



April R. Rice
Manager, Nuclear Licensing
New Nuclear Deployment

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Document Control Desk
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Virgil C. Summer Nuclear Station (VCSNS) Units 2&3
Combined License Nos. NPF-93 and NPF-94
Docket Nos. 52-027 & 52-028

Subject: LAR 17-01: VCSNS Units 2&3 Request for License Amendment:
Classification of Nonsafety-Related Instrumentation

- References:
1. ND-16-2448, Southern Nuclear Operating Company Vogtle Electric Generating Plant Units 3 and 4, Request for License Amendment: Classification of Nonsafety-Related Instrumentation (LAR-16-029) Dated December 16, 2016 [ADAMS Accession No. ML16351A483]
 2. ND-17-0028, Southern Nuclear Operating Company Vogtle Electric Generating Plant Units 3 and 4, Supplement to Request for License Amendment: Classification of Nonsafety-Related Instrumentation (LAR-16-029S1) Dated January 12, 2017 [ADAMS Accession No. ML17012A272]

In accordance with the provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), acting on behalf of itself and South Carolina Public Service Authority (Santee Cooper), the licensees for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, request an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 and 3, respectively. The requested amendment includes changes to the Updated Final Safety Analysis Report (UFSAR) in the form of a departure from the incorporated plant-specific Design Control Document Tier 2 information.

The proposed change revises the UFSAR to address the seismic Category and AP1000 equipment class of nonsafety-related instrumentation that interfaces with safety-related pressure boundaries.

The description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration determination), and environmental considerations for the

proposed changes in this license amendment request (LAR) are contained in Enclosure 1. Enclosure 2 identifies the requested changes and provides markups depicting the requested changes to the plant-specific UFSAR.

This license amendment request is identical in technical content with Reference 1 and incorporates the correction made in Reference 2.

In order to support the VCSNS Unit 2 construction schedule, SCE&G requests NRC staff review and approval of the license amendment no later than September 18, 2017. Approval by this date will allow sufficient time to implement licensing basis changes prior to affected construction activities. SCE&G expects to implement this proposed amendment (through incorporation into the licensing basis documents; e.g., the UFSAR) within 30 days of approval of the requested changes. Southern Nuclear Operating Company (SNC) has indicated the current requested approval date for the Vogtle Electric Generating Plant Unit 3 license amendment request for this topic is June 1, 2017.

In accordance with 10 CFR 50.91, SCE&G is notifying the State of South Carolina of this LAR by transmitting a copy of this letter and its enclosures to the designated State Official.

This letter contains no regulatory commitments. This letter has been reviewed and confirmed to not contain security-related information.

Should you have any questions, please contact Mr. Nick Kellenberger by telephone at (803) 941-9834, or by email at nicholas.kellenberger@scana.com.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 20th day of January, 2017.

Sincerely,



April R. Rice
Manager, Nuclear Licensing
New Nuclear Deployment

ARR/gt

U.S. Nuclear Regulatory Commission

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Enclosure 1: Request for License Amendment: Classification of Nonsafety-Related Instrumentation (LAR 17-01)

Enclosure 2: Proposed Changes to the Licensing Basis Documents (LAR 17-01)

c : Billy Gleaves
Ruth Reyes
Chandu Patel
Paul Kallan
Jennifer Dixon-Herrity
Sam Lee
Shawn Williams
Tom Fredette
Tomy Nazario
Cathy Haney
Jim Reece
Stephen A. Byrne
Jeffrey B. Archie
Ronald A. Jones
Alvis J. Bynum
Kathryn M. Sutton
April Rice
Nick Kellenberger
Matt Kunkle
Mory Diane
Bryan Barwick
Dean Kersey
Greg Travers
Cynthia Lanier
Lisa Spears
Frederick Willis
Neil Haggerty
Carl Churchman
Ken Langdon
Pat Young
Zach Harper
Brian McIntyre
Brian Bedford
Joseph Cole
Chuck Baucom
Lisa Alberghini
Curt Castell
Susan E. Jenkins
William M. Cherry
Rhonda O'Banion
vcsummer2&3project@westinghouse.com
VCSummerMail@westinghouse.com
DCRM-EDMS@SCANA.COM

South Carolina Electric & Gas Company

NND-17-0018

Enclosure 1

Virgil C. Summer Nuclear Station Units 2&3

**Request for License Amendment:
Classification of Nonsafety-Related Instrumentation**

(LAR 17-01)

(Enclosure 1 consists of 18 pages, including this cover page.)

NND-17-0018

Enclosure 1

Request for License Amendment: Classification of Nonsafety-Related Instrumentation
(LAR 17-01)

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In accordance with the provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), acting on behalf of itself and South Carolina Public Service Authority (Santee Cooper), the licensees for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, request an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 and 3, respectively.

1. SUMMARY DESCRIPTION

The proposed changes revise the Updated Final Safety Analysis Report (UFSAR) in regard to the nonsafety-related instrumentation that interfaces with safety-related pressure boundaries. The changes involve adding a new paragraph to UFSAR Subsection 3.2.2.8 to address the seismic Category and *AP1000* equipment class of such instruments. The changes consist of assigning equipment Class D, seismic Category II to the manifold, instrument, and impulse line (interconnecting tubing between the manifold and instrument). The changes assign safety-related pressure boundary from the process connection to the inboard connection with the instrument manifold, including the intervening isolation valve. The classification of the safety-related portion is proposed to be the same as the safety-related system to which it connects consistent with the classification of sensing lines for Class C instrumentation.

The requested amendment requires changes to the licensing basis documents in the form of departures from the plant-specific Design Control Document (DCD) Tier 2 information (as incorporated into the UFSAR and detailed in Section 2). No change is made to Tier 1, Tier 2*, or COL information; however this change involves a revision to plant-specific Tier 2 information that meets the criteria for a license amendment under 10 CFR Part 52, Appendix D, Section VIII.B.5.b(8) in that it was determined that the proposed change would result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses, and thus requires NRC approval for the Tier 2 departures. This enclosure requests approval of the license amendment necessary to implement this change.

2. DETAILED DESCRIPTION

As described in UFSAR Section 3.2, structures, systems, and components (SSCs) in the *AP1000* are classified according to nuclear safety classification, quality groups, seismic category, and codes and standards. UFSAR Section 3.2, including subsections, provides the classification methodology used for safety-related and seismic classification of *AP1000* SSCs.

Seismic Classification

As stated in UFSAR Subsection 3.2.1, General Design Criterion (GDC) 2 requires that nuclear power plant "Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena, such as earthquakes, tornados, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions." 10 CFR Part 100, Appendix A sets forth the criteria by which the plant design bases demonstrate the capability to function during and after vibratory ground motion associated with the safe shutdown earthquake conditions.

Per UFSAR Subsection 3.2.1, AP1000 seismic classification methodology classifies SSCs into three categories: seismic Category I (C-I), seismic Category II (C-II) and non-seismic (NS). Seismic Category I classification applies to SSCs required to maintain both functionality and integrity, and seismic Category II classification applies to SSCs only required to maintain integrity. Non-seismic items located in the proximity of safety-related items, the failure of which during a safe shutdown earthquake could result in loss of function of safety-related items, are designated as seismic Category II.

The classification criteria for seismic Category I are provided in UFSAR Subsection 3.2.1.1.1, which states that seismic Category I applies to, in general, safety-related SSCs. Seismic Category I also applies to those SSCs required to support or protect safety-related SSCs. Safety-related items are defined as those necessary to provide for the following:

- The integrity of the reactor coolant pressure boundary
- The capability to shut down the reactor and maintain it in a safe shutdown condition
- The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guideline exposures of 10 CFR 50.34

Seismic Category I SSCs meet the quality assurance requirements of 10 CFR Part 50, Appendix B.

UFSAR Subsection 3.2.1.1.2 provides the criteria for seismic Category II. Seismic Category II applies to plant SSCs which perform no safety-related function, and the continued function of which is not required. Seismic Category II applies to SSCs designed to prevent their collapse under the safe shutdown earthquake. Structures, systems and components are classified as seismic Category II to preclude their structural failure during a safe shutdown earthquake or interaction with seismic Category I items which could degrade the functioning of a safety-related SSC to an unacceptable level, or could result in incapacitating injury to occupants of the main control room. Additionally, the seismic Category II turbine building first bay building structure, including Wall 11.2, provides tornado missile protection for openings in Wall 11 as described in UFSAR Table 3.5-1. The design of seismic Category II SSCs is such that a safe shutdown earthquake does not cause unacceptable structural failure of or interaction with seismic Category I items. Seismic Category II fluid systems require an appropriate level of pressure boundary integrity if located near sensitive equipment. As discussed in UFSAR Subsection 3.2.1.1.2, pertinent portions of 10 CFR Part 50, Appendix B apply to the analysis and design of seismic Category II SSCs and are sufficient to provide that these components not cause unacceptable structural failure of or interaction with seismic Category I items during seismic or other applicable design basis events.

AP1000 Equipment Classification System

As described in UFSAR Subsection 3.2.2, the AP1000 equipment classification system conforms to the requirements of 10 CFR 50.55a for the development of a Quality Group classification and the use of codes and standards. The classification system provides a means of identifying the extent to which SSCs are related to safety-related and seismic

requirements. The classification system provides an easily recognizable means of identifying the extent to which SSCs are related to the American Nuclear Society (ANS) nuclear safety classification, NRC quality groups, American Society of Mechanical Engineers (ASME) Code, Section III classification, seismic category and other applicable industry standards.

As described in UFSAR Subsection 3.2.2.3, equipment Class A is a safety-related class equivalent to ANS Safety Class 1. It applies to the reactor coolant system pressure boundary, including the required isolation valves and mechanical supports. This class has the highest integrity, and the lowest probability of leakage. 10 CFR Part 21 applies to Class A SSCs. Class A SSCs are seismic Category I and use codes and standards consistent with the guidelines for NRC Quality Group A. 10 CFR Part 50, Appendix B applies to equipment Class A, and ASME Code, Section III, Class 1 applies to pressure retaining components.

As described in UFSAR Subsection 3.2.2.4, equipment Class B is a safety-related class equivalent to ANS Safety Class 2. Application of Class B requirements limits the leakage of radioactive material from the containment following a design basis accident. 10 CFR Part 21 applies to Class B SSCs. Class B SSCs are seismic Category I and use codes and standards consistent with the guidelines for NRC Quality Group B. 10 CFR Part 50, Appendix B applies to equipment Class B and ASME Code, Section III, Class 2 or Class MC applies to pressure retaining components. ASME Code, Section III, Subsection NE applies to the containment vessel and guard pipes.

As described in UFSAR Subsection 3.2.2.5, equipment Class C is a safety-related class equivalent to ANS Safety Class 3. Class C requirements apply to SSCs that perform safety-related functions, other than those addressed by Class A or Class B, as required to mitigate design basis accidents and other design basis events. Minor leakage will not prevent Class C SSCs from meeting the safety-related function, either from the regard of radiation dose or system functioning. This class also applies to equipment that, upon rupturing, would cause dose limits for unrestricted areas, as specified in 10 CFR Part 20, to be exceeded or would cause a loss of core cooling. 10 CFR Part 21 and 10 CFR Part 50, Appendix B apply to Class C SSCs. ASME Code, Section III, Class 3 applies to pressure retaining components. For electrical systems, including the electrical portions of instrumentation and control systems, Class C is equivalent to Class 1E and appropriate Institute of Electrical and Electronic Engineers (IEEE) standards, including IEEE standard 323-74, IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations, and IEEE standard 344-87 IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations, apply.

As described in UFSAR Subsection 3.2.2.6, equipment Class D is nonsafety-related with some additional requirements on procurement, inspection or monitoring. An SSC is classified as Class D when it directly acts to prevent unnecessary actuation of the passive safety systems. SSCs that support those that directly act to prevent the actuation of passive safety systems are also Class D. These SSCs are normally used to support plant cooldown and depressurization and to maintain shutdown conditions during maintenance and refueling outages. Standard industrial quality assurance standards are applied to Class D SSCs to provide appropriate integrity and function although 10 CFR Part 50, Appendix B and 10 CFR

Part 21 do not apply. Pertinent portions of 10 CFR Part 50, Appendix B are applied to Class D seismic Category II applications, as discussed in UFSAR Subsection 3.2.1.1.2.

As described in UFSAR Subsection 3.2.2.7, equipment Class E is used for nonsafety-related SSCs not classified as Class D that do not have a specialized industry standard or classification, such as fire protection or heating, ventilation and air conditioning systems.

The AP1000 design includes six other equipment classifications that are not pertinent to this activity.

Current instrumentation and control line interface criteria are provided in UFSAR Subsection 3.2.2.8:

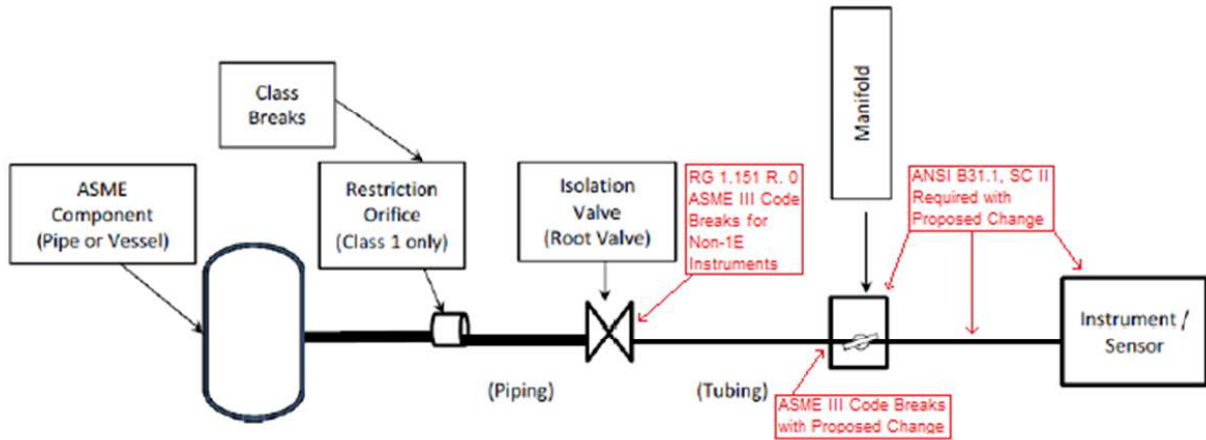
“Class C instrumentation, as defined in Subsection 3.2.2.5 have a safety-related equipment class pressure boundary including the sensing line, valves and instrument sensor. The pressure boundary is the same safety-related equipment class as the systems or components it is connected to. Sensing lines connected to the reactor coolant system pressure boundary are Class B if a suitable flow restrictor is provided.

The parts of the sensor, outside the pressure boundary, are designated Class C (1E) if they provide a safety-related function per Subsection 3.2.2.1. They are Class D if the instrument supports Class D functions per Subsection 3.2.2.6. Otherwise the parts are Class E.”

AP1000 design contains fifty instruments (identified in Table 1 in the last two pages of this Enclosure) that monitor safety-related systems, but perform no safety function and are not required to be available following a design basis event. The classification methodology described in UFSAR Subsection 3.2.2.8 includes cases in which a safety-related instrument monitors a safety-related pressure boundary (Class A, B, or C), and cases of nonsafety-related instruments monitoring nonsafety-related pressure boundaries (Class D or E), but does not currently provide methodology for classification of nonsafety-related instruments monitoring safety-related pressure boundaries. The UFSAR is thus silent in regards to the application of equipment class and seismic categories to nonsafety-related instrumentation connected to safety-related, ASME Section III pressure boundaries.

In the absence of specific UFSAR requirements, this amendment request proposes adding a new classification methodology to UFSAR Subsection 3.2.2.8 applicable to the instruments listed in Table 1. Specifically, the proposed activity adds information to UFSAR Subsection 3.2.2.8 to describe that the instrument, manifold, and impulse line of nonsafety-related instruments that monitor safety-related pressure boundaries be classified as equipment Class D, seismic Category II. The instrument sensing line from the system piping to the manifold, including the instrument isolation valve, are proposed to be safety-related, seismic Category I. The equipment class applied to the safety-related portions is proposed to be the same as that of the monitored system, which is the same approach applied to safety-related instruments. The proposed changes are shown in the highlighted portion of Figure 1 below.

Figure 1: Safety Classification of Instrumentation Sensing Line, Manifold, and Instrument



| Instrument / Sensor | Component Classification (Safety Class / Seismic Category / Associated Code Designation) | | | | |
|---------------------|---|-----------------------|-----------------------|-----------------------|--|
| | Process to Restrictor (if any) | Pipe to Root Valve | Tubing | Manifold | Impulse Line (if applicable) and Transmitter |
| Safety-Related | A / S-I / III-1 | B / S-I / III-2 | B / S-I / III-2 | B / S-I / III-2 | C / S-I / 1E |
| | B / S-I / III-2 | B / S-I / III-2 | B / S-I / III-2 | B / S-I / III-2 | C / S-I / 1E |
| | C / S-I / III-3 | C / S-I / III-3 | C / S-I / III-3 | C / S-I / III-3 | C / S-I / 1E |
| Nonsafety-Related | A / S-I / III-1 | B / S-I / III-2 | B / S-I / III-2 | D / S-II / B31.1 | D / S-II / B31.1 |
| | B / S-I / III-2 | B / S-I / III-2 | B / S-I / III-2 | D / S-II / B31.1 | D / S-II / B31.1 |
| | C / S-I / III-3 | C / S-I / III-3 | C / S-I / III-3 | D / S-II / B31.1 | D / S-II / B31.1 |
| Nonsafety-Related | D, S-II or NNS, B31.1 | D, S-II or NNS, B31.1 | D, S-II or NNS, B31.1 | D, S-II or NNS, B31.1 | D or E, S-II or NNS, non-1E |
| | E, S-II or NNS, B31.1 | E, S-II or NNS, B31.1 | E, S-II or NNS, B31.1 | E, S-II or NNS, B31.1 | E, S-II or NNS, non-1E |

Note: Section in red border reflects proposed changes, other sections are consistent with current classification methodology.

Licensing Basis Change Descriptions

| Plant-Specific Change | Description of Proposed Change |
|-----------------------|---|
| UFSAR Section 3.2.2.8 | Revise to state that for nonsafety-related instruments interfacing with safety-related pressure boundaries, the instrument sensing lines and isolation valves have safety-related pressure boundary function, and the instrument manifold, sensor and impulse line are nonsafety-related and seismic Category II. |

3. TECHNICAL EVALUATION

Per UFSAR Appendix 1A, Regulatory Guide 1.151, Rev. 0 and the endorsed standard ISA S67.02-1980 serve as the basis for safety and seismic classification of instrument lines. ISA S67.02-1980, as described by Regulatory Guide 1.151, Rev. 0, establishes the applicable ASME code requirements and boundaries for the design and installation of instrument sensing lines that interconnect safety-related piping and vessels with safety and nonsafety-related instrumentation.

The ISA S67.02-1980 pressure boundary scope extends from the ASME Section III piping or vessel up to but not including the instrument manifold. Per the requirements of this standard, ASME Section III, Class 3 is required from the process piping to the accessible isolation valve, from which point to the manifold ANSI B31.1 is required. There is no distinction between safety and nonsafety-related instruments in ISA S67.02-1980 requirements. In its endorsement of ISA S67.02-1980, Regulatory Guide 1.151, Rev. 0 imposed the additional requirements that, for connections to ASME III, Class 1 or 2 systems, the sensing line be at least ASME Section III, Class 2. Further, in cases where the instrument has a safety function, Regulatory Guide 1.151, Rev. 0 extends ASME Section III, Class 2 requirements up to the instrument. In summary, the applicable requirements are as follows:

- For Class 1E instruments, all appurtenances from the process connection to the instrument, including sensing lines, isolation valve, manifold and tubing, are safety-related, seismic Category I.
- For non-Class 1E instruments, the sensing lines and isolation valve are safety-related, seismic Category I and the tubing from the isolation valve to the inboard connection with the instrument manifold is ANSI B31.1. No specific requirements are given beyond this connection.

In the case of non-Class 1E instruments connecting to ASME Section III piping or vessels, both Regulatory Guide 1.151, Rev. 0 and ISA S67.02-1980 are silent on the safety classification for the pressure boundary components outboard of the connection to the manifold. Thus, this license amendment request includes a description of the AP1000 safety and seismic classification methodology for pressure boundary components not specifically required to be safety-related, seismic Category I by Regulatory Guide 1.151, Rev. 0 or ISA S67.02-1980.

The proposed change in AP1000 classification methodology for non-1E instruments connected to safety-related systems would transition the sensing lines from safety-related, seismic Category I to nonsafety-related, seismic Category II at the inboard connection to the instrument manifold. This added conservatism exceeds the requirements of Regulatory Guide 1.151, Rev. 0 and ISA S67.02-1980 as neither require extension of ASME Section III beyond the accessible isolation valve for non-1E instrumentation. Beyond this connection, where neither Regulatory Guide 1.151, Rev. 0 nor ISA S67.02-1980 require seismic Category I, the proposed change requires AP1000 equipment Class D, seismic Category II. Additionally, the manifold, instrument, and impulse line are all mounted on the same seismic Category I mounting plate.

UFSAR Appendix 1A states that Regulatory Guide 1.151, Rev. 0 and the endorsed standard ISA S67.02-1980 serve as the basis for safety and seismic classification of instrument lines. The scope of Regulatory Guide 1.151, Rev. 1 is expanded from that of Regulatory Guide 1.151, Rev. 0. However, the classification methodology proposed in this activity also meets or exceeds the classification methodology of Regulatory Guide 1.151, Rev. 1 where specific requirements are given.

The isolation valves for non-1E instrumentation affected by the proposed change are accessible per the requirements of ISA S67.02-1980, that is, they are available to personnel during normal plant operation. Per UFSAR Figure 12.3-1 (withheld from public disclosure due to security-related content) normal operation radiation zone maps, the maximum zone the instrument isolation valves are located in is the maintenance area and maintenance mezzanine near the CA02 wall, which is Zone V (Limited access ≤ 1 R/h). The bulk of the regions are indicated as Zone IV (Limited access ≤ 100 mR/h). For systems such as the reactor coolant system, the shield wall as shown in ISA S67.02-1980 Figure 1 is CA01. In these instances, an appropriate orifice is used and the tubing and isolation valve are therefore AP1000 equipment Class B, such that no nonsafety-related instruments are directly connected to an AP1000 equipment Class A system. For instrument taps located in the upper elevations of the steam generator system, where radiation zones are less severe, there is no shield wall as permitted by ISA S67.02-1980 Table 1, note f.

ISA S67.02-1980, Section 4.2.2 provides four elements applicable to ANSI B31.1 components within the scope of the proposed changes. The proposed changes conform to these elements, including requirements for certified material testing reports, pressure testing, design and service limits, and for connections between ASME Section III and ANSI B31.1 to be in compliance with ASME Section III requirements.

Thus, the proposed changes conform with the guidance of Regulatory Guide 1.151, Rev. 0, and the requirements of endorsed standard ISA S67.02-1980 as stated in the UFSAR Appendix 1A summary description for Reg. Guide 1.151, Rev. 0, and ASME Section III requirements. Instruments that do not have a safety function such as actuation of an engineered safety feature or monitoring of process variables for safety-related display are not required to be safety-related by either Regulatory Guide 1.151 or ISA S67.02-1980. The proposed changes are consistent with AP1000 design criteria, which exceed ISA S67.02-1980 requirements by extending the ASME Section III boundary beyond the root valve that isolates the instrument sensing lines from the process piping, up to the instrument manifold as an added conservatism.

The proposed changes are consistent with the UFSAR commitment to ANSI B31.1 for nonsafety-related instruments as stated in the UFSAR Appendix 1A summary description for Reg. Guide 1.151, Rev. 0. Nonsafety-related instrumentation and the associated tubing are considered inherently robust and are not subject to ASME Section III requirements. The proposed changes are consistent with the UFSAR commitment to Regulatory Guide 1.26, Rev. 3 and Rev. 4 as stated in UFSAR Appendix 1A, including the application of ASME Section III and ANSI B31.1 to the safety and nonsafety-related portions respectively.

The proposed changes are consistent with the UFSAR commitment to Regulatory Guide 1.29, Rev. 3 and Rev. 4 as stated in UFSAR Appendix 1A. No new exceptions to Regulatory Guide 1.29, Rev. 3 or Rev. 4 are required as a result of the proposed change.

Although the pressure boundary safety function ends at the accessible isolation valve for non-1E instrumentation, additional quality requirements are enacted in support of the proposed changes to AP1000 classification methodology. These additional quality requirements provide added assurance that the nonsafety-related components are not susceptible to a common mode failure due to a design basis earthquake. The additional Class D quality requirements include a pressure test at 1.5 times design pressure and a requirement to provide certified material test reports. Applying seismic Category II requirements to the manifold and tubing provides added assurance that they will not break free during a design basis earthquake. In addition to seismic mounting, additional seismic Category II requirements for the instrumentation prohibit structural failure or leakage of process fluids, such as through a failure of the sensing element. As previously discussed, an orifice is used in instances where nonsafety-related instrumentation connects to Class A systems, limiting the safety requirements for the instrument sensing line from the process connection to the inboard connection with the instrument manifold to AP1000 equipment Class B. These changes provide additional assurance that compliance with the maximum allowable reactor coolant system operational leakage rates specified in the COL Appendix A Technical Specifications Limiting Condition for Operation (LCO) 3.4.7 is not adversely affected.

The proposed changes are consistent with the definition of AP1000 equipment Class D provided in UFSAR Subsection 3.2.2.6. Per this definition, Class D applies additional requirements on procurement, inspection or monitoring to SSCs that act to prevent unacceptable interaction with safety-related systems. The proposed changes are also consistent with UFSAR Subsection 3.2.1.1.2 requirements for seismic Category II, which states that nonsafety-related SSCs may not cause unacceptable structural failure of, or interaction with, seismic Category I items.

The proposed changes do not affect any function or feature used for the prevention or 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 in the UFSAR. The proposed changes do not affect the radiological source terms (i.e., amounts and types of radioactive materials released, their release rates and release durations) used in the accident analyses.

The proposed changes do not adversely affect a fission product barrier. No system or design function is adversely affected by the proposed changes. The changes do not result in

a new failure mode, malfunction or sequence of events that could affect a radioactive material barrier or safety-related equipment. The AP1000 design does not include any nonsafety-related instruments with sensing lines that penetrate the containment. Nonsafety-related instruments monitoring the steam generator are included in the boundary of the 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 57 closed volume, and redundant steam generator isolation is provided outside containment through means of steam generator blowdown isolation, feedwater isolation, and steamline isolation valves. The proposed changes do 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.

The proposed changes do not affect or require any change to the AP1000 probabilistic risk assessment (PRA) presented in UFSAR Chapter 19, including the Fire PRA, results and insights (e.g., core damage frequency and large release frequency). There are no changes to the existing failures within the PRA model, and no new postulated failures are required in the PRA model. Therefore, there are no changes required to initiating event frequencies and system logic models of the PRA. The existing PRA risk significance investment protection determination for systems included in the proposed changes are not affected. There is no increase in risk significance to SSCs affected by the proposed changes that are identified as risk-significant within the scope of the Design Reliability Assurance Program (D-RAP) in UFSAR Table 17.4-1.

The proposed changes do not change fire barrier performance and the fire loading analyses results remain unchanged and within their design allowances. The amounts of combustible material loadings in the affected fire areas do not change as a result of this activity. The proposed changes do not adversely affect any safety-related equipment, design code limit allowable value, safety-related function or design analysis, nor do they adversely affect any safety analysis input or result, or design/safety margin.

The proposed changes do not affect the containment, control, channeling, monitoring, processing or release of radioactive and non-radioactive materials. No effluent release path is affected by the proposed changes. Therefore, neither radioactive nor non-radioactive material effluents are affected by the proposed changes.

Plant radiation zones (as described in UFSAR Section 12.3), controls under 10 CFR 20, and expected amounts and types of radioactive materials are not affected by the proposed changes. Therefore, individual and cumulative radiation exposures do not change.

Summary

The proposed changes revise UFSAR Section 3.2.2.8 to apply equipment Class D, seismic Category II requirements on nonsafety-related instruments that connect to safety-related pressure boundaries, including the manifold and connecting tubing. Safety-related pressure boundary and seismic Category I requirements are extended from the process connection to the inboard connection with the manifold. The proposed changes comply with or exceed the requirements of Regulatory Guide 1.151, Rev. 0, and endorsed standard ISA S67.02-1980. The proposed changes do not result in an adverse effect to any structure, system, or

component's UFSAR described design function, therefore no decrease in safety results from the proposed changes.

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section. This change involves a revision to plant-specific Tier 2 information which meets the criteria for a license amendment under 10 CFR Part 52, Appendix D, Section VIII.B.5.b(8), and thus requires NRC approval for the Tier 2 departure.

10 CFR 50.55a requires that safety-related equipment be designed and fabricated to the requirements of the ASME Code, Section III. The proposed changes do not involve safety-related equipment, however the instrument sensing lines from the process connection to the inboard connection with the manifold, including the intervening isolation valve, are designed and fabricated to ASME Code, Section III, exceeding the 10 CFR 50.55a requirement as an added conservatism. Other pressure retaining portions affected by the proposed changes are manufactured to ANSI B31.1 consistent with applicable regulatory guidance and UFSAR commitments.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1, "Quality Standards and Records," requires that nuclear power plant structures, systems, and components (SSCs) important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed. This requirement is applicable to both pressure-retaining and non-pressure-retaining SSCs that are part of the reactor coolant pressure boundary and other systems important to safety. Applicable SSCs are relied upon to prevent or mitigate the consequences of accidents and malfunctions originating within the reactor coolant pressure boundary, permit shutdown of the reactor and maintain it in a safe-shutdown condition, and to retain radioactive material. None of the instrumentation involved in this activity, including the manifolds and connecting tubing, is required to perform the safety-related functions described. To provide additional assurance against a common mode failure due to a safe shutdown earthquake, the proposed changes apply seismic Category II requirements for these instruments. The proposed changes apply nonsafety-related equipment Class D requirements on these instruments, which augments quality assurance requirements by including additional testing and extends the pertinent portions of 10 CFR Part 50 Appendix B to seismic Category II SSCs as discussed in UFSAR Subsection 3.2.1.1.2. The proposed changes also extend the safety-related pressure boundary along the instrument sensing line from the process connection to the inboard connection with the manifold, including the intervening isolation valve, which exceeds the quality group requirements of Regulatory

Guide 1.26, Rev. 3 and Rev. 4, and nonsafety-related instrument requirements of Regulatory Guide 1.151, Rev. 0, and its endorsed standard ISA S67.02-1980, as an added conservatism. Thus, the proposed changes meet or exceed applicable regulatory guidance and industry standards and are consistent with the requirements of GDC 1.

10 CFR Part 50, Appendix A, GDC 2, "Design Bases for Protection Against Natural Phenomena," requires that nuclear power plant SSCs important to safety be designed to withstand the effects of earthquakes without loss of capability to perform their safety functions. As previously discussed, none of the instrumentation affected by the proposed changes is required to remain functional should an SSE occur. Seismic Category I classification is therefore not required; however seismic Category II is applied by the proposed changes as added assurance against common mode failure due to a seismic event. As previously discussed, the safety-related pressure boundary is extended from the process connection to the inboard connection with the instrument manifold as an added conservatism. The changes maintain compliance with Regulatory Guide 1.29, Rev. 3 and Rev. 4 requirements for seismic design classification and are consistent with the requirements of GDC 2.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration Determination

The proposed changes would revise the Updated Final Safety Analysis Report (UFSAR) with regard to Tier 2 information. The change would revise nonsafety-related instrument classification methodology by applying equipment Class D, seismic Category II requirements on nonsafety-related instruments that connect to safety-related pressure boundaries, including the manifold and connecting tubing. Safety-related pressure boundary and seismic Category I requirements are extended from the process connection to the inboard connection with the manifold in excess of applicable standards and regulatory requirements.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

4.3.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed changes to nonsafety-related instrument classification methodology will allow nonsafety-related instrumentation connected to safety-related systems to be appropriately qualified to withstand a safe shutdown earthquake without adversely affecting a safety-related pressure boundary. The safe shutdown fire analysis is not affected, and the fire protection analysis results are not adversely affected. The proposed changes do not involve any accident,

initiating event or component failure; thus, the probabilities of the accidents previously evaluated are not affected. The proposed change does not adversely affect compliance with the maximum allowable reactor coolant system operational leakage rates specified in the Technical Specifications, and radiological material release source terms are not affected; thus, the radiological releases in the accident analyses are not affected.

Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

4.3.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed changes to nonsafety-related instrument classification methodology will allow nonsafety-related instrumentation connected to safety-related systems to be appropriately qualified to withstand a safe shutdown earthquake without adversely affecting a safety-related pressure boundary. The proposed changes do not adversely affect any safety-related system, structure, or component. The nonsafety-related instrumentation provides information for nonsafety-related display and does not control any safety-related feature. Thus, the proposed changes do not introduce a new failure mode. The proposed changes to the nonsafety-related instrument classification methodology do not create a new fault or sequence of events that could result in a radioactive material release.

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

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

Response: No

The proposed changes to nonsafety-related instrument classification methodology will allow nonsafety-related instrumentation connected to safety-related systems to be appropriately qualified to withstand a safe shutdown earthquake without adversely affecting a safety-related pressure boundary. The upgrade in the qualification of the sensing lines and associated instrument isolation valves does not affect the function of the safety-related systems to which they are connected. No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed change, thus no margin of safety is reduced.

Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of “no significant hazards consideration” is justified.

4.4 Conclusions

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. The above evaluations demonstrate that the requested changes can be accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in a margin of safety. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determined that the requested change does not involve a Significant Hazards Consideration.

5. ENVIRONMENTAL CONSIDERATIONS

The proposed changes would revise the Updated Final Safety Analysis Report (UFSAR) with regard to Tier 2 information. The change would revise nonsafety-related instrument classification methodology by applying equipment Class D, seismic Category II requirements on nonsafety-related instruments that connect to safety-related pressure boundaries, including the manifold and connecting tubing. Safety-related pressure boundary and seismic Category I requirements are extended from the process connection to the inboard connection with the manifold in excess of applicable standards and regulatory requirements.

NRC approval of the proposed changes is required under 10 CFR 50, Appendix D, Section VIII.B.5.b(8). However, a review of the anticipated construction and operational effects of the requested amendment has determined the requested amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

- (i) *There is no significant hazards consideration.*

As documented in Section 4.3, Significant Hazards Consideration Determination, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment.” The Significant Hazards Consideration Determination determined that (1) the requested amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the requested amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the requested amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the requested amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

- (ii) *There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.*

The proposed amendment is to change nonsafety-related instrument classification methodology to allow nonsafety-related instrumentation connected to safety-related systems to be appropriately qualified to withstand a safe shutdown earthquake without adversely affecting a safety-related pressure boundary. The proposed change is unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Therefore, it is concluded that the requested amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

- (iii) *There is no significant increase in individual or cumulative occupational radiation exposure.*

The proposed amendment is to change nonsafety-related instrument classification methodology to allow nonsafety-related instrumentation connected to safety-related systems to be appropriately qualified to withstand a safe shutdown earthquake without adversely affecting a safety-related pressure boundary. Plant radiation zones are not affected, and controls in accordance with 10 CFR Part 20 preclude a significant increase in occupational radiation exposure. Therefore, the proposed amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

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

6. REFERENCES

None.

Table 1: Nonsafety-Related Instruments Connected to ASME-III Systems

| Instrument Tag # | P&ID | Sensing Line Safety Class |
|-------------------------|-----------------|----------------------------------|
| CVS-JE-PT040 | CVS-M6-005 | B |
| PXS-JE-LT009A | PXS-M6-001 | B |
| PXS-JE-LT009B | PXS-M6-001 | B |
| PXS-JE-LT010A | PXS-M6-001 | B |
| PXS-JE-LT010B | PXS-M6-001 | B |
| PXS-JE-PT027 | PXS-M6-001 | C |
| PXS-JE-PT028 | PXS-M6-001 | C |
| PXS-JE-PT029 | PXS-M6-001 | C |
| PXS-JE-PT030 | PXS-M6-001 | C |
| PXS-JE-PT065 | PXS-M6-002 | B |
| RCS-JE-FT171 | RCS-M6-001 | B |
| RCS-JE-FT172 | RCS-M6-001 | B |
| RCS-JE-FT173 | RCS-M6-001 | B |
| RCS-JE-FT174 | RCS-M6-001 | B |
| RCS-JE-LT200 | RCS-M6-002 | B |
| RCS-JE-LT305A | RCS-M6-002 | B |
| RCS-JE-LT305B | RCS-M6-002 | B |
| RNS-JE-FT001A | RNS-M6-001 | C |
| RNS-JE-FT001B | RNS-M6-001 | C |
| RNS-JE-PT011A | RNS-M6-001 | C |
| RNS-JE-PT011B | RNS-M6-001 | C |
| RNS-JE-PT012A | RNS-M6-001 | C |
| RNS-JE-PT012B | RNS-M6-001 | C |
| SFS-JE-LT020 | SFS-M6-001 | C |
| SFS-JE-LT022 | SFS-M6-001 | C |
| SGS-JE-FT020 | SGS-M6-001 | B |
| SGS-JE-FT021 | SGS-M6-001 | B |
| SGS-JE-FT022 | SGS-M6-002 | B |

| Instrument Tag # | P&ID | Sensing Line Safety Class |
|-------------------------|-----------------|----------------------------------|
| SGS-JE-FT023 | SGS-M6-002 | B |
| SGS-JE-FT024 | SGS-M6-001 | B |
| SGS-JE-FT025 | SGS-M6-002 | B |
| SGS-JE-FT055C | SGS-M6-001 | C |
| SGS-JE-FT055D | SGS-M6-001 | C |
| SGS-JE-FT055E | SGS-M6-001 | C |
| SGS-JE-FT056C | SGS-M6-002 | C |
| SGS-JE-FT056D | SGS-M6-002 | C |
| SGS-JE-FT056E | SGS-M6-002 | C |
| SGS-JE-LT044 | SGS-M6-001 | B |
| SGS-JE-LT045 | SGS-M6-001 | B |
| SGS-JE-LT046 | SGS-M6-002 | B |
| SGS-JE-LT047 | SGS-M6-002 | B |
| SGS-JE-LT071 | SGS-M6-001 | B |
| SGS-JE-LT072 | SGS-M6-002 | B |
| SGS-JE-PT062 | SGS-M6-001 | C |
| SGS-JE-PT063 | SGS-M6-002 | B |
| VBS-JE-PDT032A | VBS-M6-002 | C |
| VBS-JE-PDT032B | VBS-M6-002 | C |
| VBS-JE-PDT032C | VBS-M6-002 | C |
| VES-JE-PT001A | VES-M6-001 | C |
| VES-JE-PT001B | VES-M6-001 | C |

South Carolina Electric & Gas Company

NND-17-0018

Enclosure 2

Virgil C. Summer Nuclear Station Units 2&3

Proposed Changes to the Licensing Basis Documents

(LAR 17-01)

Note:

Added text is shown as Blue Underline

(Enclosure 2 consists of two pages, including this cover page.)

Tier 2 information in UFSAR Section 3.2, Classification of Structures, Components, and Systems, Subsection 3.2.2.8, is revised with the addition of a new second paragraph, as shown below.

3.2.2.8 Instrumentation and Control Line Interface Criteria

Class C instrumentation, as defined in Subsection 3.2.2.5 have a safety-related equipment class pressure boundary including the sensing line, valves and instrument sensor. The pressure boundary is the same safety-related equipment class as the systems or components it is connected to. Sensing lines connected to the reactor coolant system pressure boundary are Class B if a suitable flow restrictor is provided.

Nonsafety-related instrumentation that monitors safety-related fluid systems is Class D, as defined in Subsection 3.2.2.6. The instrument sensing line is safety-related, seismic Category I from the connected fluid system to the instrument manifold. The instrument, manifold, and impulse line (interconnecting tubing between the manifold and instrument) are Class D, seismic Category II, as defined in Subsection 3.2.1.1.2. The Class D quality requirements include a pressure test at 1.5 times design pressure and a requirement for certified material test reports.

The parts of the sensor, outside the pressure boundary, are designated Class C (1E) if they provide a safety-related function per Subsection 3.2.2.1. They are Class D if the instrument supports Class D functions per Subsection 3.2.2.6. Otherwise the parts are Class E.