SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO EXEMPTIONS AND AMENDMENT NOS. 100 AND 99

TO THE COMBINED LICENSE NOS. NPF-91 AND NPF-92

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GEORGIA POWER COMPANY

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VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4

DOCKET NOS. 52-025 AND 52-026

1.0 INTRODUCTION

By letter dated February 17, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17048A533), Southern Nuclear Operating Company (SNC) submitted License Amendment Request (LAR) 16-032 requesting that the U.S. Nuclear Regulatory Commission (NRC or Commission) amend the combined licenses (COL) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, COL Numbers NPF-91 and NPF-92, respectively.

The requested amendment requires changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the Plant-Specific Design Control Document (DCD) Tier 2 information and involves changes to plant-specific Tier 1 information (and corresponding changes to COL Appendices A and C), associated with the in-containment refueling water storage tank (IRWST) level instrumentation and some other protection and safety monitoring system (PMS) related changes. Because the changes proposed in this LAR impact Tier 1 of the plant-specific DCD, Appendices A and C of the COL, this LAR has been determined to require prior NRC approval.

The requested amendment specifically proposed to revise the design of the PMS, involving IRWST water level instrumentation and reactor coolant average temperature (RCAT) P-9 permissive and interlock for the reactor trip system (RTS) and engineered safety features actuation system (ESFAS), as described in the UFSAR and related COL Appendices A and C and plant-specific DCD Tier 1.

Pursuant to the provisions of 10 CFR 52.63(b)(1), SNC has also requested exemptions, one for each unit, from the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Appendix D, "Design Certification Rule for the AP1000 Design," Section III.B, "Scope and Contents." The requested exemptions would allow a departure from the corresponding portions of the certified information in Tier 1 of the generic DCD.[1] The staff's review of the exemption request, as well as the LAR, is included in this safety evaluation.

In letters dated July 21, 2017, and October 3, 2017 (ADAMS Accession Nos. ML17202U703 and ML17276B556), SNC provided responses to the Request for Additional Information (RAI) questions and also submitted additional clarification information to supplement the initial submittal of this LAR. The supplemental information did not expand the scope of the original LAR, and did not change the NRC staff's originally proposed no significant hazards consideration as published in the *Federal Register* on March 22, 2017 (82 FR 14760). The staff's review of the initial submittal, RAI responses, and supplemental design information for this LAR is presented below in this safety evaluation.

2.0 REGULATORY EVALUATION

10 CFR Part 52, Appendix D, Section VIII.A.4 states that exemptions from Tier 1 information are governed by the requirements of 10 CFR 52.63(b)(1) and 10 CFR 52.98(f). It also states that the Commission will deny such a request if the design change causes a significant reduction in plant safety otherwise provided by the design.

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 TS, or requires a license amendment under paragraphs B.5.b or B.5.c of the section.

10 CFR Part 52, Appendix D, VIII.C.6 states that after issuance of a license, "Changes to the plant-specific TS will be treated as license amendments under 10 CFR 50.90." 10 CFR50.90 addresses the applications for amendments of licenses, construction permits, and early site permits

10 CFR 50.36, Technical specifications (TS) impose limits, operating conditions, and other requirements upon reactor facility operation for the public health and safety. The TS are derived from the analyses and evaluations in the safety analysis report. In general, TS must contain: (1) safety limits and limiting safety system settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls.

10 CFR 52.63(b)(1) allows the licensee who references a design certification rule to request NRC approval for an exemption from one or more elements of the certification information. The Commission may only grant such a request if it determines that the exemption will comply with the requirements of 10 CFR 52.7, which, in turn, points to the requirements listed in 10 CFR

[1] While SNC describes the requested exemption as being from Section III.B of 10 CFR Part 52, Appendix D, the entirety of the exemption pertains to proposed departures from Tier 1 information in the generic DCD. In the remainder of this evaluation, the NRC will refer to the exemption as an exemption from Tier 1 information to match the language of Section VIII.A.4 of 10 CFR Part 52, Appendix D, which specifically governs the granting of exemptions from Tier 1 information.

50.12 for specific exemptions, and the special circumstances present outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption. Therefore, any exemption from the Tier 1 information certified by Appendix D to 10 CFR Part 52 must meet the requirements of 10 CFR 50.12, 52.7, and 52.63(b)(1).

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL, including any modification to, addition to, or deletion from the Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) contained in the license. Therefore, the proposed changes require a license amendment and NRC approval is required prior to making the plant-specific proposed changes in this LAR.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1, "Quality standards and records," and 10 CFR 50.55a, "Codes and standards," require that systems and components be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed. Regulations in 10 CFR 50.55a also incorporate by reference the applicable editions and addenda of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPV Code), which addresses pressure integrity of components, and the ASME Operation and Maintenance of Nuclear Power Plants, Division 1, (OM Code) for the in-service testing of pumps, valves, and dynamic restraints. Application of 10 CFR 50.55a and GDC 1 provides assurance that the codes and standards applied are commensurate with the importance to safety of these functions.

GDC 2 requires that structures, systems and components (SSC) important to safety be designed to withstand the effects of natural phenomena, such as earthquakes. The proposed changes in this LAR involve the SSC, and therefore, compliance with GDC 2 is required.

GDC 13 requires that instrumentation be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. The proposed changes in this LAR involve instruments to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions. Therefore, the changes proposed in this LAR are required to comply with the requirements of GDC 13.

GDC 20 requires the protection system to be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety. The proposed changes proposed in this LAR involve the protection system. Therefore, the proposed changes are required to meet the requirements of GDC 20.

GDC 29 requires the protection and reactivity control systems to be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences. The proposed changes in this LAR involve the protection and reactivity control systems. Therefore, the changes proposed in this LAR are required to comply with the requirements of GDC 29.

GDC 34 requires that a system to remove residual heat be provided. The proposed changes to the PMS for the addition of the IRWST lower narrow range level instruments, changes to the IRWST wide range level instruments, addition of the new ESFAS P-9 permissive and interlock, and addition of the new ESFAS refueling cavity and spent fuel pool cooling system (SFS) isolation function, involve in the functions of residual heat removal. Therefore, the proposed changes are required to comply with the requirements of GDC 34.

GDC 35 requires that a system to provide abundant emergency core cooling 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 PMS for the addition of the IRWST lower narrow range level instruments, changes to the IRWST wide range level instruments, addition of the new ESFAS P-9 permissive and interlock, and addition of the new ESFAS refueling cavity and SFS isolation function, involve maintaining the safety-related and non-safety-related design functions of the passive core cooling system (PXS), including providing adequate core cooling to ensure that regulatory requirements are met. Therefore, the proposed changes are required to comply with the requirements of GDC 35.

10 CFR 50.55a(h), "Protection and Safety Systems," requires compliance with the Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," and the correction sheet dated January 30, 1995. Clause 5.1 of IEEE Std. 603-1991 requires, in part, that safety systems shall perform all safety functions required for a design basis event in the presence of any single detectable failure within the safety systems concurrent with all identifiable but non-detectable failures. Clause 5.7 of IEEE Std. 603-1991 requires, in part, that capability for test and calibration of safety system equipment shall be provided while retaining the capability of the safety system to accomplish their safety functions. Clause 6.7 of IEEE Std. 603-1991 requires, in part, that capability of a safety system to accomplish its safety function shall be retained while sense and command features equipment is in maintenance bypass. The changes proposed in this LAR involve the protection and safety systems. Therefore, the proposed changes are required to comply with the requirements in IEEE Std. 603-1991.

10 CFR 50.49(d) states, in part, that the licensee shall prepare a list of electric equipment important to safety and shall keep the list and information in the file current and retain the file in auditable form.

NUREG 0800, Standard Review Plan (SRP) Section 3.11, "Environmental Qualification of Mechanical and Electrical Equipment," addresses the review of environmental design and qualification of all equipment important to safety.

SRP Section 3.2.1, Revision 2, "Seismic Classification" provides guidance to the staff in the review of SSCs to ensure SSCs important to safety be designed to withstand the effects of earthquakes without loss of capability to perform their safety functions.

SRP Section 3.2.2, "System Quality Group Classification" provides guidance to the staff, in the review SSC, the acceptable, primarily deterministic, approach to classify fluid systems important to safety and identify their applicable construction codes and standards depending on the system or component function and relative importance to safety.

Regulatory Guide (RG) 1.26, "Quality Group Classifications and Standards For Water-, Steam-,

and Radioactive-Waste-Containing Components of Nuclear Power Plants" describes an acceptable method for determining quality standards for Quality Group B, C, and D water- and steam-containing components important to safety of water-cooled nuclear power plants meet the associated requirements of the ASME Boiler and Pressure Vessel Code, Section III. The proposed change addresses the treatment of components that are classified in accordance with this guidance; therefore this requirement is considered in the evaluation.

RG 1.29, Revision 4, "Seismic Design Classification," describes an acceptable method of identification and classification of SSCs important to safety that should be designed to withstand the safe shutdown earthquake (SSE). RG 1.29 states that systems and components required for safe shutdown, including their foundations and supports, are designated as seismic Category I and should be designed to withstand the effects of the SSE and remain functional.

3.0 TECHNICAL EVALUATION

3.1 EVALUATION OF EXEMPTION REQUEST

The regulations in Section III.B of Appendix D to 10 CFR Part 52 require a holder of a COL referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in Tier 1 of the generic AP1000 DCD. Exemptions from Tier 1 information are governed by the change process in Section VIII.A.4 of Appendix D of 10 CFR Part 52. Because the SNC has identified has identified changes to plant-specific Tier 1 information, with corresponding changes to the associated COL Appendices A and C information resulting in the need for a departure, an exemption from the certified design information within plant-specific Tier 1 material is required to implement the LAR.

The Tier 1 information for which a plant-specific departure and exemption was requested relates to IRWST level instrumentation, the refueling cavity and SFS isolations for PMS engineered safety features, and conforming nomenclature changes for certain PMS instrumentation features. The result of this exemption would be that the licensees could implement modifications to Tier 1 information in the UFSAR as well as departures from a plant-specific DCD Tier 2 table, and a COL Appendices A and C table. 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 requested for the involved Tier 1 information described and justified in LAR 16-032, as supplemented. This exemption is a permanent exemption limited in scope to the particular Tier 1 information specified.

As stated in Section VIII.A.4 of Appendix D to 10 CFR Part 52, an exemption from Tier 1 information is governed by the requirements of 10 CFR 52.63(b)(1) and 52.98(f). Additionally, Section VIII.A.4 of Appendix D to 10 CFR Part 52 provides that the Commission will deny a request for an exemption from Tier 1 if it finds that the requested change will result in a significant decrease in the level of safety otherwise provided by the design. Pursuant to 10 CFR 52.63(b)(1), the Commission may, grant exemptions from one or more elements of the certification information, so long as the criteria given in 10 CFR 52.7, which, in turn, references 10 CFR 50.12, is met and that the special circumstances, which is defined by 10 CFR 50.12(a)(2), outweigh any potential decrease in safety due to reduced standardization.

Pursuant to 10 CFR 52.7, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 52. As

10 CFR 52.7 further states, the Commission's consideration will be governed by 10 CFR 50.12, "Specific exemptions," which states that an exemption may be granted when: (1) the exemptions are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security; and (2) special circumstances are present. Specifically, 10 CFR 50.12(a)(2) lists six circumstances for which an exemption may be granted. It is necessary for one of these bases to be present in order for the NRC to consider granting an exemption request. SNC stated that the requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subparagraph defines special circumstances as when "[a]pplication 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 staff's analysis of these findings is presented below.

3.1.1 AUTHORIZED BY LAW

This exemption would allow the SNC to implement changes to elements of the plant-specific Tier 1 DCD to depart from the AP1000 certified design (Tier 1) information. This exemption is a permanent exemption limited in scope to particular Tier 1 information. Subsequent changes to the plant-specific Tier 1 DCD would be subject to the exemption process specified in Section VIII.A.4 of Appendix D to 10 CFR Part 52 and the requirements of 10 CFR 52.63(b)(1). As stated above, 10 CFR Part 52, Appendix D, Section VIII.A.4 allows the NRC to grant exemptions from one or more elements of the Tier 1 information. Based on 10 CFR Part 52, Appendix D, Section VIII.A.4, the staff has determined that granting of the SNC's proposed exemption will not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations. Therefore, as required by 10 CFR 52.7 and 10 CFR 50.12(a)(1), the exemption is authorized by law.

3.1.2 NO UNDUE RISK TO PUBLIC HEALTH AND SAFETY

The underlying purpose of Appendix D to 10 CFR Part 52 is to ensure that a licensee will construct and operate the plant based on the approved information found in the DCD incorporated by reference into a licensee's licensing basis. The exemption proposed by SNC from the requirements of 10 CFR Part 52, Appendix D, Section III.B would allow changes to elements of the plant-specific Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information. The plant-specific DCD Tier 1 will continue to reflect the approved licensing basis for VEGP Units 3 and 4, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the DCD. Therefore, the affected plant-specific DCD Tier 1 ITAAC will continue to serve its required purpose. The specific changes proposed by SNC are related to the addition of IRWST level instrumentation, refueling cavity and SFS isolations and permissive interlocks for the PMS Engineered Safety Features and nomenclature consistency changes. The staff finds that all those changes do not represent any adverse impact to the design function of the IRWST level instrumentation and will continue to protect the health and safety of the public in the same manner.

The changes proposed by SNC do not add or delete systems or equipment as described in Tier 1 of the AP1000 DCD. These changes will not impact the ability of the systems or equipment to perform their design function. Because they will not alter the operation of any plant equipment or systems, these changes do not present an 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 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 significant fuel cladding failures. Accordingly, these changes do not present an undue risk from any new equipment or systems, because there remains no challenge to containment integrity as a result of hydrogen generation due to the proposed changes. Therefore, as required by 10 CFR 50.12(a)(1), the staff finds that there is no undue risk to public health and safety.

3.1.3 CONSISTENT WITH COMMON DEFENSE AND SECURITY

The proposed exemption would allow the SNC to depart from elements of the plant-specific DCD Tier 1 design information. The proposed changes do not alter or impede the design, function, or operation of any plant SSCs associated with the facility's physical or cyber security and, therefore, does not affect any plant equipment that is necessary to maintain a safe and secure plant status. In addition, the proposed changes have no impact on plant security or safeguards. Therefore, as required by 10 CFR 50.12(a)(1), the staff finds that the common defense and security is not impacted by this exemption.

3.1.4 SPECIAL CIRCUMSTANCES

Special circumstances, in accordance with 10 CFR 50.12(a)(2)(ii), are present whenever 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. Special circumstances are present in the particular circumstances discussed in LAR 16-032 as supplemented because the application of the specified Tier 1 information does not serve the underlying purpose of the rule. The underlying purpose of the Tier 1 information is to ensure that licensees will safely construct and operate a plant based on the certified information found in the AP1000 DCD, which was incorporated by reference into the VEGP's licensing basis. 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 exemption proposed in this LAR would revise the ITAAC supporting Tier 1 tables related to the proposed changes to the PMS for the addition of the IRWST lower narrow range level instruments, changes to the IRWST wide range level instruments, addition of the new ESFAS P-9 permissive and interlock, addition of the new ESFAS refueling cavity and SFS isolation function, and nomenclature consistency changes for PMS Engineered Safety Features.

The above proposed changes, assessed in detail in Section 3.2 of this Safety Evaluation (SE) below, maintain the required design functions. The changes proposed do not affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. The proposed changes do not involve nor interface with any SSC accident initiator or initiating sequence of events related to the accidents evaluated and therefore do not have an adverse effect on any SSC's design function. Accordingly, this exemption from the certification information will enable the licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR Part 52, Appendix D.

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 LAR does not serve the underlying purpose of the rule, the staff finds that the special circumstances required by 10 CFR 50.12(a)(2)(ii) for the granting of an exemption from the Tier 1 information exist.

3.1.5 SPECIAL CIRCUMSTANCES OUTWEIGH REDUCED STANDARDIZATION

Based on the nature of the changes to the plant-specific DCD Tier 1 information and the understanding that these changes support the design function of the IRWST level instrumentation, refueling cavity and SFS isolations and permissive interlocks for the PMS Engineered Safety Features, 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 components associated with this request will continue to be maintained. Furthermore, the justification provided in this LAR 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 this requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by this exemption.

3.1.6 NO SIGNIFICANT REDUCTION IN SAFETY

The proposed changes to the PMS do not adversely interface with or adversely affect safety related equipment or a fission product barrier, and do not impact the functional capabilities of the PMS. The proposed four new level instruments for the IRWST and their application are similar in function and qualification to many safety-related instruments already performing similar safety functions. No system or design function or equipment qualification (EQ) is adversely affected by the proposed changes. Because the changes related to 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.

3.2 TECHNICAL EVALUATION OF PROPOSED CHANGES

The PMS is a digital instrumentation and control (I&C) system, which detects off-normal conditions and actuates the appropriate safety-related functions necessary to achieve and maintain the plant in a safe shutdown condition. The PMS controls safety-related components in the plant that are operated from the main control room (MCR) or remote shutdown workstation. In addition, the PMS provides the equipment in MCR necessary to monitor the plant safety-related functions during and following an accident.

The IRWST contains cold borated water. The bottom of the IRWST is above the containment recirculation system (RCS) loop elevation so that the borated water can drain by gravity into the RCS after it is sufficiently depressurized. The IRWST is connected to the RCS through two direct vessel injection lines. The isolation valves for each gravity injection line are arranged in two parallel paths, each path having one squib valve backed up by one check valve.

The changes proposed in this LAR will revise the COLs concerning the design details of the PMS including the RTS, ESFAS, PXS, SFS, and steam generator (SG) blowdown system (BDS). The specific design changes proposed in this LAR include: (1) addition of four new IRWST lower narrow range and changes to original IRWST wide range level instrumentation channels, (2) addition of a new RCAT permissive P-9 and interlock for, and renaming of, Low-2 SG narrow range water level reactor trip, (3) addition of a new ESFAS Permissive P-9 and interlock for core makeup tank (CMT) actuation, reactor coolant pump trip, passive residual heat removal (PRHR) heat exchanger actuation, and BDS Isolation, and (4) changes to ESFAS refueling cavity and SFS isolation, including addition of a new P-9 Permissive and interlock. The above technical changes are assessed below.

3.2.1 Evaluation of Instrumentation and Control Changes

The I&C related changes proposed in this LAR include the addition of four new lower narrow range instrumentation channels and deletion of one original IRWST wide range level instrumentation channels for the IRWST, modifications to the PMS permissives and logic, and renaming of nomenclature for some level setpoints. The specific I&C associated changes included in the original submittal, RAI responses, and supplemental information is evaluated as are addressed below

3.2.1.1 Changes to IRWST Level Instrumentation Channels

There are four existing IRWST wide range level instrumentation channels for the safety-related IRWST systems, which are designed to provide adequate cooling of the reactor. Initially, this is achieved by discharging water from the IRWST into the reactor vessel. When the current Low-3 IRWST level setpoint is reached in the IRWST, the RCS isolation valves shall open and water from the containment RCS compartment shall flow into the reactor vessel through the PXS piping. This IRWST injection and containment recirculation time scale is dependent upon the accuracy of the existing Low-3 IRWST level setpoint in order to remain within the bounds assumed in the long-term cooling safety analysis as contained in Chapter 15 of the UFSAR.

There are four existing IRWST wide range level instrumentation channels, which are designed to perform the ESFAS automatic actuation function to open the containment recirculation squib valves to provide redundant flow paths from the containment to the reactor on a two-out-of-four Low-3 IRWST level logic coincident with an automatic RCS depressurization (fourth stage automatic depressurization system (ADS) actuation signal). Each existing IRWST wide range level instrumentation channel is also designed to provides the level indication in MCR and provides a Low-2 IRWST level alarm, with three channels required to function short-term (24 hours), and two channels required to function long-term (4 months), following a design basis accident for performing the post-accident monitoring system (PAMS) IRWST level instrumentation function.

However, it is found that the existing four IRWST wide range level instrumentation channels cannot provide the ESFAS IRWST level Low-3 actuation signal within the accuracy assumed in the safety analysis. Therefore, in this LAR , SNC proposed to add four new IRWST lower narrow range level instrumentation channels to provide a Low-2 IRWST level alarm function and Low-3 IRWST level ESFAS automatic actuation function to open the containment recirculation squib valves, which were previously performed by the four existing IRWST wide range level instrumentation channels. Because of the narrow range of these four new instrumentation channels, they can accurately measure the Low-3 IRWST level setpoint within the bounds of the assumption in the safety analysis, and provide a more accurate Low-2 IRWST level alarm

function and PAMS monitoring function. The lower narrow range instrumentation improves the instrument span accuracy for the Low-2 IRWST level alarm function and Low-3 IRWST level ESFAS function, without any changes required to the existing setpoints for these functions.

However, in the initial submittal of this LAR, the staff found that the SNC did not provide adequate information to clarify why the existing four IRWST wide range level instrumentation channels cannot provide the required accuracy assumed in the safety analysis for the ESFAS IRWST level Low-3 actuation function. The staff also found that SNC did not provide justifications on how the proposed four new lower narrow range level instrumentation channels can meet the accuracy requirement assumed in the safety analysis for the ESFAS IRWST level Low-3 actuation safety function. Hence, the staff issued an RAI question requesting SNC to provide additional information to clarify why the existing wide range level instrumentation channels cannot meet the accuracy requirement assumed in the safety analysis, but the proposed new lower narrow range level instrumentation channels can.

In its RAI response, SNC stated, in relevant part, that, although not explicitly described in the licensing basis, the long-term core cooling analysis in Subsection 15.6.5.4C.1 of the UFSAR assumes that the transition to containment recirculation on Low-3 IRWST level following a loss of coolant accident (LOCA) occurs between an upper limit at 110.0 ft elevation and a lower limit at 107.8 ft elevation. The total instrument uncertainty of the existing IRWST wide range level instrumentation channels determined by the approved AP1000 setpoint methodology, which includes a statistical evaluation of manufacturer-specified instrument accuracy and other variables including calibration equipment accuracy, instrument drift, and environmental effects, exceeds this required accuracy. The current IRWST wide range level instrumentation channels have a large span of 24.0 fts and a sensor reference accuracy of ±0.25 percent of span, or approximately ±0.72 inches. When combined with other setpoint methodology uncertainties, the resultant total instrument uncertainty does not support the assumed actuation range and accuracy. But, the proposed four new IRWST lower narrow range level instrumentation channels have a much smaller span of 35.0 inches and a sensor reference accuracy of ±0.25 percent of span, or approximately ±0.0875 inches. This results in a total instrument uncertainty determined by the AP1000 setpoint methodology within the required accuracy for the Low-3 IRWST level actuation setpoint with margin. Hence, the new IRWST lower narrow range level instrumentation channels proposed in this LAR meet the accuracy requirements assumed in Subsection 15.6.5.4C.1 of the UFSAR on long-term core cooling analysis for both the upper and lower Low-3 IRWST level ESFAS actuation limits. The staff finds that the above additional information is sufficient an acceptable justifying why the existing IRWST wide range level instrumentation channels cannot meet the accuracy requirement assumed in the safety analysis, but the proposed new IRWST lower narrow range level instrumentation channels can.

SNC also proposed some changes to existing IRWST wide range level instrumentation channels because of the proposed four new IRWST lower narrow range level instrumentation channels, which took over some functions originally assigned to them. Specific changes include deletion of one of the four existing IRWST wide range level instrumentation channels, reassignment of the Low-2 IRWST level alarm function and Low-3 IRWST level ESFAS function to the four new IRWST lower narrow range level instrumentation channels. This proposed change results in removal of IRWST wide range level transmitter isolation valves for the one removed IRWST wide range level instrumentation channel. The three remaining IRWST wide range level instrumentation channels remain specified and should be qualified according to RG 1.97, Revision 3, Instrumentation For Light-Water-Cooled Nuclear Power Plants To Access Plant And Environs Conditions During And Following An Accident," as Type B1, D2, and F2 PAMS IRWST level instrumentation, with the three channels required to function short-term (24

hours), and two channels required to function long-term (four months), following a design basis accident. As specified in the UFSAR Table 7.5-1, Note 4, the number of instrument channels required after stable plant conditions is two. The third instrument channel for the IRWST level is available to resolve information ambiguity if necessary. Therefore, the staff finds that deletion of one of the four existing IRWST wide range level instrumentation channels and other associated changes are acceptable.

According to IEEE Std. 603-1991 as endorsed in 10 CFR 50.55a(h), the staff finds in the LAR that the four new lower narrow range level instruments are specified to meet the same environmental qualification requirements with the exception of a PAMS function, with only a required 24 hours operating time. The staff understands this means that two of the three remaining wide range level channels (PXS-047 and PXS-048) remain required to be environmentally qualified for PAMS with a required four month operating time. However, Table 3.11-1 in Enclosure 3 revised in this LAR still anticipates four month PAMS operating time for all three remaining wide range level channels for their PAM functions. Therefore, the staff issued an RAI question requesting SNC to provide justification to support this exception of a 24 hour operating time, instead of the 4 month operating time required for PAMS and clarify the inconsistency.

In the RAI response the SNC states, in part, that the three remaining IRWST wide range level transmitters (PXS-JE-LT046, PXS-JE-LT047, and PXS-JE-LT048) remain specified and required to be qualified according to RG 1.97, Revision 3 as Type B1, D2, and F2 PAMS IRWST level instrumentation; and the existing PAMS post-accident operating time required in UFSAR Table 3.11-1 for the IRWST wide range level instrumentation channels is not changed. Therefore, the PAMS post-accident operating time for all three remaining IRWST wide range level instrumentation channels is still four months. The new IRWST lower narrow range level transmitters (PXS-JE-LT066, PXS-JE-LT067, PXSJE-LT068, and PXS-JE-LT069) are specified and qualified according to RG 1.97, Revision 3 as Type D2 PAMS IRWST level instrumentation to support monitoring of the ESFAS automatic actuation function. The ESFAS automatic actuation function for the new IRWST lower narrow range level instrumentation is specified in the LAR for 24 hours post-accident operating time, which is the same as currently specified in UFSAR Table 3.11-1 for the IRWST wide range level instrumentation. UFSAR Table 3D.4-2 states that equipment not required for Type A, B, or C primary variables shall have a PAMS qualification time specific to its function. Therefore, these instruments do not require PAMS qualification beyond the first 24 hours as the required Type D2 PAMS monitoring of IRWST level is provided by the remaining three IRWST wide range level instruments beyond the first 24 hours for a period of four months. The IRWST wide range level sensors are located above the flood up level and are qualified for four months in accordance with Table 3D.4-2 of the UFSAR.

In addition, the SNC states in the RAI response that clarification is made to make the statements cited in the RAI question consistent in regards to the required post-accident operating times of the IRWST wide range level instruments (two channels are qualified for an ESF 24 hour operability time and all three channels are qualified for a PAMS four month operability time) and the IRWST narrow range level instruments (all four channels are qualified for an ESF 24 hour operability time and all four channels are qualified for a PAMS 24 hour operability time). The associated Enclosure 1 of the LAR was revised to be consistent in the RAI response accordingly. Therefore, the staff finds that the above clarification and changes to the original submittal of this LAR are adequate and acceptable.

The staff also observed in the LAR that the L-2, L-3, and PAM functions are re-assigned to the new level instruments, but it is not clear what specific PAM functions are assigned to the new

lower narrow range level instruments and what PAM functions are retained for the remaining three existing wide range level instruments. Thus, the staff issued an RAI question requesting SNC to provide additional information. In the RAI response, SNC clarified that the IRWST wide range level instrumentation channels remain unchanged and qualified as RG 1.97, Revision 3, Type B1, D2, and F2 PAMS IRWST level instrumentation, and the existing PAMS functions and post-accident operating time for the IRWST wide range level instrumentation channels are not proposed to be changed. In addition, the new IRWST lower narrow range level instrumentation channels (PXS-066, PXS-067, PXS-068, and PXS-069) are specified and required to be qualified according to RG 1.97, Revision 3 as Type D2 PAMS IRWST level instrumentation with a post-accident operating time of 24 hours. The three remaining IRWST wide range level instrumentation channels continue to support Type B1, D2, and F2 PAMS IRWST level instrumentation functions. With the four new lower narrow range level instrumentation channels and three existing wide range level instrumentation channels assessed above for the IRWST, the staff determined that the proposed changes in this LAR meet the regulatory requirements in 10 CFR Part 50, Appendix A, GDC 13 for monitoring the IRWST level.

3.2.1.2 Changes to Nomenclature of Steam Generator Water and Spent Fuel Pool Level Setpoints

SNC identified that there are inconsistencies in the current licensing documents when referring to the setpoint designator. Therefore, in the LAR, SNC proposed revision generic “low” references to eliminate inconsistency on which specific setpoint designator is used for a given PMS function. The format used for the setpoint designator is also not consistent, including the lack of using narrow range where applicable. In some instances a given setpoint designator is used for more than one setpoint. To avoid confusion and address the human factor issues related to labeling different setpoints with the same setpoint designator, a given setpoint is referred to with its own unique setpoint designator in the proposed licensing basis changes. In addition, SNC submitted a separate request, LAR 17-004 (ADAMS Accession No. ML17055C352), to standardize the nomenclature scheme for instrumentation setpoints used in the PMS.

Hence, in this LAR SNC proposed to rename the existing Low SG narrow range water level reactor trip setpoint actuation name to Low-2 SG narrow range water level in COL Appendix C, ITAAC (and plant-specific DCD Tier 1), COL Appendix A TS, and the UFSAR. SNC also proposed to rename the existing Low SG wide range water level and Low SG narrow range water level setpoint ESFAS automatic actuation names to Low-2 SG wide range water level and Low-2 SG narrow range water level, respectively, in the COL Appendix A TS, and the UFSAR where necessary. Additionally SNC proposed to change the existing spent fuel pool level setpoint actuation and alarm names to Low-2, Low, and High spent fuel pool level in the UFSAR where necessary for consistency with standard nomenclature.

The staff finds that the above proposed changes to the nomenclature scheme do not involve any change to the physical design of the SG and spent fuel pool level instrumentation and are only changes to the names of the actuation setpoints in the licensing basis from the existing level instrumentation name. The staff also finds that these proposed changes do not impact any setpoint value itself, and just provide clarity to the licensing basis, so that it is clear which setpoint designator is used for the specified PMS functions. The staff finds that the proposed changes to the setpoint nomenclature are editorial and are also consistent with the new standardized nomenclature scheme stated in LAR 17-004. Therefore, the staff finds that the proposed changes in this LAR to rename SG and spent fuel pool level setpoints are acceptable.

3.2.1.3 Addition of New RCAT Permissive P-9 and Interlock for Steam Generator Water Level Reactor Trip

In this LAR, SNC proposed to add a RCAT P-9 permissive and interlock for Low-2 SG narrow range water level reactor trip functions.

As described in Subsection 7.2.1.1.5 of the UFSAR, a loss of heat sink reactor trip is actuated by the PMS from low (proposed to be renamed to be Low-2 in this LAR) SG narrow range water level in any SG. This trip protects the reactor from loss of heat sink in the event of a loss of feedwater to the SGs. The reactor is tripped when two-out-of-four coincident logic of SG narrow range water level sensors in any SG produces signals below the setpoint value. But, in the current PMS logic design there are no existing interlocks or permissives associated with this trip. In addition, routine maintenance and testing is typically performed for the SGs, and associated feedwater and steam systems for some operational modes when the normal residual heat removal system (RNS) is in service. This may include draining the secondary side of the SGs, which could result in undesired and unnecessary Low-2 SG narrow range water level reactor trips occurring. However, the design of the current PMS logic design does not allow blocking of a loss of heat sink reactor trip from Low-2 SG narrow range water level in any SG during routine operations, maintenance, or testing performed during shutdown.

Therefore, as shown in the revised Figure 7.2-1, Sheet 7 of the UFSAR in this LAR, SNC proposed to add a new RCAT P-9 permissive and interlock for Low-2 SG narrow range water level reactor trip functions. So, a loss of heat sink reactor trip from Low-2 SG narrow range water level in any SG can be manually blocked when RCAT is below the P-9 permissive setpoint of 200°F, and is automatically unblocked when RCAT is above the P-9 permissive.

Therefore, the staff finds that the proposed changes do not adversely affect the design functions of the Low-2 SG narrow range water level reactor trip function. Also the proposed changes allow blocking of an RTS function that is not applicable during shutdown conditions, while automatically reinstating the RTS function prior to reaching the modes required for this RTS function during plant startup. So, the staff finds that the reactor protection system with the proposed changes still meet the regulatory requirements in 10 CFR Part 50, Appendix A, GDC 20 for the protection system and therefore are acceptable.

3.2.1.4 Addition of ESFAS Permissive P-9 and Interlock for CMT Actuation, Reactor Coolant Pump Trip, PRHR Heat Exchanger Actuation, and BDS Isolation

In this LAR, SNC proposed to add the P-9 permissive and interlock for the CMT actuation (including reactor coolant pump (RCP) trip), PRHR heat exchanger actuation, and SG blowdown system isolation on Low-2 SG narrow range water level and Low-2 SG wide range water level ESFAS functions.

As described in the UFSAR, routine maintenance and testing is typically performed for the SGs, and associated feedwater and steam systems for a few operational modes when RNS is in service. This may include draining the secondary side of the SGs, which could result in undesired and unnecessary Low-2 SG wide range level or Low-2 SG narrow range level ESFAS actuations to occur. However, the design of the current PMS logic design does not allow blocking of Low-2 SG wide range water level or Low-2 SG narrow range water level ESFAS automatic actuations during routine operations, maintenance, or testing performed during shutdown. Hence, in this LAR SNC proposed to make changes to the PMS logic design, so that (1) CMT actuation and RCP trip from Low-2 SG wide range level signals can be manually

blocked when RCAT is below the P-9 permissive setpoint of 200°F, and automatically unblocked when RCAT is above the P-9 permissive; (2) PRHR heat exchanger actuation (and subsequent BDS isolation) from either Low-2 SG wide range level or Low-2 SG narrow range level signals can be manually blocked when RCAT is below the P-9 permissive setpoint of 200°F, and automatically unblocked when RCAT is above the P-9 permissive; and (3) BDS isolation from Low-2 SG narrow range level signals can be manually blocked when RCAT is below the P-9 permissive setpoint of 200°F, and automatically unblocked when RCAT is above the P-9 permissive.

The staff finds that the addition of the P-9 permissive and interlock to allow manual blocking of the Low-2 SG wide range water level or Low-2 SG narrow range water level ESFAS automatic actuations during shutdown allows routine maintenance and testing of the SGs, and associated feedwater and steam systems, while preventing undesired and unnecessary Low-2 SG wide range water level and Low-2 SG narrow range water level ESFAS automatic actuations. The SGs have limited capability to remove core decay heat at an RCS RCAT of 200°F or less (i.e., below the P-9 permissive). CMT manual actuation and RCP trip capability is not allowed to be blocked in any mode by the proposed changes to the PMS logic design. Therefore, the staff finds that it is adequate to allow manual block of CMT actuation and RCP trip from Low-2 SG wide range water level signals when RCAT is less than 200°F.

The staff finds that the changes proposed in this LAR allow blocking of ESFAS functions that are not applicable during cold shutdown conditions, while automatically reinstating the ESFAS functions prior to reaching the required modes for these ESFAS functions during plant startup. Those proposed changes do not adversely affect the design functions of the ESFAS Low- 2 wide range SG level and Low-2 narrow range SG level functions as described in the certified AP1000 DCD. Therefore, the staff finds that the reactor protection system with the proposed changes still comply with the regulatory requirements in 10 CFR Part 50, Appendix A, GDC 20 for the protective safety system and hence are acceptable.

3.2.1.5 Addition of P-9 Permissive and Interlock ESFAS Actuation for Refueling Cavity and SFS Isolation

In this LAR, SNC proposed to add a new Low IRWST wide range level ESFAS automatic actuation function for refueling cavity and SFS isolation by including the P-9 permissive and interlock.

The SFS lines are isolated by the PMS logic upon the coincident logic of spent fuel pool level below the Low setpoint. This helps to maintain the water inventory in the refueling cavity due to line leakage. The SFS contains a line that connects the IRWST and the refueling cavity to the SFS Pumps. When the IRWST piping is aligned to the SFS for purification, cooling, and inventory control, a seismic or other event resulting in a pipe rupture in the non-safety-related, non-seismic SFS could potentially result in a loss of IRWST inventory. Therefore, an ESFAS automatic actuation change addresses the potential for a pipe rupture while the SFS is connected to the IRWST. Therefore, SNC proposed in this LAR to add a new ESFAS automatic actuation to close the existing SFS containment isolation valves on Low IRWST wide range level. Specifically SNC proposed to (1) add ESFAS actuation of refueling cavity and SFS isolation on one of two divisions of Low IRWST wide range level; and (2) allow closure of the containment isolation valves in the SFS lines between the IRWST and the SFS by Low IRWST wide range level to be manually blocked when RCAT is below the P-9 permissive setpoint of 200°F, and automatically unblocked when RCAT is above the P-9 permissive.

As described in the certified AP1000 DCD, the SFS may be connected to the refueling cavity and the IRWST during cold shutdown conditions for purification and cooling, and to transfer water between the spent fuel pool, refueling cavity, and IRWST. The SFS may also be connected to the IRWST for purification, cooling, and inventory control for the IRWST during any operational condition. The staff finds that the capability to manually isolate the IRWST from the SFS remains available as required by COL Appendix A TS Table 3.3.9-1, Function 12. This new ESFAS automatic actuation function is not required to protect the core and mitigate the consequences of design basis events. In MODE 6 of the TS, the refueling cavity is filled providing significant water available for core cooling before requiring any remaining IRWST inventory. If this function fails or is manually blocked during a seismic or other event resulting in a pipe rupture in the non-safety-related, non-seismic SFS, the probable consequence includes inoperability of the IRWST as a result of loss of inventory, which is addressed by COL Appendix A TS 3.5.6, 3.5.7, and 3.5.8.

In IEEE Std. 603-1991, Clause 5.1 requires, in part, that safety systems shall perform all safety functions required for a design basis event in the presence of any single detectable failure within the safety systems concurrent with all identifiable but non-detectable failures. Clause 5.7 requires, in part, that capability for test and calibration of safety system equipment shall be provided while retaining the capability of the safety system to accomplish their safety functions. Clause 6.7 requires, in part, that capability of a safety system to accomplish its safety function shall be retained while sense and command features equipment is in maintenance bypass. But, the staff finds in the LAR that only two of the three remaining IRWST wide range level channels are used in the PMS logic for the refueling cavity and SFS isolation function. So, the staff issued an RAI question requesting SNC to provide a safety justification for using only two IRWST wide range level channels (and specifically justify having only one remaining channel when the other channel is out-of-service for maintenance) for the refueling cavity and SFS isolation safety function.

In the RAI response SNC, in part, that with one channel in maintenance, single failure protection would not be maintained. However, because the proposed new function in this LAR supports continued operability of the IRWST when aligned to the non-seismic SFS piping, planned maintenance would not be performed on this function while the IRWST is aligned to the SFS. The use of the SFS for IRWST purification, cooling, and inventory control is only infrequently used during operations (absent any unexpected or unusual conditions inside containment), primarily to purify the water in the IRWST shortly before the start of each refueling outage. Therefore, planned maintenance can be performed during times when the IRWST is not aligned to the SFS. Otherwise, if either or both channels of this new function fail or require maintenance while the IRWST is connected to the SFS, then the IRWST would be declared inoperable until the SFS containment isolation valves are closed to eliminate the non-seismic SFS piping connection to the IRWST. In addition, the IRWST wide range level instrumentation channels remain within the scope of the Design Reliability Assurance Program as shown in the UFSAR Table 17.4-1, and are therefore highly reliable, so maintenance is not expected to be necessary during the infrequent times that the IRWST is aligned to the SFS. Therefore, there is no detrimental effect on overall sense and command features availability, satisfying the requirements of Clause 5.7 and Clause 6.7 of IEEE Std. 603-1991. The staff finds that the additional information is adequate to justify the use of only two IRWST wide range level channels for the refueling cavity and SFS isolation safety function.

The staff also finds that the changes proposed in this LAR do not adversely affect the design functions of the PXS, including the IRWST, or the SFS. Additionally, there is no adverse impact on the existing ESFAS functions for containment isolation of the SFS lines and containment

recirculation involving the IRWST. Also, the new ESFAS automatic actuation function for Low IRWST wide range level addresses an event that would potentially result in a loss of IRWST inventory. So, the proposed changes will allow blocking of the ESFAS automatic actuation function during cold shutdown conditions, while automatically reinstating the new ESFAS automatic actuation function prior to reaching the modes necessary during plant startup. Therefore, the staff finds that with the proposed changes to add the P-9 permissive and interlock to the new ESFAS Low IRWST wide range level function, the protection system continues to meet the regulatory requirements in 10 CFR Part 50, Appendix A, GDC 20 and hence the proposed changes are acceptable.

3.2.2 Evaluation of Technical Specification Changes

COL Appendix A TS are revised as follows:

1. TS Table 3.3.1-1 is revised to change the name of Function 10 from SG Narrow Range Water Level – Low to SG Narrow Range Water Level – Low 2.
   The existing Low SG wide range water level and Low SG narrow range water level setpoint ESFAS automatic actuation names are changed to Low-2 SG wide range water level and Low-2 SG narrow range water level to provide consistency in the current licensing basis which is not consistent when referring to this setpoint designator. The renaming of the SG Narrow Range Water Level – Low to SG Narrow Range Water Level – Low 2 will accommodate the addition of the RCAT P-9 permissive and interlock which is added for CMT actuation (including RCP trip), PRHR heat exchanger actuation, and SG blowdown isolation on Low-2 SG narrow range water level and Low-2 SG wide range water level ESFAS functions.

2. TS Table 3.3.8-1 is revised to:

   a. Change the name of Engineered Safeguards Actuation System Instrumentation Function 18 IRWST Level - Low 3 to IRWST Lower Narrow Range Level - Low 3. Four divisions A, B, C, and D IRWST lower narrow range level instruments are proposed to be added for ESFAS actuations on IRWST Level Low-2 and Low-3.

   b. Change the name of Function 20 from SG Narrow Range Water Level – Low to SG Narrow Range Water Level – Low 2, and change the name of Function 21 from SG Wide Range Water Level – Low to SG Wide Range Water Level – Low The naming changes accommodate the P-9 permissive and interlock that is added for CMT actuation (including RCP trip), PRHR heat exchanger actuation, and SG blowdown isolation on Low-2 SG narrow range water level and Low-2 SG wide range water level ESFAS functions.

3. TS LCO 3.3.14 is revised to rename Spent Fuel Pool Level – Low as Spent Fuel Pool Level – Low-2.
   A new Low IRWST wide range level ESFAS automatic actuation function is added for refueling cavity and SFS isolation, including a P-9 permissive and interlock.

4. TS Table 3.3.17-1 is revised to rename Post-Accident Monitoring Instrumentation Function 11 IRWST Water Level as IRWST Wide Range Water Level.
   The naming change accommodates the addition of four divisions of IRWST lower narrow range level instruments and the deletion of division A IRWST level

instrumentation and the level instrumentation of divisions B, C, and D IRWST being renamed as IRWST wide range level instrumentation.

The above TS changes to function names in TS 3.3 Tables are consistent with the changes proposed to the plant PMS, RTS, ESFAS, BDS, PXS and SFS systems and the FSAR. The TS changes do not affect any function or feature used for the prevention and mitigation of accidents or the safety analyses, and do not adversely affect any allowable value or design analysis. The staff therefore finds the TS changes acceptable and in accordance with 10 CFR 50.36. The TS Bases are changed to be consistent with the TS.

3.2.3 Evaluation of Probabilistic Risk Assessment Changes

Table 17.4-1, "Risk-Significant SSCs within the Scope of D-RAP," is revised in the general I&C system under low pressure/differential pressure sensors to rename the IRWST level sensors as IRWST wide range level and to delete PXS-045. Also, the IRWST lower narrow range level instrumentation (PXS-066, -067, -068, -069) is added to the table, with RAW/CCF identified as the rationale for their inclusion, and a clearer and more specific statement of the insights and assumptions related to IRWST level sensors is supplied.

The new lower narrow range level instrumentation performs the ESFAS actuation function with an accuracy that supports the safety analysis. The remaining wide range level instrumentation is still specified to be qualified post-accident monitoring equipment that meets RG 1.97, Revision 3 and the number of instruments is still sufficient for that purpose. Staff finds the proposed revisions to Table 17.4-1 are consistent with the modified IRWST level instrumentation design and therefore acceptable.

3.2.4 Evaluation of Rector System Changes

The staff asked for clarification concerning the time sequence changes noted in the RAI response regarding the revised Table 15.2-1, Sheets 5 and 6, provided on the last page of Enclosure 6. The staff asked for clarification because there was no explanation provided in the RAI response as to why the change supposedly not related to the LAR was being marked in the revised table. SNC stated that the timing sequence changes were part of a previously approved license amendment number 52 and was approved by the staff for the updated core reference report for the AP1000 design. This core reference report and the revised timing sequences were also incorporated into the latest UFSAR update provided to the NRC on June 6, 2017. Thus, SNC was making the RAI response to be consistent with prior LAR reviews.

3.2.5 Evaluation of Mechanical and Electrical Changes

To perform the technical review of the proposed changes, the staff considered sections of the VEGP Units 3 and 4 UFSAR, as well as portions of the AP1000 Design Control Document, Revision 19, NUREG–1793 "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design" and its Supplements, and the Final Safety Evaluation Report for the VEGP Units 3 and 4 Combined License Application, documenting the staff's technical evaluation of those aspects of the AP1000 DCD and VEGP Units 3 and 4 COL application, respectively. The staff reviewed SNC's proposed change to evaluate the impact on the overall safety of the plant. The following paragraphs describe the staff's review.

1. The existing licensing basis, the UFSAR Subsection 3.2.1, provides that Seismic Category I structures, systems, and components are designed to withstand the

appropriate seismic loads, as discussed in UFSAR Subsection 3.7, “Seismic Design.” AP1000 Class C, Seismic Category I, Principle Construction Code as ASME III-3 are correctly identified for the SSC classification of the added isolation valves and reference lines in Table 3.2-3. The proposed isolation valves and reference lines are designed to be safety-related, Seismic Category I and Quality Group C. The staff finds these changes acceptable because the design criteria for the isolation valves and reference lines meet GDC 1 and GDC 2.

2. The staff reviewed the proposed revisions to add the IRWST Transmitter Isolation valves and the associated EQ criteria to the UFSAR Tier 2, Table 3.11-1, “Environmentally Qualified Electrical and Mechanical Equipment,” and finds it acceptable because the EQ criteria, including environmental zone, function, operating time requirement, and qualification program, for the valves is correctly identified. By letter dated October 3, 2017, (ADAMS Accession No. ML17276B556), SNC provided a supplement to LAR 16-032 and identified that the IRWST Transmitter Isolation valves will be exposed to submergence. The staff reviewed the supplement and found the revision to add submergence testing in Table 3.11-1 for the IRWST Transmitter Isolation valves to be acceptable because it specifies that the valves will be qualified for submergence as part of the mechanical equipment qualification program.

3. The staff reviewed the proposed revisions to add the IRWST Transmitter Isolation valves to the UFSAR Tier 2, Table 3.I6-3, “List of AP1000 Safety-Related Electrical and Mechanical Equipment Not High Frequency Sensitive,” and finds it acceptable because the valves are correctly classified as not high frequency sensitive.

4. The staff reviewed the proposed revisions to the UFSAR Tier 2, Table 3.11-1. The proposed changes identify the Environmental Zone as harsh environment, the equipment function (ESF or PAM), and the operating time. The staff finds the changes to the UFSAR Tier 2, Table 3.11-1 are acceptable because it provides sufficient information to verify the equipment added will be qualified in accordance with the environmental qualification requirements specified in 10 CFR 50.49. Therefore, SNC continues to meet 10 CFR 50.49 and specifically, SNC updated the list of electric equipment important to safety that will be qualified.

5. The staff reviewed the proposed revisions in Table 3I.6-3 “List Of AP1000 Safety-Related Electrical and Mechanical Equipment Not High Frequency Sensitive,” which is revised to delete IRWST Level Transmitter A Isolation valves (PXSPL-V150A and PXS-PL-V151A), IRWST Level Transmitter B Isolation (PXSPL-V150B), IRWST Level Transmitter C Isolation (PXS-PL-V150C), and IRWST Level Transmitter D Isolation (PXS-PL-V150D), and finds the changes are acceptable since the valves are being deleted from the design. The staff finds that the changes did not affect the existing design criteria previously approved in DCD Tier 2 for the PXS system. Table 3I.6-3 is revised to rename IRWST Level Transmitter B Isolation (PXSPL-V151B), IRWST Level Transmitter C Isolation (PXS-PL-V151C), and IRWST Level Transmitter D Isolation (PXS-PL-V151D) as IRWST Wide Range Level Transmitter B Isolation (PXS-PL-V151B), IRWST Wide Range Level Transmitter C Isolation (PXS-PL-V151C), and IRWST Wide Range Level Transmitter D Isolation (PXS-PL-V151D), respectively. The renaming valves of “IRWST Level Transmitter B Isolation” to be “IRWST Wide Range Level Transmitter B Isolation” is acceptable, since the renames of these valves are correctly identified valves, V151B, C and D. These valves are correctly identified in Table 3I.6.3 to be not high frequency sensitive. The staff finds that the changes did not

affect the existing design criteria previously approved in DCD Tier 2 for the PXS system.

The staff has reviewed SNC's analysis provided in LAR 16-032, dated February 17, 2017 and finds that:

(1) The proposed changes did not adversely affect the existing safety standard of the PXS and approved systems.

(2) The proposed components meet the appropriate seismic design requirements and are fabricated to standards commensurate with their safety function.

Based on these findings, the staff concludes that there is reasonable assurance that the requirements of GDC1, GDC 2, 10 CFR 50.49, 10 CFR 50.55a, and Appendix D to 10 CFR Part 52 continue to be met with the changes described in LAR 16-032. Therefore, the staff finds the proposed changes provided in LAR 16-032 to be acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), the Georgia State official was notified of the proposed issuance of the amendment on October 10, 2017. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, "Standards for Protection Against Radiation." The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite. Also, there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (82 FR 14760, published on March 22, 2017). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

Because the exemption is necessary to allow the changes proposed in the license amendment, and because the exemption does not authorize any activities other than those proposed in the license amendment, the environmental consideration for the exemption is identical to that of the license amendment. Accordingly, the 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), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the exemption.

6.0 CONCLUSION

The staff has determined that pursuant to Section VIII.A.4 of Appendix D to 10 CFR Part 52, the exemption (1) is authorized by law, (2) presents no undue risk to the public health and safety, (3) is consistent with the common defense and security, (4) is a special circumstance that outweighs the reduction in standardization, and (5) does not significantly reduce the level of

safety at the Vogtle Electric Generating Plant Units 3 and 4 facility. Therefore, the staff grants SNC an exemption from Tier1 information specified by SNC.

The Commission has concluded, based on the considerations discussed in Section 3 and staff's confirmation that the changes proposed in this LAR do not change an analysis methodology, or assumptions that there is reasonable assurance that: (1) the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that 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, the staff finds the changes proposed in this LAR acceptable.

7.0 REFERENCES

1. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, "Request for License Amendment and Exemption: Addition of In-containment Refueling Water Storage Tank (IRWST) Lower Narrow Range Level Instrumentation," dated February 17, 2017 (ADAMS Accession No. ML17048A533).

2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, "LAR 16-032S1: Voluntary Supplement to VEGP Units 3 and 4 Request for License Amendment and Exemption: Addition of In-containment Refueling Water Storage Tank (IRWST) Lower Narrow Range Level Instrumentation," dated July 21, 2017 (ADAMS Accession No. ML17202U703).

3. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4, "LAR 16-032S2: Supplement to VEGP Units 3 and 4 Request for License Amendment and Exemption: Addition of In-containment Refueling Water Storage Tank (IRWST) Lower Narrow Range Level Instrumentation," dated October 3, 2017 (ADAMS Accession No. ML17276B556).

4. Vogtle Units 3 and 4 Updated Final Safety Analysis Report, Revision 4 and Tier 1, Revision 3 dated July 13, 2015 (ADAMS Accession No. ML15194A443).

5. AP1000 Design Control Document, Revision 19, dated June 13, 2011 (ADAMS Accession No. ML11171A500).

6. Combined License NPF-91 for Vogtle Electric Generating Plant Unit 3, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A106).

7. Combined License NPF-92 for Vogtle Electric Generating Plant Unit 4, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A135).

8. Vogtle Electric Generating Plant Final Safety Evaluation Report, NUREG-2124, Vol 1, "Final Safety Evaluation Report Related to the Combined Licenses for Vogtle Electric Generating Plant, Units 3 and 4" dated September 30, 2012 (ADAMS Accession No. ML12271A045).

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