Ronald A. Jones
Vice President
New Nuclear Operations

SCE&G®
A SCANA COMPANY

July 17, 2013
NND-13-0395
10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

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

Subject: LAR 13-20 Request for License Amendment: Module Obstructions and Details

Reference: 1. Southern Nuclear Operation Company, Vogtle Electric Generating Plant Units 3 and 4 Request for License Amendment: Module Obstructions and Details (LAR-13-006) (Adams Accession Number ML13170A009)

2. Acceptance Review of Southern Nuclear Operating Company's Request for License Amendment (LAR-13-006) for the Vogtle Electric Generating Plant Units 3 and 4: Module Obstructions and Details (TAC No. RP9444) (Adams Accession Number ML13190A256)

In accordance with the provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G) requests an amendment to the Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 combined licenses (COLs) numbers NPF-93 and NPF-94, respectively.

The proposed amendment would depart from VCSNS Units 2 and 3 plant-specific Design Control Document (DCD) Tier 2 and Tier 2* material contained within the Updated Final Safety Analysis Report (UFSAR) to acknowledge various obstructions and interferences (other than wall openings and penetrations) that may cause a change to the design spacing of shear studs and the design and spacing of wall module trusses in a local area, and to acknowledge appropriate weld types. The departures from information provided in the Tier 2* and associated Tier 2 material are addressed in the enclosed License Amendment Request (LAR).

Enclosure 1 provides the description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration determination) and environmental considerations for the proposed changes. Enclosure 2 provides markups depicting the requested changes to the VCSNS Units 2 and 3 UFSAR.

D083
NRO

The changes proposed in this License Amendment Request are consistent and identical in technical content with License Amendment Request LAR-13-006, submitted by Southern Nuclear Operating Company, identified as Reference 1 of this letter and accepted by the NRC for review as stated in Reference 2 of this letter.

In order to support the VCSNS Unit 2 construction schedule, SCE&G requests NRC staff review and approval of the license amendment by October 29, 2013. Approval by this date will allow sufficient time to implement the licensing basis changes prior to installation of structural module CA20. SCE&G expects to implement the proposed amendment within 30 days of approval.

This letter contains no regulatory commitments.

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 enclosures to the designated State Official.

Should you have any questions, please contact Mr. Alfred M. Paglia by telephone at (803) 941-9876, or by email at apaglia@scana.com.

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

Executed on this 17th day of July, 2013.

Sincerely,

Ronald A. Jones
Vice President
New Nuclear Operations

JRB/RAJ/jrb

Enclosure 1: Virgil C. Summer Nuclear Station Units 2 and 3 – Request for License Amendment: Module Obstructions and Details

Enclosure 2: Virgil C. Summer Nuclear Station Units 2 and 3 – Proposed Changes to Licensing Basis Documents

c: Denise McGovern
Ravindra Joshi
Brian Anderson
Rahsean Jackson
Victor McCree
Jim Reece
Stephen A. Byrne
Jeffrey B. Archie
Ronald A. Jones
Alvis J. Bynum
Kathryn M. Sutton
Julie Ezell
Dean Kersey
Justin Bouknight
Amy G. Aughtman
Dan Churchman
Joel Hjelseth
Brian McIntyre
Zach Harper
William E. Hutchins
Curt Castell
William A. Fox, III
Susan E. Jenkins
William M. Cherry
Rhonda O'Banion
VCSummer2&3ProjectMail@Shawgrp.com
vcsummer2&3project@westinghouse.com
DCRM-EDMS@SCANA.COM

South Carolina Electric & Gas Company

NND-13-0395

Enclosure 1

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

LAR 13-20
Request for License Amendment:
Module Obstructions and Details

Table of Contents

1. Summary Description

In accordance with 10 CFR 50.90, South Carolina Electric and Gas Company (SCE&G), the licensee for Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, requests an amendment to Combined License (COL) Numbers NPF-93 and NPF-94, for VCSNS Units 2 and 3, respectively.

The proposed changes in the requirements for detailed design of structural wall modules used to construct containment internal structures and portions of the auxiliary building are necessary to address regulatory compliance for design of shear studs and internal trusses.

The proposed changes would depart from plant-specific Design Control Document (DCD) Tier 2* and associated Tier 2 material incorporated into the Updated Final Safety Analysis Report (UFSAR) by revising requirements for design spacing of shear studs and wall module trusses and the design of structural elements of the trusses such as angles and channels. These revisions are to address interferences and obstructions that may cause a change to the design spacing in a local area. In each case where the spacing exceeds the design maximum, an evaluation supporting the increase will be completed to demonstrate that the revised spacing is in conformance with design and analysis requirements identified in the UFSAR.

The proposed changes include revising a note on UFSAR Figure 3.8.3-8, Sheet 1, to clarify that the stud spacing specified is a design value and not an exact dimension. A tolerance for stud spacing is added to the note.

The proposed changes include revision of the weld symbol on a Tier 2* figure to change the symbol to a symbol that indicates complete joint penetration and a change to the associated Tier 2 text to clarify that the weld symbol used in the figure indicates complete joint penetration.

This enclosure requests approval of the license amendment necessary to implement the proposed changes to the Tier 2* and associated Tier 2 material.

2. Detailed Description

Overview

Modular construction techniques are used extensively in the containment internal structures and for portions of the auxiliary building. Subassemblies are initially fabricated both offsite and onsite. Module assembly consists of combining the subassemblies into structural modules after which they are installed in the plant. Following placement of the modules within the plant, the hollow wall structures are filled with concrete.

The structural wall modules for the containment internal structures and the auxiliary building have an internal structure consisting of trusses and shear studs and other internal elements including backup structures, reinforcements, embedments, and leak chases. In

addition, penetrations, piping, and conduit that serve plant systems are embedded within the modules and are not considered part of the structural system of the module. While the shear studs and trusses are spaced at regular design intervals, the backup structures, leak chases, penetrations, piping, and conduit are spaced irregularly based on their functional requirements and on the needs of the plant systems they serve.

Design finalization of the modules and fabrication experience in the shop environment have identified issues related to interferences between the internal structural components of the modules (shear studs and trusses) and the other interferences, including those associated with backup structures, leak chases, penetrations, piping, and conduit contained within the modules. As a result of these local interferences, there is a recurring need to revise the typical design spacing of the shear studs by moving or removing studs in the area of the interference. The design and spacing of trusses in close proximity to interferences may be revised by moving or removing channels or shifting the truss. In some cases, this revised spacing may exceed the design spacing described in the UFSAR.

The UFSAR notes that the shear stud and truss design spacing is Tier 2* information. Subsection 3.8.3.1.3 further states that this is the design spacing of the studs, trusses, and channels in the trusses in the structural wall modules "in locations away from openings and penetrations in the walls." This statement is understood to mean that the design spacing of studs, etc. may be revised near wall openings and penetrations. However, the UFSAR did not specifically identify other examples of interferences to the regularly spaced stud and truss design intervals.

The proposed change activity is the revision of Tier 2* text in the UFSAR to acknowledge the various other types of interferences that may cause a change of the design spacing of shear studs and the design and spacing of structural wall module trusses in a local area. The interferences include leak chases, penetrations, internal structures such as reinforcements, embedments, and backup structures, and internal conduit and piping. In each case where the spacing is revised from the typical design spacing, an evaluation supporting the revised spacing is required to demonstrate that the revised spacing is in conformance with design and analysis requirements identified in the UFSAR. The design requirements include conformance with spacing requirements in American Institute of Steel Construction (AISC) N690 and American Concrete Institute (ACI) 349. The basis for the evaluation of the size and spacing of shear studs is the same for the standard spacing and the altered spacing near obstructions. In some cases, spacing requirements may differ between the AISC N690 and ACI 349 codes. Module design documents specify the spacing requirements used and the basis of the spacing evaluation criteria. The design requirements apply to containment internal structures and the structural wall modules in the auxiliary building.

The proposed change activity includes revising a note on UFSAR Figure 3.8.3-8, Sheet 1, to clarify that the stud spacing specified is a design value and not an exact dimension. A tolerance for stud spacing is added to the note. The tolerance is consistent with the tolerance in American Welding Society (AWS) D1.1 for a similar configuration of shear

studs welded to steel beams. The tolerance also is supported by the margin in the stud spacing evaluations considering possible failure modes. Consistent with this revision, the third paragraph of Subsection 3.8.3.1.3 is revised to remove the "maximum" designator in two places.

UFSAR Subsection 3.8.3.5.3.6 identifies the design and evaluation requirements for stud spacing. A revision to these Tier 2 requirements is proposed to define the provisions of AISC N690 that are applied to the design of the shear stud spacing. Discussion of possible failure modes considered is also added.

Design finalization of the modules, fabrication experience in the shop environment, and the comparison of text and figures presented in the UFSAR with shop assembly drawings have identified the need to revise the licensing basis information related to welding of the structural module faceplates. UFSAR Figure 3.8.3-8, Sheet 1, uses the weld symbol for a square groove weld for the welding together of faceplates. This symbol is used in two places. This does not reflect the preferred weld design for module fabrication. Any weld that provides complete joint penetration, including bevel and V-groove welds, is acceptable and satisfies the design requirements and other licensing basis descriptions. The proposed change activity for the weld symbol is revision to Tier 2* Figure 3.8.3-8 to change the symbol to a symbol that indicates complete joint penetration and revision to Tier 2 UFSAR Subsection 3.8.3.1.3 to clarify that the weld symbol used in Figure 3.8.3-8 indicates complete joint penetration. Designation of the weld as typical is not needed because the text already indicates that a complete joint penetration weld is used for faceplate to faceplate welds.

Licensing Basis Change Descriptions

The affected UFSAR subsections and figure are proposed to be modified as discussed below and shown in Enclosure 2.

- UFSAR Subsection 3.8.3.1, "Description of the Containment Internal Structures," text is added to address changes in design spacing of studs and trusses because of obstructions and interferences. Reference to stud design requirements in Subsection 3.8.3.5.3.6 is also added.

- UFSAR Subsection 3.8.3.1.3, "Structural Wall Modules," information is added to clarify the use of weld symbols on Figure 3.8.3-8.

- UFSAR Subsection 3.8.3.1.3, "Structural Wall Modules," information is added to note that spacing for studs and trusses may vary from that shown on Figure 3.8.3-8.

- UFSAR Subsection 3.8.3.5.3.6, "Design of Shear Studs," reference to provisions in AISC N690 for the evaluation of shear stud design is added. Discussion of possible failure modes considered is also added.

- UFSAR Figure 3.8.3-8, Sheet 1, "Structural Modules – Typical Design Details," NOTE 2 is revised to clarify that the stud spacing is a design value and not an exact dimension. A tolerance for stud spacing is added.
- UFSAR Figure 3.8.3-8, Sheet 1, the weld symbol for faceplate welds is changed to show a complete joint penetration weld.

These requirements in UFSAR Subsection 3.8.3 are also applicable to the structural wall modules used in the auxiliary building based on UFSAR Subsection 3.8.4.1.2.

3. Technical Evaluation

Structure, System, Component and/or Analysis Description

The nuclear island structures, consisting of the containment, shield building, and auxiliary building are founded on the 6-foot-thick, cast-in-place, reinforced concrete basemat foundation. The nuclear island basemat provides the interface between the nuclear island structures and the supporting soil or rock. The primary functions of the nuclear island structures are to provide support, protection, and separation for the seismic Category I mechanical and electrical equipment located in the nuclear island.

The nuclear island structures provide protection for the safety-related equipment against the consequences of either a postulated internal or external event. The nuclear island structures are designed to withstand the effects of natural phenomena such as hurricanes, floods, tornados, tsunamis, and earthquakes without loss of capability to perform safety functions. The nuclear island structures are designed to withstand the effects of postulated internal events such as fires and flooding without loss of capability to perform safety functions.

Modular construction techniques are used extensively in the containment internal structures and for portions of the auxiliary building. Subassemblies are initially fabricated both offsite and onsite. Module assembly consists of combining the subassemblies into structural modules after which they are installed in the plant. Following placement of the modules within the plant, the hollow wall structures are filled with concrete. Structural modules are designed as reinforced concrete elements with the steel faceplates serving as reinforcement. Because the faceplates do not have deformation patterns typical of reinforcement, shear studs are welded to the inside of the module faceplates. After the modules are filled with concrete and cured, shear forces caused by design basis loads are transferred to the faceplates by the studs so that the concrete and steel respond in a composite manner. In addition, shear studs provide anchorage into the concrete for piping and electrical raceway supports and other items attached to the module faceplates.

The shear studs are welded to the faceplates on the inside of the modules and are designed to requirements based on AISC N690-1994, "Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities" and

additional criteria included in the UFSAR. Stud spacing and sizing are such that stud loadings are within acceptable limits and that the steel and concrete portions of the structural module act in a composite manner. The composite action is accomplished by considering the combined action of the concrete and faceplate augmented by the shear transfer capability of the welded studs. The studs are sized and spaced such that an equivalent cross section of steel over a specific area under design basis loading is credited with transferring and transforming the shear forces from the concrete into the yield stress of the faceplate. The composite section resists bending moment by one face resisting tension and the other face resisting compression when subjected to a bending moment.

The trusses consist of angles welded vertically to the faceplates and connected by horizontal channels that are welded to the angles and faceplates to form a rectangular pattern between opposite faceplates. The trusses provide a structural framework for the modules, maintain the separation between the faceplates, support the modules during transportation and erection, and act as "form ties" between the faceplates when concrete is being placed. In addition, the trusses provide for in-plane shear transfer between the steel plates and concrete as well as out-of-plane shear strength similar to that provided by shear ties in reinforced concrete. The design requirements for the trusses and evaluation of the trusses for shear transfer are similar to that for the studs.

The welds between module faceplates in subassemblies and completed modules are required to be complete joint penetration welds. Any weld that provides complete joint penetration, including bevel and V-groove welds, and that satisfies design requirements and other licensing basis descriptions is acceptable. Figure 3.8.3-8, Sheet 1, uses the weld symbol for square groove weld for the welding together of faceplates. The square groove weld is one type of complete joint penetration weld. The designation of a square groove weld does not reflect the preferred weld design for module fabrication.

Supporting Technical Details

The shear studs and trusses are welded to the plates on the inside of the modules and are designed to requirements based on AISC N690-1994. Steel and concrete composite (SC) structural module stud spacing is designed to ACI 349 and AISC N690 requirements. ACI 349 requirements are used to evaluate the required thickness (area) of reinforcement based on the demand. In addition, ACI 349 is used for evaluation of cover and clear distance requirements. AISC N690 is used to evaluate the required stud spacing. SC failure modes are addressed in the design of the structural module shear stud spacing. Shear transfer between the steel faceplate and the concrete is evaluated in accordance with AISC N690 Sections Q1.11.1 and Q1.11.4. Faceplate buckling is evaluated in accordance with AISC N690 Section Q1.5.1.3.

Other considerations, including fabrication, result in a design spacing that includes some margin in developing the faceplate strength. Construction tolerances are provided for the design stud spacing. The construction tolerances are determined with consideration of

the SC failure modes, margin in the evaluation and the tolerance in AWS D1.1 for spacing of shear studs in a similar application.

The design requirement is that stud spacing and sizing are such that stud loadings are within acceptable limits and that the structural module acts in a composite manner. Composite action to resist design loading is accomplished by considering the combined action of the concrete and steel faceplate augmented by the shear transfer capability of the welded studs. The composite section resists an out-of-plane bending moment by one face resisting tension and the other face resisting compression. In-plane forces are resisted by composite action of the steel faceplates and concrete infill.

The evaluation of the structural wall modules used in the containment internal structures and for portions of the auxiliary building considers the interfacial shear force transferred through several studs in an analyzed area. The area required for transferring the shear load is included with other engineering factors to determine the design spacing and size of the studs. For example, the choice of shear stud size was limited to standard sizes so that a custom size did not have to be designed and qualified. In addition, trusses and other structural features within the module walls also provide for shear transfer. Spacing of the studs was selected to provide an even spacing of studs between the trusses and the same horizontal and vertical spacing. These factors result in a design size and spacing of the studs that provide a shear connection that develops the steel faceplate yield strength within a maximum of 7.5 feet. Because there is excess capacity in faceplate strength development due to the design stud and truss spacing, studs at local interferences may be removed from the normal pattern of studs without an adverse effect on the composite action of the module.

The evaluation required for local variation of the design spacing applies the same code provisions as the determination of the nominal design spacing and includes verification of the capacity of the shear connections (for example, shear studs) within the area surrounding the localized variation to develop the yield strength of the faceplate. The acceptance criteria for this evaluation are based on provisions in AISC N690 and design criteria for structural modules described in Subsection 3.8.3.5.3. The criterion for developing the yield strength of the plate over about 7.5 ft is derived from the requirements of AISC N690 Q1.11.4 for full composite behavior of a composite beam. The span for the main structural module walls is approximately 30 feet, with the maximum moment occurring at the mid-span. The stud spacing and truss spacing are designed to develop the yield strength of the face plate in tension in one fourth of the nominal span (the approximate distance between the point of inflection and maximum moment); this corresponds to 7.5 ft or three times the wall thickness for the typical wall size, 30 inches. The distance of 7.5 ft is analogous to the development length for reinforcing bar and this spacing criterion is used for all structural module wall spans and thicknesses. Conformance of the design of the structure with the design requirements in UFSAR Subsection 3.8.3 is maintained.

Examples of configurations where the spacing is changed due to interferences have been evaluated to demonstrate that such a change is acceptable using the criteria of AISC

N690. The most common example occurs when one or two studs are removed from the pattern because of the interference of an embedment or backup structure. Embedments are used to provide additional capacity to transfer load into the concrete at the location of piping or component supports. The embedments may consist of deformed bars extending from the faceplate into the concrete a distance greater than the length of the studs or the deformed bars are connected to an anchor positioned in the mass of concrete. Backup structures are provided for larger loads such as a wall or floor. Backup structures are constructed of steel plates or structural shapes that in many cases span the thickness of the module. Evaluation of typical cases has demonstrated that there is margin in the shear transfer capacity from the remaining shear studs surrounding the removed studs.

In cases where one side of the module provides the side wall of a pool or tank, the welds that join the faceplates are backed up by leak chases. These leak chases may interfere with the attachment of the shear studs and require that shear studs be shifted away from the leak chase. Evaluation of stud spacing variance examples at representative leak chase locations has been completed to support this departure. This evaluation demonstrates that the shear capacity from the resulting configuration of shear studs is sufficient to satisfy the requirements and criteria for shear capacity which are based on AISC N690 Table Q1.11.4.

At corner locations where module wall assemblies are connected, studs in the adjacent wall or internal structures, such as internal diaphragms, may result in an interference that causes a larger spacing than the identified design maximum between the last row of studs and the edge of the plate. Evaluation of a representative example of interferences in a corner demonstrates that the shear capacity from the remaining shear studs and the corner geometry is sufficient and the design criteria for structural modules described in Subsection 3.8.3.5.3 are satisfied.

The trusses consist of angles welded vertically to the faceplates and connected by channels welded in a rectangular pattern. When embedments or backup structures are located at or adjacent to the trusses, the channels may be shifted or removed or the truss shifted. The angles of the trusses may be interrupted for the interferences. The embedments and backup structures extend into the concrete beyond the shear studs and are included in the evaluation of the handling loads and in the evaluation of wet concrete loads. The structural elements of the trusses (angles and channels) provide shear connections between the faceplates and concrete. Internal interferences may require that the truss design is modified from the typical configuration. The modifications include shifting or reorienting the channels or interrupting the angles. In the case of interrupted angles, the angles may be framed around the interference. Evaluations of representative modified truss examples demonstrate that the capacity of the revised design is adequate to satisfy the design requirements of the truss in the structural module design.

UFSAR Subsection 3.8.3.5.3.6 identifies requirements for design spacing of the studs. These requirements are for the overall spacing away from interferences and obstructions. The discussion of the design of the size and spacing of the shear studs in UFSAR Subsection 3.8.3.5.3.6 is expanded and clarified by citing the provisions in AISC N690

applied in the evaluation of stud spacing and noting the possible failure modes considered.

UFSAR Figure 3.8.3-8, Sheet 1, is revised to clarify that the stud spacing specified is design spacing and the tolerance for the spacing is added.

Module faceplates are required by the design criteria discussed in UFSAR Subsection 3.8.3.1.3 to be joined with complete joint penetration welds to provide that the capacity of the plates is developed across the weld seam. A properly welded complete joint penetration provides this capacity. A square groove weld is not the only means to achieve a complete joint penetration weld. Other groove welds such as a bevel or V-groove weld also provide a complete joint penetration weld and with greater facility than a square groove weld. Note that Figure 3.8.3-8 is titled "Structural Modules – Typical Design Details," and the weld type is one of these typical details.

No tests of plant systems or experiments are involved with this departure. The attachment of the shear studs and trusses to the steel plates, assembly of modules, and placement within the concrete is not changed in service or during operation of the plant. No procedures or controls for plant systems and components would change the performance of the shear stud or structural module design function.

The proposed activity has no adverse effect on the ex-vessel severe accident. The geometry and strength of the structures are not altered. The material of the steel plates is not altered. The thickness of the structures and steel plates are not reduced. The properties of the concrete included in the containment internal structures are not altered. The design and material selection of the concrete floor beneath the reactor vessel is not altered. The response of the containment to a postulated reactor vessel failure, including direct containment heating, ex-vessel steam explosions, and core concrete interactions is not altered by the changes to the shear stud or truss spacing. The design of the reactor vessel and the response of the reactor vessel to a postulated severe accident are not altered by the changes to the shear stud spacing, truss design and spacing, or welding of the faceplates.

The proposed activity has no impact on the Aircraft Impact Assessment. The changes described are to structures internal to the containment and the auxiliary building. There is no change to protection of plant structures, systems, and components provided by the design of the shield building and the auxiliary building. There is no change to the design of any of the key design features described in UFSAR Appendix 19F. The activity described does not change the design or construction of the shield building.

Because the proposed change activity does not change the geometry or strength of any structural modules or the design or location of any plant equipment, the proposed change activity has no impact on emergency plans or physical security plans. There is no change to systems or the response of systems to postulated accident conditions. There is no change to perimeter walls or other aspects of the structures that could impact physical security.

The proposed changes associated with this license amendment request include a change in the design of internal structures. These changes do not affect the containment, control, channeling, monitoring, processing or releasing of radioactive and non-radioactive materials. The permeability and waterproofing of the concrete for the walls below grade and the basemat is not changed. No effluent release path is affected. The types and quantities of expected effluents are not changed. The functionality of the design and operational features that are credited with controlling the release of effluents during plant operation is not diminished. Therefore, neither radioactive nor non-radioactive material effluents are affected.

The thickness of the wall and density of the concrete are not changed. Therefore, there is no adverse change to the shielding provided by the structural modules. There is no change to plant systems or the response of systems to postulated accident conditions. There is no change to the predicted radioactive releases due to normal operation or postulated accident conditions. Plant radiation zones, controls required by 10 CFR Part 20, and expected amounts and types of radiologically controlled materials are not affected by the proposed changes. Therefore, individual and cumulative radiation exposures do not change.

Summary

This activity does not adversely affect any design function. The departure does not involve an adverse change to the method of evaluation for establishing design bases or safety analyses. It does not adversely affect a design feature credited in the ex-vessel severe accident assessment. Tests, experiments, and procedures described in the licensing basis are unchanged by this activity.

4. Regulatory Evaluation

4.1 Applicable Regulatory Requirements/Criteria

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1 requires that structures be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety functions to be performed. The proposed change does not change the criteria for the design, analysis, and construction of the shear studs and trusses. The code provisions used for the design of the studs are clarified. The design of the structural modules and welding requirements affected by this activity remain in conformance with the code requirements identified and supplemented in the UFSAR.

10 CFR Part 50, Appendix A, GDC 2 states structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. The structures

affected by this activity maintain compliance with GDC 2. The thickness, geometry, and strength of the structures are not altered. The response of the structural modules to seismic motions is not altered by the change in the internal design of the structural modules or the clarification of the welding requirements for the faceplates.

10 CFR Part 50, Appendix A, GDC 4 states 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. The structures affected by this activity maintain compliance with GDC 4. The thickness, geometry, and strength of the structures are not altered. The response of the structural modules to the effects of postulated accidents, including subcompartment pressurization, is not altered by the change in the internal design of the structural modules or the clarification of the welding requirements for the faceplates.

10 CFR Part 52, Appendix D, Section VIII.B requires prior NRC approval for Tier 2* information departures. Although this departure does not adversely affect safety, it does involve departures from Tier 2* information. Therefore, NRC approval is required prior to implementing the Tier 2* departures addressed in this departure.

4.2 Precedent

This proposed change is consistent and identical in technical content with License Amendment Request LAR-13-006 (Adams Accession Number ML13170A009) dated June 19, 2013, submitted by Southern Nuclear Operating Company. The NRC accepted LAR-13-006 for review on July 9, 2013 (Adams Accession Number ML13190A256).

4.3 Significant Hazards Consideration Determination

The proposed amendment would revise the plant-specific design control document (DCD) Tier 2* and associated Tier 2 material incorporated into the Updated Final Safety Analysis Report (UFSAR) to acknowledge types of interferences (other than wall openings and penetrations) that may cause a change in the design spacing of shear studs and the design and spacing of wall module trusses in a local area, to revise a note to clarify that the stud spacing is specified as a design value, to add the tolerance for stud spacing, and to clarify the welding requirements for the modules.

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 design function of the containment structural modules is to support the reactor coolant system components and related piping systems and equipment. The design functions of the affected structural modules in the auxiliary building are to provide support and protection for new and spent fuel and the equipment needed to support fuel handling, cooling, and storage in the spent fuel racks, and to provide support, protection, and separation for the seismic Category I mechanical and electrical equipment located outside the containment building. The design function of the shear studs is to enable the concrete and steel faceplates to act in a composite manner and transfer loads into the concrete of the structural modules. The structural modules are seismic Category I structures and are designed for dead, live, thermal, pressure, safe shutdown earthquake loads, and loads due to postulated pipe breaks. The loads and load combinations applicable to the structural modules in the auxiliary building are the same as for the containment internal structures except that there are no design basis accident loadings due to the automatic depressurization system or pressure loads due to pipe breaks. The proposed changes to the UFSAR are to include types of interferences other than wall openings and penetrations that may cause a change in the design spacing of shear studs and the design and spacing of wall module trusses in a local area. The proposed changes clarify that the stud spacing is specified as a design value and add the tolerance for stud spacing. The revised spacing including the tolerance continues to be in conformance with the design and analysis requirements identified in the UFSAR. The proposed changes also include clarification of a requirement for a complete joint penetration weld. The thickness, geometry, and strength of the structures are not adversely altered. The material of the steel plates is not altered. The properties of the concrete included in the structural modules are not altered. As a result, the design function of the containment structural modules is not adversely affected by the proposed change. There is no change to plant systems or the response of systems to postulated accident conditions. There is no change to the predicted radioactive releases due to postulated accident conditions. The plant response to previously evaluated accidents or external events is not adversely affected, nor does the change described create any new accident precursors. 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 the UFSAR acknowledge types of interferences (other than wall openings and penetrations) that may cause a change in the typical design spacing of shear studs and the design and spacing of wall module trusses in a local area. The proposed changes clarify that the stud spacing is specified as a design value and provide the tolerance for stud spacing. The revised spacing, including the tolerance, continues to be in conformance with the design and analysis requirements identified in the UFSAR. Stud spacing and sizing are evaluated to demonstrate that stud loadings and shear transfer capability are within acceptable limits and that the structural module acts in a composite manner. An additional proposed change is to clarify a requirement for a complete joint penetration weld. The thickness, geometry, and strength of the structures are not adversely altered. The materials of the steel plates are not altered. The properties of the concrete included in the structural modules are not altered. The changes to the internal design of the structural modules do not create any new accident precursors. As a result, the design function of the modules is not adversely affected by the proposed changes. 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 criteria and requirements of American Concrete Institute (ACI) 349 and American Institute of Steel Construction (AISC) N690 provide a margin of safety to structural failure. The design of the shear studs and wall trusses for the structural wall modules conforms to applicable criteria and requirements in ACI 349 and AISC N690 and, therefore, maintain the margin of safety. The proposed changes to the UFSAR acknowledge types of interferences (other than wall openings and penetrations) that may cause a change in the typical design spacing of shear studs and the design and spacing of wall module trusses in a local area. The proposed changes clarify that the stud spacing is specified as a design value and add the tolerance for stud spacing. The revised spacing including the tolerance continues to be in conformance with the design and analysis requirements identified in the UFSAR. An additional proposed change is to clarify a requirement for a complete joint penetration weld. There is no change to the capacity of the weld or to the design requirements of the modules. There is no change to the method of evaluation from that used in the design basis calculations. Therefore, the proposed amendment does not result in 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

In conclusion, 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.

5. Environmental Considerations

The proposed amendment departs from Tier 2* and associated Tier 2 material in the UFSAR (Section 3.8) to acknowledge types of interferences (other than wall openings and penetrations) that may cause a change to the design spacing of shear studs and the design and spacing of wall module trusses in a local area. The proposed amendment includes changes to clarify that the stud spacing is specified as a design value and add the tolerance for stud spacing. The proposed amendment also departs from information on a Tier 2* figure in the UFSAR by clarifying welding requirements.

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, or would change an inspection or surveillance requirement. However, facility construction and operation following implementation of the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment complies with 10 CFR 51.21 by meeting the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration Determination, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment." The Significant Hazards Consideration determined that (1) the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3)

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

(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 involves structural design changes which do not change the as-built configuration of the plant systems and thus do not introduce any changes 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, these changes do not 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 proposed 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 involves structural design changes within the walls and a clarification in the welding requirements used to connect wall plates without impacting the bulk of the material utilized for radiation protection, and thus, do not affect any plant structure, system or component, their function, plant effluent, or radiation controls. This proposed amendment does not change the as-built configuration of plant systems. Consequently, these changes have no effect on individual or cumulative occupational radiation exposure during plant operation. Therefore, it is concluded that the proposed amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the proposed amendment, it has been determined that anticipated construction and operational impacts of the proposed amendment do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment complies with 10 CFR 51.21 by meeting 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 need be prepared in connection with the proposed amendment.

South Carolina Electric & Gas Company

NND-13-0395

Enclosure 2

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

LAR 13-20

Proposed Changes to Licensing Basis Documents

UFSAR Subsection 3.8.3.1, Description of the Containment Internal Structures - Revise Tier 2* and Tier 2 information in the fourth paragraph to include additional information in the locations shown below.

[*The information in Figure 3.8.3-2 that is Tier 2* is the minimum size of the angles and channels used to fabricate the modules. The information in Figure 3.8.3-15 that is Tier 2* is the maximum design spacing between the face plates for the 4-foot-thick refueling canal wall in the containment internal structures and the maximum design spacing between the trusses used to fabricate the modules in locations away from openings or penetrations in the wall. Local variation in the design of the trusses and spacing of the trusses and shear studs may be required to address internal obstructions and accessibility for fabrication and inspection. The obstructions include features such as leak chases; internal structures such as reinforcements, embedments, and backup structures; and internal conduit and piping.*]* See Subsection 3.8.3.5.3.6 for criteria for design of the shear stud size and spacing.

A typical floor module…

UFSAR Subsection 3.8.3.1.3, Structural Wall Modules - Revise Tier 2 information in the second paragraph to include additional information in the location shown below.

Face plates are welded to adjacent plates with full penetration welds so that the weld is at least as strong as the plate. The full penetration welds are identified in Figure 3.8.3-8, Sheet 1 with the weld symbol that includes the notation CJP for complete joint penetration. Plates on each face of the wall module…

UFSAR Subsection 3.8.3.1.3, Structural Wall Modules - Revise Tier 2* information in the third paragraph to include revised information in the locations shown below.

[*The information in Figure 3.8.3-8, Sheet 1 that is considered to be Tier 2* information is the ~~maximum~~ design spacing of the faceplates, trusses, channels in the trusses and the minimum size and ~~maximum~~ design spacing of the headed studs for the modular wall in the containment internal structure in locations away from openings or penetrations in the walls. Local variation in the design of the trusses and spacing of the trusses and shear studs may be required to address internal obstructions and accessibility for fabrication and inspection. The use of full penetration welds to connect the faceplates of the modules is also considered to be Tier 2* information. The information in Figure 3.8.3-8, Sheet 2 that is considered to be Tier 2* information is the use of mechanical connectors and the development length requirement for the mechanical connectors.*]*

UFSAR Subsection 3.8.3.5.3.6, Design of Shear Studs - Revise Tier 2 information in the second paragraph to include revised information in the locations shown below.

The design of the shear stud size and spacing ~~of the shear studs is based on~~ includes consideration of shear transfer and faceplate buckling. Shear transfer is evaluated in accordance with AISC N690 Sections Q1.11.1 and Q1.11.4. ~~of AISC N690 to develop full composite action between the concrete and the steel faceplates.~~ Faceplate buckling is evaluated in accordance with AISC N690 Section Q1.5.1.3. Conformance with these requirements precludes the possible failure modes for structural module construction for design basis loads.

UFSAR Section 3.8, Figure 3.8.3-8, Sheet 1 of 3, [*Structural Modules – Typical Design Details*]* - Revise Tier 2* information in Note 2 to address acceptable spacing and tolerances.

2. DESIGN SPACING FOR WELDED STUDS IS ~~SHALL BE SPACED~~ AS FOLLOWS,
UNLESS OTHERWISE REQUIRED BY THE SPECIFIC CODES AND STANDARDS INVOKED:

$^{3}/_{4}$" Φ x 6" @ 10" VERTICAL FOR A36 CS
$^{3}/_{4}$" Φ x 6" @ 10" HORIZONTAL FOR A36 CS
$^{5}/_{8}$" Φ x 6" @ 6" VERTICAL FOR SS
$^{5}/_{8}$" Φ x 6" @ 6" HORIZONTAL FOR SS
THE TOLERANCE FOR THE SPACING IS ± 10% OF THE DESIGN SPACING.

UFSAR Section 3.8, Figure 3.8.3-8, Sheet 1 of 3, [*Structural Modules – Typical Design Details*]* - Revise Tier 2* information in the Plan View Detail 1 to change weld symbols currently showing a square groove weld to a symbol indicating a Complete Joint Penetration weld.