

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO AMENDMENT NO. 72

TO THE COMBINED LICENSE NOS. NPF-93 AND NPF-94

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

VIRGIL C. SUMMER NUCLEAR STATION, UNITS 2 AND 3

DOCKET NOS. 52-027 AND 52-028

1.0 INTRODUCTION

By letter dated November 16, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16323A020), proposed license amendment request (LAR) 16-09, South Carolina Electric & Gas, on behalf of itself and the South Carolina Public Service Authority (hereafter referred to as the licensee) requested the U.S. Nuclear Regulatory Commission (NRC) to amend the combined licenses (COL) for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, COL Numbers NPF-93 and NPF-94, respectively.

The proposed amendment (LAR 16-09) would revise the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the incorporated plant-specific Design Control Document (DCD) Tier 2 information. The proposed amendment also involves related changes to plant-specific Tier 1 information, with corresponding changes to the associated COL Appendix C information to clarify the Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) related to the inspection of excore (source range, intermediate range, and power range) detectors.

The licensee has also requested an exemption 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." This exemption request will allow a departure from the corresponding portions of the certified information in Tier 1 of the generic DCD.¹

In order to modify the UFSAR (the plant-specific DCD) Tier 1 information, the NRC must find the licensee's exemption request included in its submittal for the LAR to be acceptable. The staff's review of the exemption request, and the LAR is included in this safety evaluation.

¹ While the licensee 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.

The NRC staff issued an initial *Federal Register* notice of opportunity to request a hearing and a proposed No Significant Hazard Determination on February 14, 2017 (82 FR 10590).

By letter dated July 25, 2016 (ADAMS Accession No. ML16207A496), as supplemented by letters dated September 23, 2016, and October 13, 2016, (ADAMS Accession Nos. ML16267A429 and ML16287A662, respectively), Southern Nuclear Operating Company, Inc. (SNC), the licensee for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, submitted LAR 16-010. VCSNS' LAR 16-09 is identical in technical content to that of the license amendment request submitted to the NRC by SNC for VEGP Units 3 and 4. On January 19, 2017, the NRC issued License Amendment No. 66 for VEGP Units 3 and 4 (ADAMS Accession No. ML16320A230) regarding LAR 16-010.

2.0 REGULATORY EVALUATION

As defined in Section II of Appendix D to 10 CFR Part 52, Tier 1 information includes ITAAC and design descriptions, among other things. Therefore, a licensee referencing Appendix D incorporates by reference all Tier 1 information contained in the generic DCD. The Tier 1 ITAAC and the design descriptions, along with the plant-specific ITAAC, were included in Appendix C of the COL at its issuance.

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

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 50.12 for specific exemptions. In addition, the Commission must consider whether special circumstances, as required by 10 CFR 52.7 and 50.12, 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 a proposed amendment to the COL for any modification to, addition to, or deletion from the terms and conditions of a COL. LAR 16-09 involves changes to plant-specific Tier 1 ITAAC information and its corresponding COL Appendix C information, so NRC approval is required.

10 CFR Part 50, Appendix A, General Design Criteria (GDC) 4, "Environmental and dynamic effects design bases," requires that structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components 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.

10 CFR Part 50, Appendix A, GDC 10, "Reactor design," requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin

to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

10 CFR Part 50, Appendix A, GDC 13, "Instrumentation and control," requires that instrumentation shall 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.

10 CFR Part 50, Appendix A, GDC 20, "Protection system functions," requires that the protection system shall 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.

10 CFR Part 50, Appendix A, GDC 35, "Emergency core cooling," requires a system to provide abundant emergency core cooling. 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.

10 CFR Part 50, Appendix A, GDC 38, "Containment heat removal," requires a system to remove heat from the reactor containment. The system safety function shall be to reduce rapidly, consistent with the functioning of other associated systems, the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels.

10 CFR Part 52, Appendix D, Section III.B requires a holder of a COL referencing 10 CFR Part 52, Appendix D to incorporate by reference and comply with the requirements of Appendix D, including all Tier 1 information contained in the generic AP1000 DCD.

10 CFR Part 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references 10 CFR Part 52, Appendix D 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, the Technical Specifications, or requires a license amendment under 10 CFR Part 52, Appendix D, Section VIII.B.5.b or B.5.c. LAR 16-09 involves a license amendment for the plant-specific Tier 1 ITAAC information and its corresponding COL Appendix C information, so NRC approval is also required to change the Tier 2 UFSAR information.

3.0 TECHNICAL EVALUATION

3.1 EVALUATION OF EXEMPTION

The regulations in Section III.B of Appendix D to 10 CFR Part 52 require a licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including all Tier 1 information contained in the generic AP1000 DCD. As defined in Section II of Appendix D to 10 CFR Part 52, Tier 1 information includes ITAAC and design descriptions, among other things. Therefore, a licensee referencing Appendix D incorporates by reference all Tier 1 information contained in the generic DCD. The Tier 1 ITAAC and the design descriptions, along with the plant-specific ITAAC, were included in Appendix C of the COL at its issuance. Because the changes to plant-specific Tier 1 information and corresponding changes to the associated COL Appendix C information, as identified by the licensee, result in the need for a departure, an exemption from the certified design information is required.

The Tier 1 information for which a plant-specific departure and exemption was requested includes corresponding changes to COL Appendix C information while revising the ITAAC for the Nuclear Instrumentation System Excore Detectors. The result of this exemption would be that the licensee could implement modifications to Tier 1 information described and justified in LAR 16-09 if, and only if, the NRC approves LAR 16-09. 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, as 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 special circumstances for which an exemption may be considered. It is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The licensee 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 each of these findings is presented below.

3.1.1 AUTHORIZED BY LAW

This exemption would allow the licensee to implement a revision to Tier 1, Table 2.2.3-4, and

corresponding information in COL Appendix C in the plant-specific DCD. This exemption is a permanent exemption limited in scope to particular Tier 1 information. Subsequent changes to Tier 1, Table 2.2.3-4, or any other Tier 1 information 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 NRC staff has determined that granting of the licensee'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 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 proposed changes would clarify the inspection requirement for the materials of the Nuclear Instrumentation System Excore Detectors, as presented in Tier 1 ITAAC tables. These changes will enable the licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC by clarifying the information mentioned above found in Tier 1, Table 2.2.3-4, of the DCD. The changes proposed by the licensee 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. These changes do not add any new equipment or system interfaces to the current plant design. The clarification for the inspections of the excore source, intermediate, and power range detectors, does not represent any adverse impact to the design function of the excore detectors or the systems, structures and components therein and will continue to protect the health and safety of the public in the same manner. The clarification for the inspections on the excore source, intermediate, and power range detectors does not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor do they modify or remove any design or operational controls or safeguards intended to mitigate any existing on-site hazards. Furthermore, the proposed 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. 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 licensee to change the inspection of the materials of the Nuclear Instrumentation System Excore Detectors, as presented in the system and non-system based ITAAC tables in the plant-specific DCD Tier 1, thereby departing from the AP1000 certified (Tier 1) design information. This proposed exemption would be a permanent exemption limited in scope to particular Tier 1, Table 2.2.3-4 information. Any changes to Tier 1, Table 2.2.3-4, or any other Tier 1 information would be subject to the exemption process in Section VIII.A.4 of Appendix D to 10 CFR Part 52. The changes do not alter or impede the design, function, or operation of any plant structures, systems, or components associated with the facility's physical or cyber security and, therefore, do not affect any plant equipment that is necessary to maintain a safe and secure plant status. In addition, the changes have no impact

on plant security or safeguards. Therefore, as required by 10 CFR 50.12(a)(1), the staff finds that the exemption is consistent with the common defense and security.

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. The underlying purpose of the Tier 1 information is to ensure that a licensee will safely construct and operate a plant based on the certified information found in the AP1000 DCD, which was incorporated by reference into the VCSNS Units 2 and 3 licensing basis. The proposed changes would clarify the inspection requirement for the materials of the Nuclear Instrumentation System Excore Detectors, as presented in Tier 1 ITAAC tables. These changes will enable the licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC by clarifying the information mentioned above found in Tier 1, Table 2.2.3-4 of the DCD.

Special circumstances are present in the particular circumstances discussed in LAR 16-09 because the application of the specified Tier 1 information does not serve the underlying purpose of the rule. The proposed changes clarify the inspection requirements of the materials for the Nuclear Instrumentation System Excore Detectors, as presented in Tier 1 ITAAC tables. This exemption request and associated revisions to Tier 1 Table 2.2.3-4, demonstrate that the applicable regulatory requirements will continue to be met. Consequently, the safety impact that may result from any reduction in standardization is minimized because the proposed design change does not result in a reduction in the level of safety. Therefore, 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

The proposed changes would clarify the inspection requirement for the materials of the Nuclear Instrumentation System Excore Detectors, as presented in Tier 1 ITAAC tables. This exemption would allow the implementation of changes to Tier 1, Table 2.2.3-4 in the DCD as proposed in the LAR. The design functions of the system associated with this request are consistent with the current design of the plant in supporting the actual system functions. The design functions of these systems will continue to be maintained because the associated revisions to Table 2.2.3-4 demonstrate that the applicable regulatory requirements will continue to be met. There is no safety impact and the benefits of clarifying these inspection requirements outweigh any reduction in standardization. Based on the foregoing reasons, as required by 10 CFR Part 52.63(b)(1), the staff finds that the special circumstances outweigh the effects the departure has on the standardization of the AP1000 design.

3.1.6 NO SIGNIFICANT REDUCTION IN SAFETY

This exemption would allow the implementation of changes to Tier 1, Table 2.2.3-4 in the DCD as proposed in the LAR. The exemption request proposes to depart from the certified design by revising the inspection requirement of the materials of the Nuclear Instrumentation System Excore Detectors. The changes for consistency will not impact the functional capabilities of this system. The proposed changes will not adversely affect the ability of the passive core cooling system to perform its design functions, and the level of safety provided by the current systems and equipment therein is unchanged. Therefore, based on the foregoing reasons and as

required by 10 CFR Part 52, Appendix D, Section VIII.A.4, the staff finds that granting the exemption would not result in a significant decrease in the level of safety otherwise provided by the design.

3.2 TECHNICAL EVALUATION OF PROPOSED CHANGES

For the technical evaluation, the NRC staff considered portions of NUREG–1793, Supplement 2, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design,” (ADAMS Accession No. ML112061231) and “Final Safety Evaluation Report Related to the Combined Licenses for Virgil C. Summer Nuclear Station, Units 2 and 3,” (ADAMS Accession No. ML110450305), which respectively document the staff’s technical evaluations of the AP1000 DCD (ADAMS Accession No. ML11171A500) and VCSNS Units 2 and 3 UFSAR (ADAMS Accession No. ML11187A074).

UFSAR Section 7.1.2.7.2, “Nuclear Instrumentation Detectors,” describes the three types of neutron detectors used to monitor the leakage neutron flux. The three types of excore neutron detectors are the source range, intermediate range, and power range detectors. Each excore detector monitors the leakage neutron flux at different power levels. UFSAR Section 7.1.2.7.2 also states that the excore detectors are installed in tubes located around the reactor vessel in the primary shield.

UFSAR Section 6.1.1.4, “Material Compatibility with Reactor Coolant System Coolant and Engineering Safety Features Fluids,” discusses the potential impacts of various materials when in contact with post-accident sump water. In post-accident scenarios when containment is flooded with water containing boric acid, trisodium phosphate is released into the water for pH adjustment through baskets inside of containment. The purpose of this pH adjustment is to provide iodine release control and protection to the austenitic stainless steels components from chloride-induced stress corrosion cracking.

UFSAR Section 6.1.1.4 also discusses the presence of aluminum and zinc surfaces inside of containment during a post-accident scenario when containment is flooded. During these accident conditions, aluminum and zinc are both subject to chemical attack that produces hydrogen and/or chemical precipitates that can challenge containment integrity and affect long-term core cooling. Due to the concern of hydrogen buildup and sump blockage, there are limits to both the amount and location of these materials inside of containment.

One large potential source of aluminum within containment are the excore detectors. Therefore, UFSAR Section 6.1.1.4 states, in part, “to avoid sump water contact with the excore detectors, they are enclosed in stainless steel or titanium housing.” By enclosing the excore detectors in a material that will not react with post-accident sump water, the excore detectors are excluded from the calculated amount of aluminum allowed in containment.

In order to ensure that the excore detectors are adequately encased to prevent contact with post-accident sump water, there is an ITAAC stating that they should be inspected.

Plant-specific Tier 1 Table 2.2.3-4 and its corresponding COL Appendix C Table 2.2.3-4, “Inspections, Tests, Analyses, and Acceptance Criteria,” both currently state:

Table 2.2.3-4 (cont.)
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
***	***	***
8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	xiv) Inspections will be conducted of the exposed surfaces of the source range, intermediate range, and power range detectors.	xiv) These surfaces are made of stainless steel or titanium.

UFSAR Table 14.3-2, “Design Basis Accident Analysis,” currently states:

Table 14.3-2
Design Basis Accident Analysis

Reference	Design Feature	Value
***	***	***
Section 6.1.1.4	The exposed surfaces of the excore detectors are made of stainless steel or titanium.	
***	***	***

Currently, the ITAAC and UFSAR wording are not clear, as the surface of the excore detectors themselves are made of aluminum – not stainless steel or titanium. Furthermore, the aluminum surface shall be encased, and therefore the surface itself is not visibly inspectable.

To address this issue, the licensee proposed changes to clarify plant-specific Tier 1 Table 2.2.3-4, its corresponding COL Appendix C Table 2.2.3-4, and also UFSAR Table 14.3-2.

3.2.1 PROPOSED CHANGES

Enclosure 3 of LAR 16-09 proposed revised changes to plant-specific Tier 1 Table 2.2.3-4 and its corresponding COL Appendix C Table 2.2.3-4, “Inspections, Tests, Analyses, and Acceptance Criteria,” and UFSAR Table 14.3-2, “Design Basis Accident Analysis.”

Plant-specific Tier 1 Table 2.2.3-4 and its corresponding COL Appendix C Table 2.2.3-4, are both amended, as shown below, to clarify the ITAAC for the excore detectors:

Table 2.2.3-4 (cont.)
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment ***	Inspections, Tests, Analyses ***	Acceptance Criteria ***
8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	xiv) Inspection will be conducted of the excore (source range, intermediate range, and power range) detectors.	xiv) A report exists and concludes that the aluminum surfaces of the excore detectors are encased in a watertight stainless steel or titanium housing.

UFSAR Table 14.3-2 is amended, as shown below, to clarify the design feature referenced in UFSAR Section 6.1.1.4:

Table 14.3-2
Design Basis Accident Analysis

Reference ***	Design Feature ***	Value ***
Section 6.1.1.4	The aluminum surfaces of the excore (source range, intermediate range, and power range) detectors are encased in a watertight stainless steel or titanium housing.	

3.2.2 EVALUATION OF PROPOSED CHANGES

The NRC staff's review focused on ensuring that there was no change to the excore detectors' functions, and that the revised wording clearly explained how the ITAAC can meet the safety analysis in UFSAR Section 6.1.1.4.

The proposed "Inspections, Tests, Analyses" column wording states that an, "[i]nspection will be conducted." COL Appendix C, Section 1.1, "Definitions," states that an "inspection" can be a visual observation, physical examination, or review of records based on visual observation or physical examination. Since LAR 16-09 states that the excore detectors are encased in stainless steel or titanium housings during manufacture the staff notes that it is likely that a review of records will be performed. The staff finds the proposed wording acceptable since the excore detectors can be inspected consistent with the definition in COL Appendix C, Section 1.1.

The proposed "Acceptance Criteria" column partially states that "[a] report exists and concludes that the aluminum surfaces of the excore detectors are encased in a watertight stainless steel or titanium housing." COL Appendix C, Section 1.2, "General Provisions," gives several examples of documentation that can be used to meet the acceptance criteria based on this wording. The two criteria that needed to satisfy the safety analysis in UFSAR Section 6.1.1.4 are that 1) the excore detectors are encased so that the aluminum surface will not come into contact with the post-accident sump water, and 2) that either stainless steel or titanium are used since those materials will not chemically react. A report can meet the acceptance criteria by stating the material that the excore detectors are encased in, and demonstrating that the housing is watertight. The staff finds the proposed wording acceptable based on COL Appendix C, Section 1.2, and UFSAR Section 6.1.1.4.

The staff also finds that the revised wording in UFSAR Table 14.3-2, "Design Basis Accident Analysis," is acceptable as that provides clarity to the important design features in UFSAR Section 6.1.1.4, and is consistent with the proposed wording in plant-specific Tier 1 Table 2.2.3-4 and COL Appendix C Table 2.2.3-4.

The staff finds that the revised wording specifying that "excore detectors" includes the source range, intermediate range, and power range detectors is acceptable since that clarifies that every detector needs to be evaluated.

LAR 16-09 states that the excore detectors are installed in wells located around the reactor vessel in the containment module. The wells have a welded cap at the top and penetrations at the bottom for instrument cables. LAR 16-09 states that the proposed ITAAC wording does not impact the ability of the excore detectors to monitor the reactor core during operation or accident conditions. The staff finds the proposed wording acceptable since the changes to the ITAAC and UFSAR only clarifies the wording and does not change the design of the wells around the reactor vessel or the excore detectors themselves.

LAR 16-09, Enclosure 1, Section 4, Regulatory Evaluation, states how the proposed changes meet GDC 4, GDC 10, GDC 13, GDC 20, GDC 35, and GDC 38 in Appendix A to 10 CFR Part 50. The staff finds that GDC 4 is met since the proposed changes only clarifies the wording and the stainless steel or titanium housing is compatible with the environmental conditions associated with a LOCA. The staff finds that GDC 10, GDC 13, and GDC 20 are met since the proposed changes do not impact the ability of the excore detectors to monitor the reactor core during operation or accident conditions. The staff finds that GDC 35 and GDC 38 are met since the watertight stainless steel or titanium that encases the aluminum detectors prevents the aluminum from chemical attack that produces hydrogen and/or chemical precipitates that can challenge containment integrity and affect long-term core cooling during accident conditions.

The NRC staff reviewed the proposed changes and finds the license amendments and requested exemption to be acceptable by the evaluation as set forth above, and because the revised wording provide clarity to the licensing basis.

SUMMARY

The staff reviewed the licensee's proposed amendments and exemption request provided in LAR 16-09. Based on the staff's technical evaluation documented above, the staff finds that:

- 1) The revised ITAAC wording in plant-specific Tier 1 Table 2.2.3-4 and its corresponding COL Appendix C Table 2.2.3-4, "Inspections, Tests, Analyses, and Acceptance Criteria,"

clarifies that the inspection is being performed to ensure that the aluminum surface of the excore detector is encased in a watertight stainless steel or titanium housing to prevent contact with sump water in order to meet the safety analysis in UFSAR Section 6.1.1.4.

- 2) The revised Design Feature wording in USFAR Table 14.3-2, "Design Basis Accident Analysis," clearly states that the aluminum surface of the excore detector should be encased in a watertight stainless steel or titanium housing, and is consistent with both the revised plant-specific Tier 1 wording and the safety analysis in UFSAR Section 6.1.1.4.
- 3) The revised ITAAC and UFSAR wording clearly states that an inspection will be performed on the excore detectors, which includes the source range, intermediate range, and power range detectors.
- 4) The revised ITAAC and UFSAR wording only clarifies the original wording and does not change any specific system, structure, or component, design function, accident scenario, or release path.
- 5) The exemption from 10 CFR Part 52, Appendix D, meets the conditions required by 10 CFR Part 52, Appendix D; 10 CFR 50.12; 10 CFR 52.7; 10 CFR 52.63; and 10 CFR 52.98.

For the reasons specified above, the NRC staff finds that the proposed changes to the plant-specific Tier 1 ITAAC table, its corresponding COL Appendix C table, and the supporting UFSAR table are acceptable.

Based on these findings, the NRC staff concludes that there is reasonable assurance that the requirements of GDC 4, GDC 10, GDC 13, GDC 20, GDC 35, and GDC 38 in Appendix A to 10 CFR Part 50 will continue to be met. Therefore, the staff finds the proposed changes to be acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b), the designated South Carolina State official was notified of the proposed issuance of the amendment. The State of South Carolina had no comment.

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, and that 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 10590 (February 14, 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 nor 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 nor 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) presents special circumstances, (5) the special circumstances outweigh the potential decrease in safety due to reduced standardization, and (6) does not reduce the level of safety at the licensee's facility. Therefore, the staff grants the licensee an exemption from the Tier 1 information requested by the licensee.

The staff has concluded, based on the considerations discussed in Section 3.2 and confirming that these changes do not change an analysis methodology, assumptions, or the design itself, 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 license amendment acceptable.

7.0 REFERENCES

1. NND-16-0347, "VCSNS Units 2 & 3 Request for License Amendment and Exemption: Nuclear Instrumentation System Excore Detector Surface Material Inspection Clarification (LAR 16-09)," dated November 16, 2016 (ADAMS Accession No. ML16323A020).
2. AP1000 Design Control Document, Revision 19, dated June 13, 2011 (ADAMS Accession No. ML11171A500).
3. NUREG-1793, Supplement 2, Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design, dated August 5, 2011 (ADAMS Accession No. ML112061231).
4. Final Safety Evaluation Report for Combined Licenses for Virgil C. Summer Nuclear Station Units 2 and 3, dated August 2011 (ADAMS Accession No. ML110450305).
5. Virgil C. Summer Nuclear Station, Units 2 & 3 Updated Final Safety Analysis Report (UFSAR), dated July 1, 2016 (ADAMS Accession No. ML16193A096).
6. ND-16-0920, "Southern Nuclear Operating Company Vogtle Electric Generating Plant Units 3 and 4 Request for License Amendment and Exemption: Nuclear Instrumentation System Excore Detector Surface Material Inspection Clarification (LAR-16-010)," dated July 25, 2016 (ADAMS Accession No. ML16207A496).
7. ND-16-1779, "Southern Nuclear Operating Company Vogtle Electric Generating Plant Units 3 and 4 Supplement to Request for License Amendment and Exemption: Nuclear Instrumentation System Excore Detector Surface Material Inspection Clarification (LAR 16-010S1)," dated September 23, 2016 (ADAMS Accession No. ML16267A429).
8. ND-16-2114, "Southern Nuclear Operating Company Vogtle Electric Generating Plant Units 3 and 4 Supplement to Request for License Amendment and Exemption: Nuclear Instrumentation System Excore Detector Surface Material Inspection Clarification (LAR 16-010S2)," dated October 13, 2016 (ADAMS Accession No. ML16287A662).
9. Issuance of License Amendment No. 66 for Vogtle Units 3 and 4 – Surface Material Inspection Clarification (LAR 16-010), dated January 19, 2017 (ADAMS Accession No. ML16320A230).