Ronald A. Jones
Vice President
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NND-16-00

January 19, 2016
11
10 CFR 50.90
10 CFR 52.98

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 15-21 Use of Localized Shoring for Composite Floors and Roof in the Auxiliary Building

1. Southern Nuclear Operating Company (SNC) Request for License Amendment LAR-15-020 (ML15320A464): Use of Localized Shoring for Composite Floors and Roof in the Auxiliary Building (ND-15-2063)

In accordance with the provisions of 10 CFR 50.90 and 52.98, 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 requested amendment proposes to depart from Tier 2* information in the Updated Final Safety Analysis Report (UFSAR) (which includes the plant-specific DCD Tier 2 information) related to the construction methods used for the composite floors and roof of the auxiliary building.

Enclosure 1 provides the description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration determination), and environmental considerations for the proposed changes in the License Amendment Request (LAR). Enclosure 2 identifies the requested changes and provides markups depicting the requested changes to the VCSNS Units 2 and 3 licensing basis documents.

SCE&G requests NRC staff review and approval of the license amendment by September 15, 2016. SCE&G expects to implement the proposed amendment within 30 days of approval.

This letter is consistent with reference 1 and 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 Mrs. April Rice by telephone at (803) 941-9858, or by email at arice@scana.com.

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

Executed on this 19th day of January, 2016.

Sincerely,

Ronald A. Jones
Vice President
New Nuclear Operations

MMD/RAJ/mmd

Enclosure 1: Virgil C. Summer Nuclear Station Units 2 and 3 – Request for License Amendment Use of Localized Shoring for Composite Floors and Roof in the Auxiliary Building (LAR 15-21)

Enclosure 2: Virgil C. Summer Nuclear Station Units 2 and 3 – Proposed Changes to the Licensing Basis Documents (LAR 15-21)

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South Carolina Electric and Gas Company

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

NND-16-0011

Enclosure 1

Request for License Amendment

Use of Localized Shoring for Composite Floors and Roof in the Auxiliary Building

(LAR 15-21)

(Enclosure 1 consists of 10 pages, including this cover page)

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Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, South Carolina Electric and Gas Company (SCE&G), 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.

1. SUMMARY DESCRIPTION

The proposed amendment revises the description for the construction of composite steel beam floors and roof of the auxiliary building by clarifying that the statements in the Updated Final Safety Analysis Report (UFSAR) Subsection 3H.5.2, which include "Unshored construction is used" and "During concreting, no shoring is provided," apply to beams. Composite floors are reinforced concrete placed on metal decking supported by steel beams. The beams are made composite with the slab through top flange shear studs embedded in the slab. The proposed change is to allow use of shoring for the metal deck in the vicinity of penetrations and other openings and as temporary supports in place of an incomplete wall. UFSAR Subsection 3H.5.2 is designated as Tier 2* information.

2. DETAILE D DESCRIPTION

Floors and the roof of the auxiliary building consist of a concrete slab on metal decking, which rest on structural steel floor beams. The metal decking spans between the beams and supports the wet concrete. The metal deck is formed to create ribs in the bottom of the concrete and to provide more strength to support the wet concrete. The metal deck is not credited as part of the structural system resisting post-construction loads. The beams are designed as composite members with the concrete and include shear studs welded to the beams and extended into the concrete.

Where heating, ventilation, and air-conditioning (HVAC) ducts, pipes, and cables pass through the floors, penetrations are installed to act as forms to provide the holes in the concrete floor. These penetrations are supported by the metal deck prior to placing the concrete. For larger penetrations and where the penetration is located near a beam or wall, the metal deck may not provide sufficient support for the weight of the penetration and wet concrete. Temporary supports, or shoring, are required at these locations to support the penetration and metal deck for concrete placement. Where the floors meet a wall, the deck may rest on structural steel attached to the wall or on the top of a partially constructed wall. If the wall is not complete to the elevation of the floor or if the wall has an opening just below the floor level, temporary supports, or shoring, are required to support the metal deck until the concrete is set.

UFSAR Subsection 3H.5.2 states that unshored construction is used for these floors and that during concreting, no shoring is provided. The context of the rest of the paragraph is that this statement is in reference to the supporting beams. The applicability to beams also extends to the second statement in a bulleted list about construction sequence. The proposed changes clarify that the reference in the UFSAR to unshored construction applies to the beams and does not apply to localized shoring of the metal deck.

This change does not impact the requirements for steel and concrete structures in UFSAR Subsection 3.8.4.5. This change does not impact the overall configuration or thickness of the floors or roof in the auxiliary building. This change does not impact the design of the reinforcement or design of the beams in the floors, roof, or walls of the auxiliary building. This

change does not impact the design requirements for the shield building concrete-filled steel module walls in UFSAR Subsection 3.8.4.5.5.

Licensing Basis Change Descriptions

The following describes the changes to Tier 2* information proposed to allow localized shoring for temporary support of the metal deck of the floors and roof of the auxiliary building.

1. In the first paragraph of UFSAR Subsection 3H.5.2, the statement on the use of unshored construction is combined with the previous sentence to clarify that this statement applies only to beams.

2. In the third bullet on construction sequence in UFSAR Subsection 3H.5.2, the statement is changed to apply the requirements for use of no shoring to beams. A sentence is added to identify that local shoring of the metal deck at penetrations and other openings in the floor and supporting wall, or at the location of an incomplete wall is acceptable.

3. TECHNI CAL EVALUATION

The changes involve revising information in UFSAR Subsection 3H.5.2 to clarify that the statements about the use of unshored construction refer to the design and construction of the supporting beams and that limited, localized temporary support or shoring of the metal deck at penetrations and other openings in the floor and supporting wall, or at the location of an incomplete wall is acceptable.

The structural evaluation of the composite floors and roof in the auxiliary building considers both the strength of the reinforced concrete and the supporting beams. The use of shoring to support the beams during placement of the concrete would result in a transfer of loads from the shoring to the beams and concrete when the shoring is removed. Shoring the beams would require a different analysis method for determining the loads in the beams and reinforcement. With the use of unshored construction, the beams are designed to support the full weight of the wet concrete and other construction loads. The use of localized temporary supports for penetrations and similar conditions does not result in a significant transfer of loads when the supports are removed. The localized shoring of the metal deck does not adversely affect the steel beams during placement of the concrete and after removal of the shoring because of the flexibility of the deck relative to the beams. At some metal deck opening locations, such as near mid-span of the beams, there is an inconsequential increase in the compressive stress in the concrete when the shoring is removed. The design of the auxiliary building composite floors and roof using localized temporary support is in conformance with applicable portions of American Concrete Institute (ACI) 349 and American Institute of Steel Construction (AISC) N690. The design and construction of the composite floors as unshored construction with localized temporary supports at penetrations, openings, and similar conditions is consistent with the requirements in AISC N690 paragraph Q1.11.2.2.

The use of localized temporary support for the metal deck at penetrations and similar conditions does not change the structural model used in the evaluation of the nuclear island structures. The evaluation method for the seismic and structural evaluation of the nuclear island structures is not changed. The analyses and evaluations of the floor and roof designs are not changed. The design of the nuclear island structures with the subject change remains in conformance with the applicable portions of ACI 349 and AISC N690.

The proposed changes do not impact the function, design, or operation of the systems and components supported by the walls, floors, floor modules, and structural wall modules. The proposed changes do not impact the function, design, or operation of the safety related systems and components. The proposed changes do not affect the prevention or mitigation of abnormal events (e.g., accidents, anticipated operational occurrences, earthquakes, floods and turbine missiles, or their safety or design analyses). The proposed changes do not involve, nor interface with any structure, system, or component accident initiator or initiating sequence of events, and thus, the probabilities of the accidents previously evaluated in the plant-specific DCD or UFSAR are not affected.

The proposed changes do not make changes to or affect safety-related equipment or a fission product barrier. No system, design function, or equipment qualification would be adversely affected by the proposed changes. The changes do not result in a new failure mode, malfunction, or sequence of events that could adversely affect a radioactive material barrier or safety-related equipment. 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 adversely affect any safety-related system, component, or equipment design code, design code allowable value, function, or design analysis, nor do they adversely affect any safety analysis input, result, or design/safety margin.

The proposed change has no adverse effect on the ex-vessel severe accident. The design, geometry, and strength of the containment internal structures are not changed. 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 construction methods used to construct the auxiliary building floor and roof. The design of the reactor vessel and the response of the reactor vessel to a postulated severe accident are not altered by the localized use of shoring.

The proposed change has no impact on the Aircraft Impact Assessment. The changes described are to construction methods for the auxiliary building floors and roof and do not impact the design or response of the containment vessel and shield building. There is no change to protection of plant structures, systems, and components against aircraft impact provided by the design of the shield building. There is no change to the design of any of the key design features described in UFSAR Appendix 19F. The thickness and strength of the walls, floors, and roof in the auxiliary building are not changed. The activity described does not change the overall design or construction of the shield building.

The proposed changes clarify that the reference in the licensing basis to unshored construction applies to the steel beams integral with the auxiliary building floors and roof and that localized temporary support and shoring of the metal deck in composite floors at penetrations and similar conditions is acceptable. The changes are to construction methods for the auxiliary building floors and roof. The configuration, thickness, and density of the structures are not changed. 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, thus, the consequences of accidents are not affected. These changes do not affect the containment, control, channeling, monitoring, processing or releasing of radioactive and non-radioactive materials. The location and design of penetrations and the permeability of the

concrete structures 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 walls, floors, structural modules, and floor modules and the density of the concrete are not changed; therefore, there is no adverse change to the shielding provided by the floors, walls, structural modules, and floor 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 under 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.

The change has no impact on the emergency plans or the physical security evaluation since there are no changes to the external configuration of walls, doors, or access to the nuclear island.

Summary

The proposed changes would revise the description of the construction of composite steel beam floors and roof in the auxiliary building. The changes involve Tier 2* requirements for the seismic Category I structures. The proposed changes do not adversely affect the design, design requirements, strength, or seismic response of the nuclear island seismic Category I structures.

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

4. REGULAT ORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR Part 52, Appendix D, VIII.B.6, requires prior NRC approval for departure from Tier 2* information. The proposed amendment revises the description of the construction of composite floors and roof in the auxiliary building. This description is designated as Tier 2* information. Therefore, this change involves UFSAR Tier 2* information and a license amendment request (LAR) (as supplied herein) is required.

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 nuclear island structures and the seismic Category II portions of the annex building and turbine building. These structures remain in conformance with the code requirements identified and supplemented in the UFSAR, i.e., applicable portions of American Concrete Institute (ACI) 349 and the applicable portions of American Institute for Steel Construction (AISC) N690.

10 CFR Part 50, Appendix A, GDC 2 requires that structures withstand the effects of earthquakes and appropriate combinations of the effects of normal and accident conditions,

including the effects of environmental loadings, such as earthquakes and other natural phenomena. The proposed changes have no impact on the seismic motions to which the nuclear island structures are subjected and no impact on the response of the nuclear island structures to seismic motions.

10 CFR Part 50, Appendix A, GDC 4 requires that systems, structures, and components can withstand the dynamic effects associated with missiles, pipe whipping, and discharging fluids, excluding dynamic effects associated with pipe ruptures, the probability of which is extremely low under conditions consistent with the design basis for the piping. The proposed changes do not change the configuration of the walls and floors which provide separation between sources and potential targets. The proposed changes have no impact on the capability of the systems, structures, and components to withstand dynamic effects associated with missiles, pipe whipping, and discharging fluids as required by this criterion. The proposed changes do not change the requirements for anchoring safety related components and supports to seismic Category I structures.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration Determination

The proposed amendment would revise the plant-specific Design Control Document (DCD) Tier 2* material incorporated into the Updated Final Safety Analysis Report (UFSAR) by revising the description of the construction of composite floors and roof in the auxiliary building.

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 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 are structurally designed to meet seismic Category I requirements as defined in Regulatory Guide 1.29.

The use of ACI 349 and AISC N690 provides criteria for the design, qualification, fabrication, and inspection of composite steel beam floors and roof in the auxiliary building. These structures continue to meet the applicable portions of ACI 349 and AISC N690. The proposed change does not have an adverse impact on the response of the nuclear island structures to safe shutdown earthquake ground motions or loads due to anticipated transients or postulated accident conditions. The change does not impact the support, design, or operation of mechanical and fluid systems. 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. 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 change revises the description of the construction of composite steel beam floors and roof in the auxiliary building. The proposed change does not change the design function, support, design, or operation of mechanical and fluid systems. The proposed change does not result in a new failure mechanism for the pertinent structures or new accident precursors. As a result, the design function of the structures is not adversely affected by the proposed change.

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 change is consistent with ACI 349 and AISC N690. The design and construction of the auxiliary building floors and roof remain in conformance with the requirements in ACI 349 and AISC N690.

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.

5. ENVIRONMENTAL CONSIDERATIONS

The proposed amendment revises plant-specific Design Control Document (DCD) Tier 2* material incorporated into the Updated Final Safety Analysis Report (UFSAR), through revision of the description of the construction of composite floors and roof in the auxiliary building.

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 meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration Determination, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment." The Significant Hazards Consideration determined that (1) the 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 changes 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 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 changes to the description of the construction of composite floors and roof in the auxiliary building but, does not impact shielding in the auxiliary building. Plant radiation zones are not affected, nor are there any changes to the controls required under 10 CFR Part 20 that preclude a significant increase in

occupational radiation exposure. 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 meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

None

South Carolina Electric and Gas Company

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

NND-16-0011

Enclosure 2

Proposed Changes to the Licensing Basis Documents

(LAR 15-21)

Note: Added text is **Blue Underline**

Deleted text is ~~**Red Strikethrough**~~

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

UFSAR Subsection 3H.5.2, Composite Structures (Floor and Roof)

Revise the first paragraph to combine the statement on the use of unshored construction with the previous sentence to clarify that the statement is only applicable to beams.

> [*The floors consist of a concrete slab on metal deck, which rests on structural steel floor beams. Several floors in the auxiliary building are designed as one-way reinforced concrete slabs supported continuously on steel beams. Typically, the beams span between two reinforced concrete walls. The beams are designed as unshored, composite beams with formed metal deck spanning perpendicular to the members. ~~Unshored construction is used.~~ For the floors, beams are predominately spaced at about 5- to 6-feet intervals and spans are between 15 feet and 25 feet. Based on local geometry considerations the intervals and spans are outside these ranges in a limited number of locations. The spacing between the beams or between beams and walls is as small as 3 feet and as large as 8 feet. The span of the beams is as small as 2 feet, 6 inches and as large as 38 feet, 6 inches. The designs of the beams satisfy the requirements in AISC N690 for composite structures.*]*

Revise the third bullet in the construction sequence to apply the requirements for the use of no shoring to beams. A sentence is added to identify that local shoring of the metal deck at penetrations and other openings in the floor and supporting wall, or at the location of an incomplete wall, is acceptable.

- *During concreting, no shoring is provided for the beams supporting the floors and roof. Local shoring of the metal deck at penetrations and other openings in the floor and supporting wall, or to act as temporary support at the location of an incomplete wall, is acceptable.*]*