piping lines PXS-L019A and PXS-L019B from their current rows, and add to new rows with line names "RNS A discharge line to PXS from RNS check valve RNS-PL-V017A to DVI line A" and "RNS B discharge line to PXS from RNS check valve RNS-PL-V017B to DVI line B," respectively. In addition, PXS piping lines PXS-L019A and PXS-L019B are revised to Yes for functional capability and continue to have requirements for ASME Code Section III and evaluated for LBB.

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- Tier 1 Table 2.3.6-2
    - Revise the line name of RNS piping lines RNS-L019A and RNS-L019B to "RNS Discharge Lines, from RCS Pressure Boundary Isolation Valves RNS-PL-V015A and RNS-PL-V015B to RCS Pressure Boundary Isolation Valves RNS-PL-V017A and RNS-PL-V017B."
    - Delete PXS piping lines PXS-L019A and PXS-L019B from table.

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

2.0 Background

The Licensee is the holder of Combined License (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 & 4, respectively.

During the detailed design finalization of the systems, departures from the details identified in Tier 1 information were determined necessary to facilitate consistency with the actual design functions of the systems described in the plant-specific DCD Tier 2 information. This activity requests exemption from the Generic DCD Tier 1 tables which support the associated COL Appendix C ITAAC.

A permanent exemption from elements of the AP1000 certified design information is requested to allow the Licensee to depart from the design details contained in these Tier 1 tables.

3.0 Technical Justification of Acceptability

An exemption is requested to depart from AP1000 generic Design Control Document (DCD) Tier 1 material in regard to the AP1000 by updating various line number information to be consistent with current design detail review information, piping layout and DCD Tier 2 information. The proposed exemption would allow a change to the plant-specific DCD Tier 1 ITAAC information.

The proposed changes to the description information presented in plant-specific DCD Tier 1 tables are at a level of detail that is consistent with the information currently provided therein. The proposed changes neither adversely impact the ability to meet the design functions of the structures, systems, or components (SSCs) nor involve a significant decrease in the level of safety provided by the SSCs. The proposed changes to information in plant-specific DCD Tier 1 continue to provide the detail necessary to implement the corresponding ITAAC. Further, application of the current generic 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 would not serve the underlying purpose of the rule since it could be read to be inconsistent with the existing design information provided in Tier 2 of the plant-specific DCD.

Additional detail for supporting the Technical Justification of this exemption is provided in Enclosure 1, Section 2, of the accompanying license amendment request.

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. The Licensee has identified necessary changes to plant-specific Tier 1 information related to the piping lines as a result of further design review activities. As a result, the Licensee requests a permanent exemption from the certified design information in plant-specific Tier 1, pursuant to the above regulations, to allow the implementation of a departure.

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)(ii)]; 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.1].

The requested exemption to allow the licensee to change the design descriptions of the structures, systems, and components satisfies the six criteria for granting specific exemptions, as described below.

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

   The NRC has authority under 10 CFR §§ 50.12, 52.7, and 52.63 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 the Licensee to depart from elements of the plant-specific DCD Tier 1 design information. The plant-specific Tier 1 material 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 plant-specific DCD. Therefore, no adverse safety impact which would present any additional risk to the health and safety of the public is present. The affected design description in the plant-specific Tier 1 material will also continue to provide the detail necessary to support the performance of the associated ITAAC.

   This proposed change will not impact the ability of the SSCs to perform their design functions. Because the changes will not alter the intended operation of any plant

equipment or systems, they do not present any undue risk from existing equipment or systems. The proposed changes do 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 that are intended to mitigate any existing on-site hazards. Furthermore, the proposed changes 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, these changes do not present an undue risk from any new 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 are necessary to maintain a safe and secure status of the plant. The proposed exemption has no impact on the facility's physical or cyber security.

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 & 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 to update line number information consistent with the current design, piping layout and DCD Tier 2 information continue to maintain the design functions of these systems. This change does not impact the ability of any SSCs to perform their functions or negatively impact safety.

Accordingly, this exemption from the certification information will allow 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 Tier 1 certified design information 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 proposed departure from the plant-specific DCD Tier 1 information and the understanding that these changes support the actual system functions, it is likely that other AP1000 licensees will request this exemption. However, if this is not the case, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the design functions of the systems associated with this request will continue to be maintained. This exemption request and the associated marked-ups to tables demonstrate that there is a minimal change from the generic AP1000 DCD, minimizing the reduction in standardization and consequently the safety impact from the reduction.

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

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

   This exemption request proposes to allow the Licensee to revise the plant-specific DCD Tier 1 information by departing from the certified design by updating line number information consistent with the current design, piping layout and DCD Tier 2 information for various systems. The updates for consistency and clarity will not impact the functional capabilities of these SSCs. Because the design changes associated with this exemption request will continue to meet existing Codes and Standards and methodologies described in the UFSAR, there are no new failure modes introduced by these changes and the level of safety provided by the current SSCs remains unchanged.

   Because the proposed changes to the SSCs will not affect the ability of the SSCs to perform their design functions and the level of safety provided is unchanged, it is concluded that the changes associated with the proposed exemption will not result in a significant decrease in the level of safety.

5.0 Risk Assessment

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

6.0 Precedent

None identified.

7.0 Environmental Consideration

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, or would change an inspection or surveillance requirement. However, the proposed exemption 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. Specific justification is provided in Enclosure 1, Section 5 of the accompanying license amendment request. Accordingly, the proposed exemption meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed exemption.

8.0 Conclusion

The proposed changes to DCD Tier 1 are necessary to update information in design descriptions in plant-specific DCD Tier 1. The exemption request meets the requirements of 10 CFR 52.63, "*Finality of Design Certifications,*" 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 decrease in the level of safety, does not present a significant decrease in safety as a result of a reduction in standardization, and meets the eligibility requirements for categorical exclusion.

9.0 References

None.

Southern Nuclear Operating Company

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

ND-16-0328

Enclosure 3

Proposed Changes to Licensing Basis Documents

(LAR-16-004)

Note: Added text is Denoted by Underlined Blue Text and Deletions ~~by Red Strikethrough~~

(Note that the sheet numbers and the total number of sheets for the marked-up Tables provided in this Enclosure may be changed by the incorporation of this and other departures. These changes are considered editorial and do not require evaluation in this submittal.)

(This Enclosure contains 9 pages, including this cover)

COL Appendix C Table 2.2.1-2 and corresponding Plant-Specific Tier 1 Table 2.2.1-2, Airborne Radiation Monitors

Revise table as shown below:

Table 2.2.1-2		
Line Name	**Line Number**	**ASME Code Section III**
…		…
Containment Purge Inlet to Containment	VFS-PL-L104, L105, L106	Yes
Containment Purge Discharge from Containment	VFS-PL-L203, L204, L205, L800, L801A/B, L803, L804, L805A/B, L810A/B, **L832**	Yes
Fan Cooler Supply Line to Containment	VWS-PL-L032	Yes
...		**...**

COL Appendix C Table 2.2.3-2 and corresponding Plant-Specific DCD Tier 1 Table 2.2.3-2

Revise table as shown below:

Table 2.2.3-2

Line Name	Line Number	ASME Code Section III	Leak Before Break	Functional Capability Required
…	…	...	...	…
CMT A inlet line from cold leg C and outlet line to reactor vessel direct vessel injection (DVI) nozzle A	RCS-L118A, PXS-L007A, PXS-L015A, PXS-L016A, PXS-L017A, PXS-L018A, PXS-L020A, PXS-L021A	Yes	Yes	Yes
	~~PXS-L019A~~, PXS-L070A	Yes	Yes	No
CMT B inlet line from cold leg D and outlet line to reactor vessel DVI nozzle B	RCS-L118B, PXS-L007B, PXS-L015B, PXS-L016B, PXS-L017B, PXS-L018B, PXS-L020B, PXS-L021B	Yes	Yes	Yes
	~~PXS-L019B~~, PXS-L070B	Yes	Yes	No
RNS A discharge line to PXS from RNS check valve RNS-PL-V017A to DVI line A	**PXS-L019A**	**Yes**	**Yes**	**Yes**
RNS B discharge line to PXS from RNS check valve RNS-PL-V017B to DVI line B	**PXS-L019B**	**Yes**	**Yes**	**Yes**
Accumulator A discharge line to DVI line A	PXS-L025A, PXS-L027A, PXS-L029A	Yes	Yes	Yes
...	**...**			**...**

COL Appendix C Table 2.2.3-2 and corresponding Plant-Specific DCD Tier 1 Table 2.2.3-2

Revise table as shown below:

Table 2.2.3-2 (cont.)

Line Name	Line Number	ASME Code Section III	Leak Before Break	Functional Capability Required
…	…	...	...	…
IRWST injection line A to DVI line A	**PXS-L123A,** PXS-L125A, PXS-L127A	Yes	Yes	Yes
	~~**PXS-L123A,**~~ PXS-L124A, PXS-L118A, PXS-L117A, PXS-L116A, PXS-L112A	Yes	No	Yes
	PXS-L133A, PXS-L134A	**Yes**	**Yes**	**No**
IRWST injection line B to DVI line B	**PXS-L123B,** PXS-L125B, PXS-L127B	Yes	Yes	Yes
	~~**PXS-L123B**~~, PXS-L124B, PXS-L118B, PXS-L117B, PXS-L116B, PXS-L114, PXS-L112B, PXS-L120	Yes	No	Yes
	PXS-L133B, PXS-L134B	**Yes**	**Yes**	**No**
...	...			...

COL Appendix C Table 2.3.6-2 and corresponding Plant-Specific DCD Tier 1 Table 2.3.6-2

Revise table as shown below:

Table 2.3.6-2 (cont.)

Line Name	Line No.	ASME Code Section III	Leak Before Break	Functional Capability Required
…	…	...	...	…
RNS Discharge Lines, from RCS Pressure Boundary Isolation Valves RNS-PL-V015A and RNS-PL-V015B to ~~Reactor Vessel DVI Nozzles~~ RCS Pressure Boundary Isolation Valves RNS-PL-V017A and RNS-PL-V017B	RNS-L019A RNS-L019B	Yes	No	Yes
	~~PXS-L019A~~ ~~PXS-L019B~~	~~Yes~~	~~Yes~~	~~Yes~~
...	...			...

UFSAR Table 3B-1 (Sheet 2 of 2)

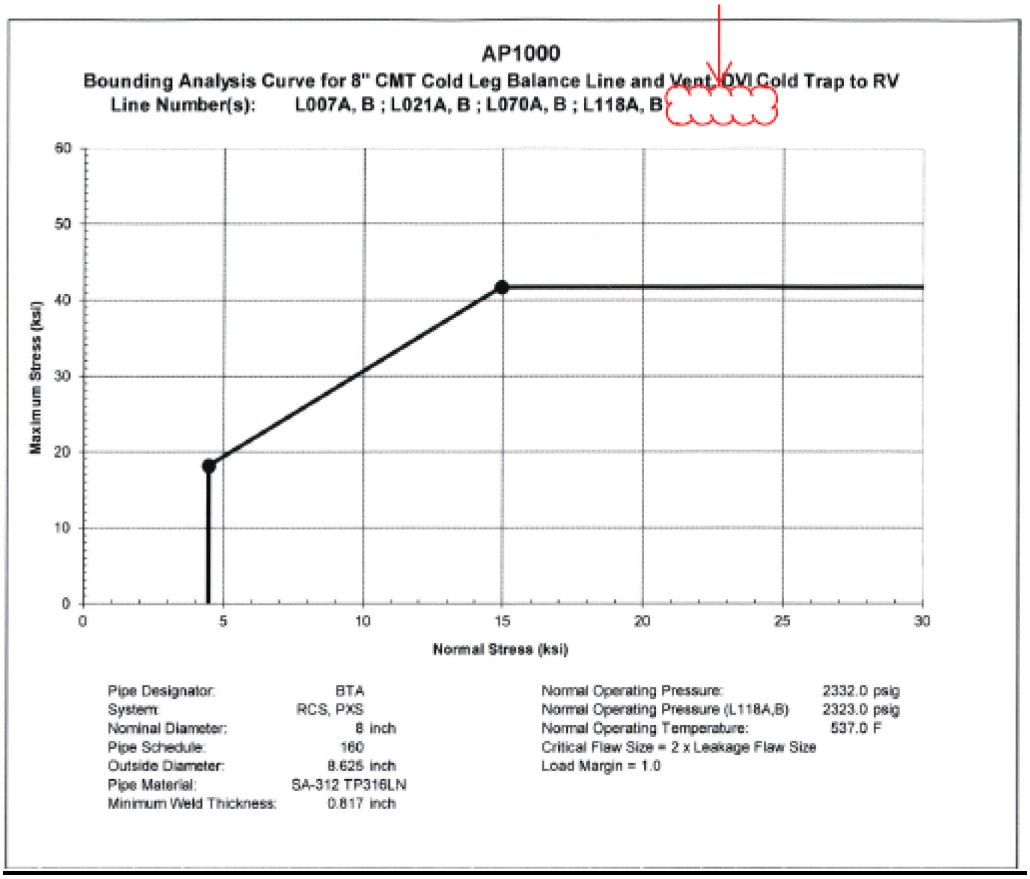
Revise table as shown below:

Table 3B-1 (Sheet 2 of 2)
AP1000 Leak-Before Break Bounding Analysis Systems and Parameters

System	Subsystem	Line No (s).	Nominal Diameter (inches)	Material	Temp (^{0}F)	Pressure (psig)	Figure No.
…	…	...	...				…
PXS	Direct Vessel Injection Line to RV	L021A, B; ~~L125A, B~~	8	SA-312 TP316LN	537.0	2310	3B-14
PXS	Core Makeup Tank (Injection Line, RV Side of Isolation Valve, Core Makeup Tank Side of Isolation Valve), Direct Vessel Injection (Accumulator Connection to Cold Trap), IWRST Injection	L015, L016, L017, L018, L020, L021, L025, L123, L125, L127, L133, L134 (All A, B)	8	SA-312 TP316LN	120.0	2310	3B-15
...	...						...

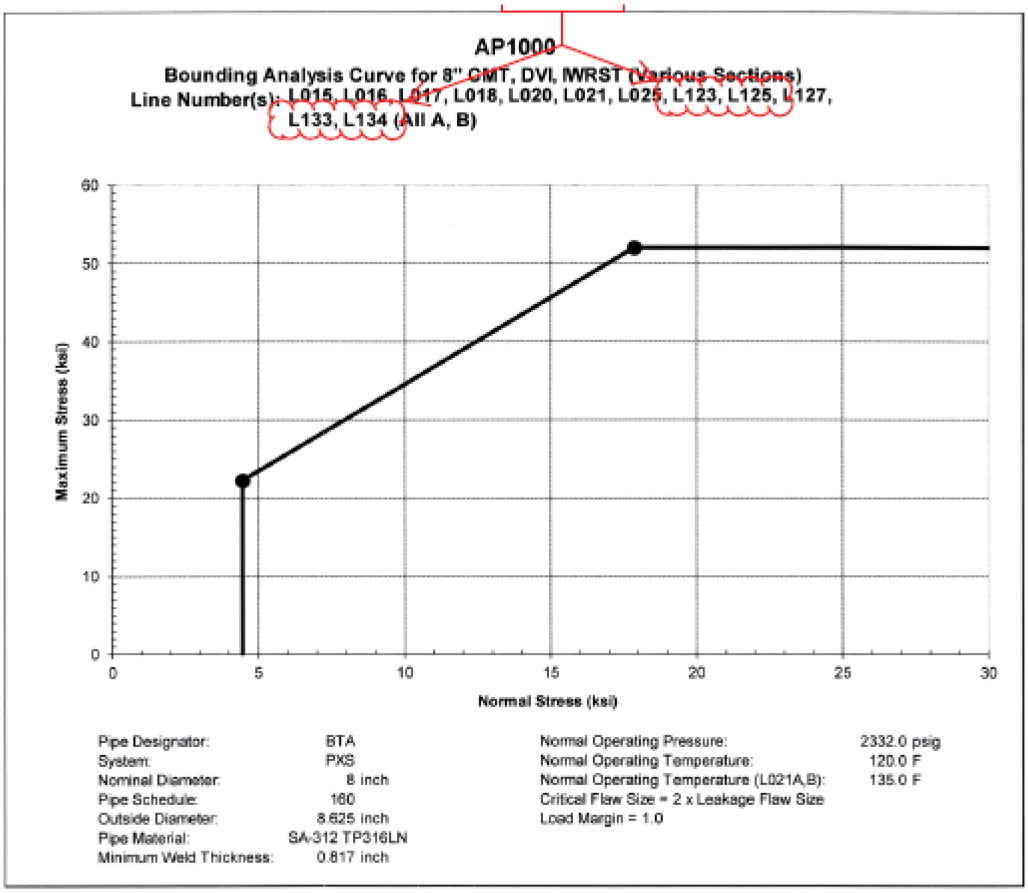
UFSAR Figure 3B-14 Bounding Analysis Curve for 8" CMT Cold Leg Balance Line and Vent, DVI Cold Trap to RV

Revise Figure as shown with ~~L125A, B~~ deleted from table heading



UFSAR Figure 3B-15 Bounding Analysis Curve for 8" CMT, DVI IWRST (Various Sections)

Revise Figure as shown below: Add L123, L125, L133, L134 to Line Numbers



UFSAR Figure 3E-4 (Sheet 2 of 2) High Energy Piping – Passive Core Cooling System: Revise figure Section as shown below: