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ND-16-0319
10 CFR 50.90
10 CFR 52.98

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Request for License Amendment:
Floor Module Connections (LAR-15-012)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) requests an amendment to the combined licenses (COLs) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4 (License Numbers NPF-91 and NPF-92, respectively). The requested amendment proposes to depart from approved AP1000 Design Control Document (DCD) Tier 2* and associated Tier 2 information in the Updated Final Safety Analysis Report (UFSAR) (which includes the plant-specific DCD Tier 2 information).

The requested amendment proposes to depart from UFSAR text and figures that describe the connections between floor modules and structural wall modules in the containment internal structures.

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 VEGP Units 3 and 4 UFSAR.

This letter contains no regulatory commitments.

SNC requests NRC staff approval of the license amendment by August 10, 2016 to support setting of steel floor modules at Elevation 107'-2". Delayed approval of this license amendment could result in a delay of construction of steel floor modules at the 107'-2" elevation and subsequent dependent construction activities. SNC expects to implement the proposed

amendment (through incorporation into the licensing basis documents, e.g., the UFSAR) within 30 days of approval of the requested changes.

In accordance with 10 CFR 50.91, SNC is notifying the State of Georgia 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. Jason P. Redd at (205) 992-6435.

Mr. B. H. Whitley states that he is the Regulatory Affairs Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

B. H. Whitley

LISA MYRICK SPEARS
MY COMMISSION EXPIRES
June 18, 2019
NOTARY PUBLIC
STATE OF ALABAMA

BHW/ERG/ljs

Sworn to and subscribed before me this 11th *day of* March, *2016*

Notary Public: Lisa Myrick Spears

My commission expires: June 18, 2019

Enclosures:
1) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment: Floor Module Connections (LAR-15-012)
2) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Proposed Changes to Licensing Basis Documents (LAR-15-012)

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Southern Nuclear Operating Company

ND-16-0319

Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Request for License Amendment:

Floor Module Connections

(LAR-15-012)

(This Enclosure consists of 16 pages, including this cover page.)

Table of Contents

1. Summary Description

2. Detailed Description
   (including Licensing Basis Change Descriptions)

3. Technical Evaluation

4. Regulatory Evaluation

   4.1. Applicable Regulatory Requirements/Criteria

   4.2. Precedent

   4.3. Significant Hazards Consideration

   4.4. Conclusions

5. Environmental Considerations

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC), the licensee for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, requests an amendment to Combined License (COL) Numbers NPF-91 and NPF-92, for VEGP Units 3 and 4, respectively.

1. Summary Description

The Updated Final Safety Analysis Report (UFSAR) Subsection 3.8.3 provides a description of the floor modules and the connection between floor modules and structural wall modules in the containment internal structures. The design of the floor modules is shown in UFSAR Figure 3.8.3-3. The connection is shown in UFSAR Figure 3.8.3-17. The text in UFSAR Subsections 3.8.3.1.3 and 3.8.3.5.8.1 references Figure 3.8.3-17. The text in UFSAR Subsection 3.8.3.1.4 describes the design elements in the floor modules and references UFSAR Figure 3.8.3-3. These text references are revised to clarify that the detailed connection design may vary from that shown. The text references are expanded to identify the design elements for which the design details may vary. The text is revised to add discussion of controlling design requirements for the connection variations. UFSAR Figure 3.8.3-17 is revised based on changes to the detail design of the connections and to add notes about the design variations. UFSAR Figure 3.8.3-3 is revised to show shear studs on top of the bottom plate of the floor module. These changes are for the connection design and do not change the structural wall module design for the three critical sections identified in the first paragraph of UFSAR Subsection 3.8.3.5.8.1.

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

2. Detailed Description

The proposed changes to UFSAR Subsection 3.8.3.1.3 include a revision to separate the discussion of floor connections from the structural wall modules for the containment internal structures. Information is added to identify that connections similar to those shown in UFSAR Figure 3.8.3-17 are also used for connections of floor submodules to wall submodules within structural modules. The elevations of the subject floor modules are added to the description. The proposed changes add a discussion to note that the design elements used and the design details in the floor modules and connection design vary in the implemented design. Information is added to identify that the elevations of the channels in the module wall relative to the connections may vary from that shown. The proposed changes note that connection design elements are sized based on American Institute of Steel Construction (AISC) N690 criteria and requirements and note that a locally thicker faceplate or an alternative back-up structure design may be used instead of design elements shown in the wall module. Consistent with Note 5 added to UFSAR Figure 3.8.3-17, the size, spacing, and length of reinforcement used as part of the floor to wall connections satisfies American Concrete Institute (ACI) 349 requirements. The use of ACI 349 standard hooks in the wall and reinforcement connectors on the faceplates is added. Information is added to the description of the floor connection to include a type of floor module connection where the top of the wall does not extend past the elevation of the floor as a variance to the floor module to wall module connection designs. Information is added to note that UFSAR Figure 3.8.3-17 is not representative of the connection of the operating deck floor to the walls of the refueling canal and other floor modules that rest on structural wall modules.

The proposed changes to UFSAR Subsection 3.8.3.1.4 include a revision to add shear studs and channels to the design elements used to construct the floor modules. The shear studs are included to provide the composite action of the concrete and steel in the floor module and transfer load from the steel plate on the bottom through the concrete to the reinforcement bars that anchor into the wall.

The proposed changes to the second paragraph of UFSAR Subsection 3.8.3.5.8.1 separate the discussion of floor module connections from the wall module discussions. UFSAR Figure 3.8.3-17 is removed from the list of wall module figures. The proposed changes include a revision to note that design elements used in the connections and design details may vary in the implemented design. The proposed changes include adding a sentence in the licensing basis identifying that a key design feature is that design elements provide a direct load path from the floor into the wall. Reference to UFSAR Subsection 3.8.3.1.3 for additional requirements is added to the paragraph. The proposed changes include a revision to note that load capacities of connection design elements satisfy AISC N690 criteria and requirements. Information is also added to reference ACI 349 requirements for reinforcement and standard hooks. Information is added to the description of the floor module connection to include a type of floor where the top of the wall does not extend past the elevation of the floor as a variance to the floor connection designs. Information is added to note that UFSAR Figure 3.8.3-17 is not representative of the connection of the operating deck floor to the walls of the refueling canal and other locations where a floor module rests on top of a structural wall module.

UFSAR Figure 3.8.3-3 shows the floor module design and is revised to include the shear studs attached to the bottom steel plate of the module.

There are proposed changes in the design of the structural wall module faceplate connection with the floor modules shown in UFSAR Figure 3.8.3-17, Sheet 1. The figure shows seat angles welded to the vertical face of structural wall modules under the ends of the floor modules with a clip angle connecting the floor module beam to the wall module. The proposed design changes remove the requirement to use these clip angles and include the use of shear plates as a design variation. Notes are added to the figure to identify variation in the connection design. The proposed changes revise the representation of the truss channels to extend to the inside surface of the faceplates. The figure is also revised to remove the elevations for top of concrete (TOC) and bottom of steel (BOS) on Sheet 1 and Sheet 2 because the wall module to floor module connection designs are used at more than one floor elevation. The representation of the reinforcement hooks length is changed to be consistent with the ACI standard for standard hooks. The representation of reinforcement connector on the faceplate is changed to be consistent with the type of connector used.

The proposed changes in the design of heavily loaded floor modules, shown in UFSAR Figure 3.8.3-17, Sheet 2, are representative for “heavily loaded” floor connections. The figure shows two clip angles for the beam connection to a structural wall module. The proposed design changes reconfigure the connection, add the use of shear plates, and remove one of the clip angles shown for the connection. At the beam location the seat angle supporting the beam is changed to show a beam seat. The changes reconfigure the backup structure and remove the plate thickness for the back-up structure because there is a large variation in the detail design of the internal backup structures. The sizes of the angle and channel that are part of the truss in the wall modules are removed because this information is included in Figure 3.8.3-8. The backup structure shown in the module wall is a representative design for the connection and the details for the design implemented may vary from that shown in the figure. The

changes to the figure remove reinforcement bars at the beam locations connected to the faceplates and the associated hooks within the wall modules. In some locations, reinforcement bars connected to the wall module are not provided immediately adjacent to the beam. Consistent with Note 5 added to the figure, where reinforcement is used, the size, spacing, and length satisfy ACI 349 requirements. Symbols identifying the location of Section A and representing concrete are moved on the figure to clarify the design. Dimensions of structural angles and reinforcement bars are added and moved on the figure due to removal of this information in other portions of the figure. Use of the term “plate girder” is replaced with “beam” on UFSAR Figure 3.8.3-17, Sheet 2. This is consistent with the use of the term “beam” on Sheet 1 of the figure.

The proposed changes to the connection design and to the UFSAR text and figures are provided to more clearly state what was always understood to be a design requirement for the connection of the floor module to the structural wall modules which is that the connection design satisfies applicable provisions of AISC N690 and ACI 349. UFSAR Figure 3.8.3-17 provides an example of a detail design that demonstrates conformance with the AISC N690 and applicable ACI 349 criteria and requirements. The specific detail design shown in UFSAR Figure 3.8.3-17 is not required to be used at all locations to provide conformance with AISC N690 and ACI 349 criteria and requirements. The proposed changes do not change the design requirements and evaluation methods for the floor modules described in UFSAR Subsection 3.8.3.5.4. The proposed changes do not change the structural wall module design for the critical sections identified in the first paragraph of UFSAR Subsection 3.8.3.5.8.1.

The proposed changes to allow for variance in the connection design are not necessary for the connections between the floor modules and wall modules in the auxiliary building. UFSAR Subsection 3.8.4.1.2 identifies that the configuration of the auxiliary building structural modules is similar to the structural modules used for the containment internal structures. However, the floors connected to structural wall modules in the auxiliary building constructed with concrete on steel plates are designed as ACI 349 structures, not as AISC N690 composite structures. UFSAR Subsection 3.8.4.1.2 identifies that the design details for structural modules in the auxiliary building are different compared to the containment internals structures. The text in UFSAR Subsection 3.8.4.1.2 provides sufficient allowance to cover the difference between the design shown in UFSAR Figure 3.8.3-17 and the design of the connections between floor modules and wall modules in the auxiliary building.

The design and construction of the shield building is not affected by this activity. The design of the shield building structural wall modules is described in UFSAR Subsection 3.8.4.5.5.

Licensing Basis Change Descriptions

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

A. Revise the information in the last paragraph of UFSAR Subsection 3.8.3.1.3, “Structural Wall Modules,” describing UFSAR Figure 3.8.3-17 and include additional details with the following proposed changes:

   1. Provide an expanded discussion of the connection of floor modules to the structural wall modules.

   2. Identify where the connections are used.

3. Identify that connections similar to those shown are also used for connections within structural modules.
4. Identify that the design elements used and the detailed design vary at different beam locations.
5. Add reference to AISC N690 Code requirements for the connection design.
6. Identify that use of clip angles and shear plates vary as needed.
7. Identify that the elevations of the channels in the module wall relative to the connections may vary.
8. Identify that thicker faceplates may be used.
9. Identify that the backup structure shown in the module wall is a representative design for the connection and the design elements used and the details for the design used vary.
10. Add the requirement for conformance of reinforcement to ACI 349 and use of ACI 349 standard hooks in the wall module.
11. Add information to note that UFSAR Figure 3.8.3-17 is not representative of the connection of the operating deck floor to the walls of the refueling canal and other floor modules that rest on structural wall modules.

B. Revise the information in UFSAR Subsection 3.8.3.1.4 to add shear studs and channels to the list of design elements used to construct the floor modules.

C. Revise the information and include additional detail in the second paragraph of UFSAR Subsection 3.8.3.5.8.1 “Structural Wall Modules,” with the following proposed changes:

1. Remove UFSAR Figure 3.8.3-17 from the list of figures showing wall module information.
2. Move the sentence describing the floor module connections to be the first sentence of a newly created separate paragraph.
3. Enhance the discussion of the information in UFSAR Figure 3.8.3-17 as part of the new separate paragraph.
4. Identify that the design elements used and the connection design details vary.
5. Describe direct load path as a key feature in connection design.
6. Add reference to additional information on the connection design in UFSAR Subsection 3.8.3.1.3.
7. Identify that details of the connection design including plate thickness, structural shape size, and reinforcement arrangement may vary based on local loads.
8. Specify that the connection design must provide sufficient load capacity to satisfy AISC N690 and ACI 349 criteria and requirements.
9. Add information to note that UFSAR Figure 3.8.3-17 is not representative of the connection of the operating deck floor to the walls of the refueling canal and other floor modules that rest on structural wall modules.

D. Revise UFSAR Figure 3.8.3-3 to add shear studs on top of the bottom steel plate of the floor module.

E. Revise the information in UFSAR Figure 3.8.3-17, Sheets 1 and 2, "Structural Modules – Design Details Standard Floor Connection" and "Structural Modules – Design Details Heavily Loaded Floor Connection" respectively, for clarity as follows:

1. Replace the term "Plate Girder" with "Beams" in the Labels for the section views shown on Sheet 2.
2. Replace the identifier "PLATE GIRDER" with "BEAMS" in three of the section views on Sheet 2.
3. Add "SHEAR PLATE" and the term "(AS APPLICABLE)" to the clip angle designation where shown on Sheet 1 and Sheet 2. Revise the figure to show a clip angle and a shear plate instead of two clip angles in the connection in Sheet 2, TOP VIEW AT BEAMS IN FLOOR and in Section A.
4. Redraw Section A and "TOP VIEW AT BEAMS IN FLOOR" on Sheet 2 to show connection design based on design finalization. The changes remove the reinforcement adjacent to the beam section and remove the connectors adjacent to the beam in Section A.
5. Redraw reinforcement hooks to show proper length for standard hooks in both sections on Sheet 1 and in SECTION BETWEEN BEAMS IN FLOOR on Sheet 2.
6. Change representation of reinforcement connector on faceplate to show representative configuration of the connector in both sections on Sheet 1 and in SECTION BETWEEN BEAMS IN FLOOR on Sheet 2.
7. Remove the dimensions from the wall module internal structure and from the plate thickness of backup structure from Top View on Sheet 2.
8. Redraw the representation of the wall module internal channels to extend to the faceplate in both sections on Sheet 1 and in SECTION AT BEAMS IN FLOOR and SECTION BETWEEN BEAMS IN FLOOR on Sheet 2.
9. Redraw the representation of the backup structure in Top View, SECTION AT BEAMS IN FLOOR, and Section A on Sheet 2.
10. Redraw the representation of the wall module structure on Sheet 2 to move and reconfigure the plates applied or overlaid onto the faceplates on the connection side of the wall module in TOP VIEW AT BEAMS IN FLOOR, SECTION AT BEAMS IN FLOOR and SECTION BETWEEN BEAMS IN FLOOR.
11. Remove the reinforcement bars in the floor and the reinforcement connectors in the Top View, Section A, and in the SECTION AT BEAMS IN FLOOR on Sheet 2.
12. Remove the elevations for TOC (top of concrete) and BOS (bottom of steel) on Sheet 1 and Sheet 2.
13. Move arrows identifying Section A in SECTION AT BEAMS IN FLOOR on Sheet 2 to clarify the location of Section A.
14. Remove symbols indicating concrete from Sheet 2 SECTION AT BEAMS IN FLOOR and add the symbols indicating concrete to Sheet 2 SECTION BETWEEN BEAMS IN FLOOR and Sheet 1 SECTION BETWEEN BEAMS IN FLOOR to be consistent with the materials at those locations.

15. Add the dimensions for the angles welded to the floor in Sheet 2, SECTION AT BEAMS IN FLOOR.
16. Replace the seat angle with a beam seat in Sheet 2, SECTION AT BEAMS IN FLOOR.
17. Add designation of reinforcement bar size (#11) to Sheet 2 SECTION BETWEEN BEAMS IN FLOOR.
18. Add shear studs attached to the bottom steel plate of the floor module in SECTION BETWEEN BEAMS IN FLOOR in Sheet 1 and 2.
19. Add notes to UFSAR Figure 3.8.3-17, Sheets 1 and 2 to provide the following information:
    a) Identify that details shown are representative of floor modules at El. 107′-2″ and 135′-3″ and the connections of floor modules to wall modules inside containment. Include reference to Subsection 3.8.3.1.3 and other notes for additional information about design details and variations.
    b) Identify that the reinforcement size and spacing in the floor module concrete are based on the requirements in ACI 349 and provide reinforcement size range.
    c) Identify that the design of the plates, beams, and stiffeners in the floor varies and satisfies the requirements of AISC N690.
    d) Identify that the reinforcement and floor design elements shown are for locations away from openings, penetrations, and other obstructions.
    e) Identify that for reinforcement included as part of the connection design, the size, spacing, and length satisfy the requirements of ACI 349 and that the design of the standard hooks and the couplers satisfy the requirements of ACI 349.
    f) Identify that the detail design, location, and attachment of the floor and beam supports are designed to the requirements of AISC N690 and support configurations are based on loading and local geometry considerations.
    g) Identify that the designs of the connections and backup structures within the modules wall satisfy the requirements of AISC N690 and that the strength of the studs is based on ACI 349, Appendix B.
    h) Identify that the thickness of the adjacent wall is based on the wall design requirements and location.
20. Add additional note to UFSAR Figure 3.8.3-17, Sheet 2 to provide the following information:
    a) Identify that the beam seat shown is not used at all beam locations. The seat angle shown on Sheet 1 is used at other locations.

3. Technical Evaluation

Modular construction techniques are used extensively in the containment internal structures. 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. Structural wall modules, designed and constructed as steel plate concrete filled composite structures, and floor modules are used for major containment internal structures.

The floor modules are seismic Category I structures and are designed for dead, live, thermal, pressure, safe shutdown earthquake, and loads due to postulated pipe breaks.

The design of the connections of the floor modules to the structural wall modules are in conformance with applicable criteria and requirements of AISC N690 and ACI 349. The designs of these floor-to-wall connections rely on a direct, mechanical connection from the design elements in the floor through the faceplate and into the wall module. The floor loads and the geometry of the floor module connection to the wall module vary significantly from one location to another. This results in variation in the size and configuration of the design elements connecting the floor module to the faceplate and in the size and configuration of the backup structure within the wall module. The proposed design changes to the connection design, including the design variances permitted by the changes, are in conformance with applicable provisions in AISC N690 and ACI 349.

The floor modules inside the containment structure are constructed of welded steel structural shapes, plates, and shear studs. These floor modules are designed as composite structures in conformance with AISC N690. Shear studs are included in the floor module design to provide for composite action between the steel plate and concrete and transfer load from the steel plate on the bottom through the concrete to the reinforcement bars that anchor into the wall. The beams directly connect the floor plates to the wall modules. The design requirements and evaluation methods are described in UFSAR Subsection 3.8.3.5.4. Floor modules are designed as simply supported as a conservative approach to consider the largest bending moment in the floor. Floor beams may have thicker sections, stiffeners or other design elements at the connection location. The floor modules are connected to the structural wall modules using structural shapes and reinforcement bars connected to the faceplate of the wall module or passing through the faceplate into the concrete of the wall module. The connection of the floor module to the structural wall modules are designed as fully fixed. The reinforcement included as part of the connection design provides for a fully fixed connection and is designed to satisfy the requirements of ACI 349. The size of the reinforcement ranges from #7 to #11. A key feature of the connection design is that structural shapes provide a direct load path from the floor to the wall through welds or mechanical connectors. The connection of the reinforcement to the hooks or anchors in the wall is also a direct connection.

The proposed changes do not change the design of the three structural wall module critical sections identified in the first paragraph of UFSAR Subsection 3.8.3.5.8.1. The headed studs attached to the wall module faceplate transfer the loads on the faceplate into the concrete. Where necessary, additional embedments and backup structures, located inside the wall, are directly connected to the wall module faceplates to transfer the floor loads into the structural wall modules.

Providing an expanded discussion of the floor-to-wall module connections separate from the discussion of the wall modules and removing UFSAR Figure 3.8.3-17 from the list of wall module figures clarifies the information that applies to the floor module and connection designs. Information is added to UFSAR Subsections 3.8.3.1.3 and 3.8.3.5.8.1 to define the variations in the detail design of the floor module and floor module to wall module connections. The proposed changes to UFSAR Figure 3.8.3-17 include redrawing the representation of the connection design to reflect design detail changes. Notes are added to UFSAR Figure 3.8.3-17 to define the variations in the detail design of the floor module to wall module connections.

Revising the information in UFSAR Subsection 3.8.3.1.4 to add shear studs and channels to the list of design elements used to construct the floor modules and adding shear studs to UFSAR Figure 3.8.3-3 expands the range of design elements used in the construction of the floors. The use of shear studs and channels in the design of the floor is consistent with the applicable requirements of AISC N690 and the design requirements and evaluation methods described in UFSAR Subsection 3.8.3.5.4. The use of shear studs and channels in the design of the floor is included in the evaluation of the floor module and connection design.

Where the reinforcement is included as part of the connection design, the size, shape, and length of the reinforcement satisfies ACI 349 requirements. The reinforcement in the floor module and the use of standard hooks for deformed bars are in conformance with the criteria and requirements of ACI 349. The change to the length of the reinforcement bar hooks shown within the wall modules in the figure is to make the representation consistent with ACI 349 requirements for standard hooks. The change in the representation of the reinforcement connectors attached to the faceplate is consistent with the design used and these connectors satisfy ACI 349 requirements.

UFSAR Figure 3.8.3-17 shows connection designs for standard and heavily loaded floors. There is a third connection configuration where the top of the wall does not extend past the elevation of the floor. This type of connection is used to connect the operating deck floor to the wall of the refueling canal. Information is added to the description of the floor module connection in UFSAR Subsections 3.8.3.1.3 and 3.8.3.5.8.1 to include this type of floor module connection as an additional type of floor module connection design. In this connection design the floor module sits on top of the wall instead of connecting to the side of the wall module. Because of the geometry difference a different connection configuration is required to satisfy AISC N690 requirements. Because of the significant differences in the configuration, UFSAR Figure 3.8.3-17 is not representative of this connection.

The wide flange tees, channels, and stiffening angles are included in the floor module design to provide strength for the floor. The sections shown in UFSAR Figure 3.8.3-17 are at specific locations in the containment internal structures. The connection design loads vary from location to location. Some floors are supported by seat angles welded to the module walls. In other locations beam seats located at the beams in the floor are required to provide sufficient load capacity. The size and type of the design elements needed at different connection locations also vary and the proposed changes identify that the design details may be different than that shown in the figure. Replacing the term “plate girder” with “beam” provides clarification of the connection description in the licensing basis text and UFSAR Figure 3.8.3-17 by providing consistency in the use of terms within the licensing basis and between the licensing basis and the design.

The thicker wall module faceplates at the connection locations are for the connection and attachment loads and to facilitate fabrication. The shear stud and truss spacing and design of other elements that provide the composite response of the wall modules do not change. The design of the connection of the floor module to the wall module, including design variations, is consistent with the overall structural design of the containment internal structures and the analysis of the seismic response.

The proposed changes do not change the function, design, and operation of the systems and components supported by and located under the floor modules and structural wall modules. The proposed changes do not change the function, design, and operation of the containment

vessel and passive containment cooling system. The proposed changes do not affect the prevention and 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 evaluated in the UFSAR are not affected.

The connections between the floor modules and structural wall modules do not interface with or affect safety-related equipment or a fission product barrier. No system or 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 or component, equipment, design code, design code allowable value, function or design analysis, nor do they adversely affect any safety analysis input or result, or design/safety margin.

The proposed activity 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 selections of the concrete floor beneath the reactor vessel are 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 detail design of connections between floor modules and structural wall modules. 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 detail design of connections between floor modules and structural wall modules.

The proposed activity has no impact on the Aircraft Impact Assessment. The changes described are internal to the structures 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 activity described does not change the overall design or construction of the shield building.

The proposed changes associated with this license amendment request include a change in the detail design of connections between the steel plate concrete composite construction used for the structural wall modules and the concrete composite floors of the containment internal structures. The changes are internal to the structures and 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 nonradioactive material effluents are affected.

The thickness of the walls and floors and the density of the concrete are not changed; therefore, there is no adverse change to the shielding provided by the 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 activity 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 Tier 2* information and associated Tier 2 information in the UFSAR in regard to requirements for detail design of floor modules and connections between the structural wall modules and the floor modules inside containment. These changes include design changes to the design elements of the connections. The proposed changes do not adversely affect the strength or 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. Regulatory Evaluation

4.1 Applicable Regulatory Requirements/Criteria

10 CFR Part 52, Appendix D, VIII.B.6 and VIII.B.5.a, require prior NRC approval for departure from Tier 2* information and for Tier 2 information departures that involve changes to Tier 2* information, respectively. The proposed amendment includes changes to design details for construction of the connections between floor modules and the structural wall modules in the containment internal structures and descriptions and figures depicting Category I structures which constitute UFSAR Tier 2* information changes. Therefore, 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 containment internal structures. These structures remain in conformance with the code requirements identified and supplemented in the UFSAR.

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 change has 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 change does 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

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), by revising the design details for construction of the floor modules and the connections between floor modules and the structural wall modules, part of the containment internal structures.

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 change of the design details for the floor modules and the connections between floor modules and the structural wall modules, and the change to more clearly state the design requirement that these connections meet criteria and requirements of American Concrete Institute (ACI) 349 and American Institute of Steel Construction (AISC) N690, do 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 of the design details for the connections between floor modules and the structural wall modules, and the clarification of design requirements for these connections, do 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 is to revise design details for the floor modules and the connections between floor modules and the structural wall modules, and more clearly state the design requirement that these connections meet criteria and requirements of ACI 349 and AISC N690. The clarification and changes to the design details for the floor modules and the connections between floor modules and the structural wall modules do not change the design requirements of the nuclear island structures. The clarification and changes of the design details for the floor modules and the connections between floor modules and the structural wall modules do not change the design function, support, design, or operation of mechanical and fluid systems. The clarification and changes of the design details for the floor modules and the connections between floor modules and the structural wall modules do not result in a new failure mechanism for the nuclear island structures or new accident precursors. As a result, the design function of the nuclear island 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

No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed changes, 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.

5. Environmental Considerations

The proposed amendment revises plant-specific Design Control Document (DCD) Tier 2* and associated Tier 2 material incorporated into the Updated Final Safety Analysis Report (UFSAR), by revising the design details for the floor modules and the connections between floor modules and the structural wall modules.

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, 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 design details for the connections between floor modules and the structural wall modules but, does not change walls, floors, or other structures which provide shielding in the containment structure. 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.

Southern Nuclear Operating Company

ND-16-0319

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to Licensing Basis Documents

(LAR-15-012)

Red text indicates additions and ~~deletions~~.

Green text indicates existing text has been relocated.

(This Enclosure consists of 12 pages, including this cover page)

(Note: these markups are based on Vogtle Units 3 & 4 UFSAR Revision 4.)

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

Representative design details of the connections ~~with~~ of floor modules to structural wall modules are shown in Figure 3.8.3-17. These connections connect the floor modules that make up the maintenance floor at elevation 107′-2″ and the operating deck at elevation 135′-3″. Similar connection designs are used within structural modules to connect floors to walls. The design details for the floor modules, including the size and spacing of the reinforcement, the use of shear studs, and the sizes of the structural shapes, are provided for background information and vary based on loading conditions and geometry. The seat angles, beam seats, shear plates, and other design elements supporting the floor modules and connecting the floors to the wall modules are sized to satisfy AISC N690 criteria and requirements. The clip angles and shear plates shown in Figure 3.8.3-17 and other design elements are used as required at beam locations for the connection. The elevation of the channels in the wall modules relative to the connection design elements may vary from that shown. The module faceplates are thicker than nominal, up to 1.5-inch thick, in the area of the connection in some locations. The backup structure shown in the module wall is a representative design, and the details for the design implemented include variation of the size and thickness of the plates used in the backup structure. The designs of the backup structures satisfy AISC N690 criteria and requirements. As an alternative, locally thicker faceplates or other design elements embedded in the wall and connected to the faceplate may be used to provide sufficient strength in the connection. Where the reinforcement is included as part of the connection design, the size, length, and shape of the reinforcement satisfies ACI 349 requirements. The standard hooks in the wall module and the reinforcement bar connectors on the faceplates satisfy ACI 349 requirements.

The operating deck floor modules adjacent to the refueling canal connect to wall modules that do not extend above the floor elevation. Design elements used for the connection for the operating deck floor modules to the refueling canal wall modules, and other floor modules that rest on top of a wall module, are located inside the wall module and are not connected to the outside of the faceplates. Figure 3.8.3-17 is not representative of these connections.

UFSAR Subsection 3.8.3.1.4, Structural Floor Modules - Revise information in the first paragraph to include additional information in the location shown below.

… The 107′-2″ floors consist of shear studs, steel tee, ~~and~~ wide flange, and channel sections, welded to horizontal steel bottom plates stiffened by transverse stiffeners.

UFSAR Subsection 3.8.3.5.8.1, Structural Wall Modules - Revise information in the second paragraph, and include the new third paragraph in the location shown below.

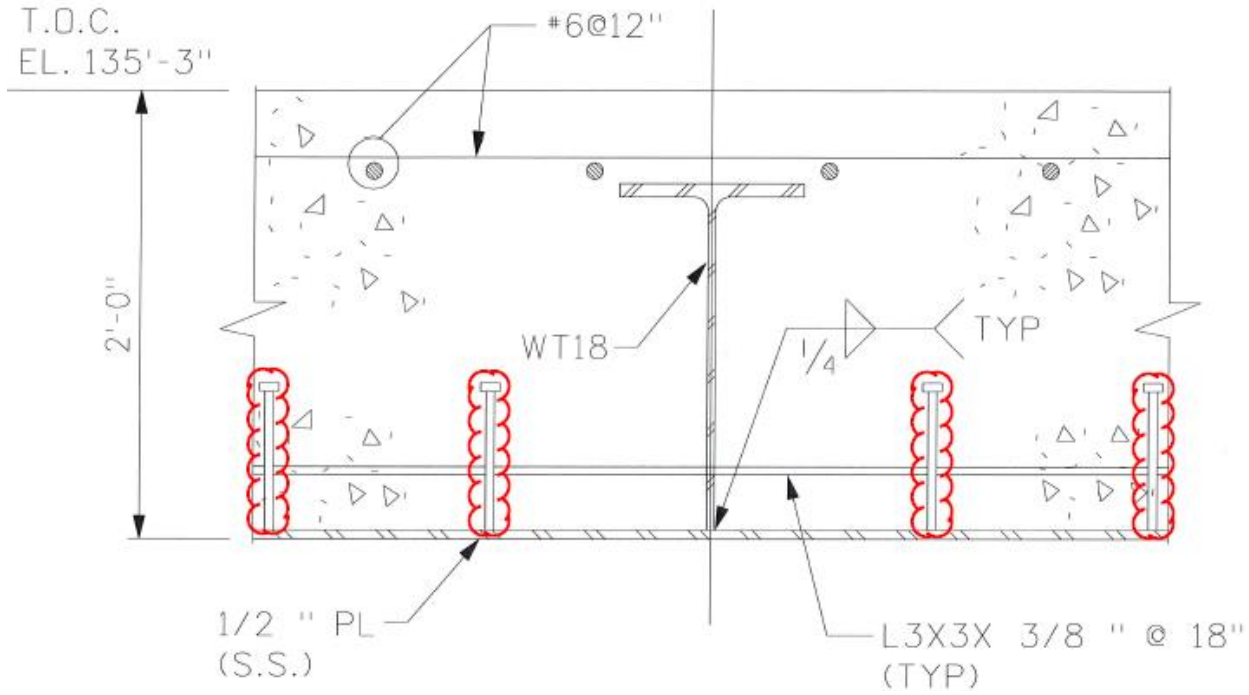
[…

… The structural configuration and typical details are shown in Figures 3.8.3-1, 3.8.3-2, 3.8.3-8, 3.8.3-14~~,~~ and 3.8.3-15~~, and 3.8.3-17~~. ~~The details shown in Figure 3.8.3-17 are representative of connections between floors in containment and walls constructed using steel plate concrete composite construction.~~ Plate thickness….]* The structural analyses are described in Subsection 3.8.3.4 and summarized in Table 3.8.3-2. The design procedures are described in Subsection 3.8.3.5.3.

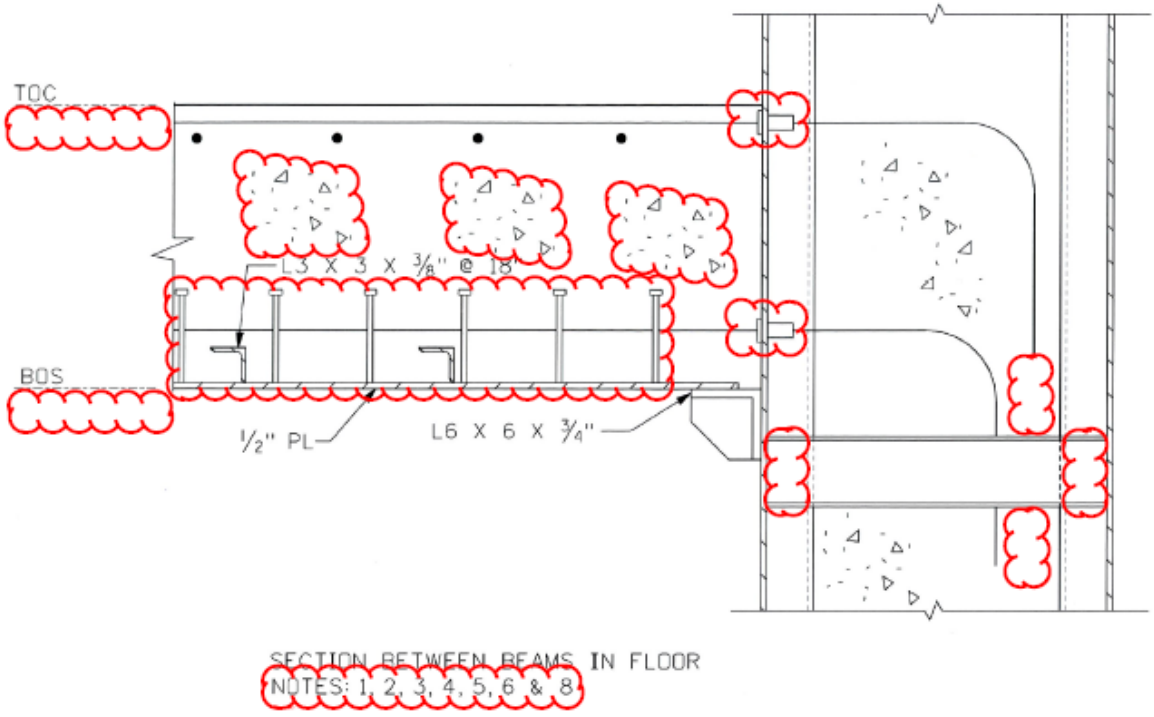
[*The details shown in Figure 3.8.3-17 are representative of connections between floors in containment and walls constructed using steel plate concrete composite construction.*]* The design details for the floor module are provided for background information and vary based on loading conditions and geometry. The seat angles, beam seats, clip angles, shear plates, shear studs, and reinforcement bars shown in Figure 3.8.3-17 and other design elements are used as required for the connection. A key feature of the connection design is that the design elements provide a direct load path from the floor into the wall. Additional information on the connection design is provided in Subsection 3.8.3.1.3. Details of the connection design, including plate thickness, structural shape type and size, use of specific design elements, and reinforcement arrangement, vary based on local loads. The design implemented in fabrication and construction drawings and instructions may have alternative structural shapes or reinforcement arrangements if they provide sufficient load capacity to satisfy AISC N690 and ACI 349 criteria and requirements. Figure 3.8.3-17 is not representative of the connection between the operating deck floor and the wall modules that form the sides of the refueling canal because these walls do not extend above the floor and the major connection design elements are located within the thickness of the wall and not attached to the faceplates.

[*The three walls…*

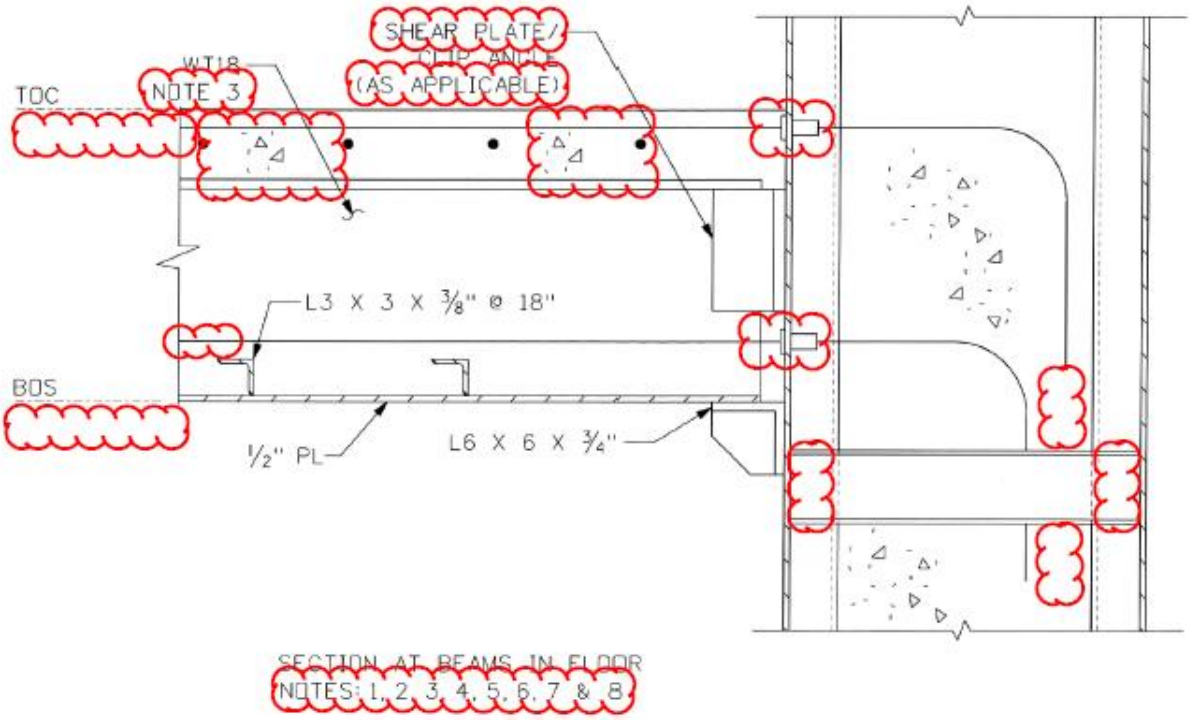
UFSAR Section 3.8, Figure 3.8.3-3, Structural Floor Module - Revise information for the structural floor module as shown below.



UFSAR Section 3.8, Figure 3.8.3-17, Sheet 1 of 2 [*Structural Modules –Design Details Standard Floor Connection*]* - Revise information for the SECTION BETWEEN BEAMS IN FLOOR as shown below.



UFSAR Section 3.8, Figure 3.8.3-17, Sheet 1 of 2 [*Structural Modules –Design Details Standard Floor Connection*]* - Revise information for the SECTION AT BEAMS IN FLOOR as shown below.



UFSAR Section 3.8, Figure 3.8.3-17, Sheet 1 of 2 [*Structural Modules –Design Details Standard Floor Connection*]* - Revise information to add Notes as shown below.

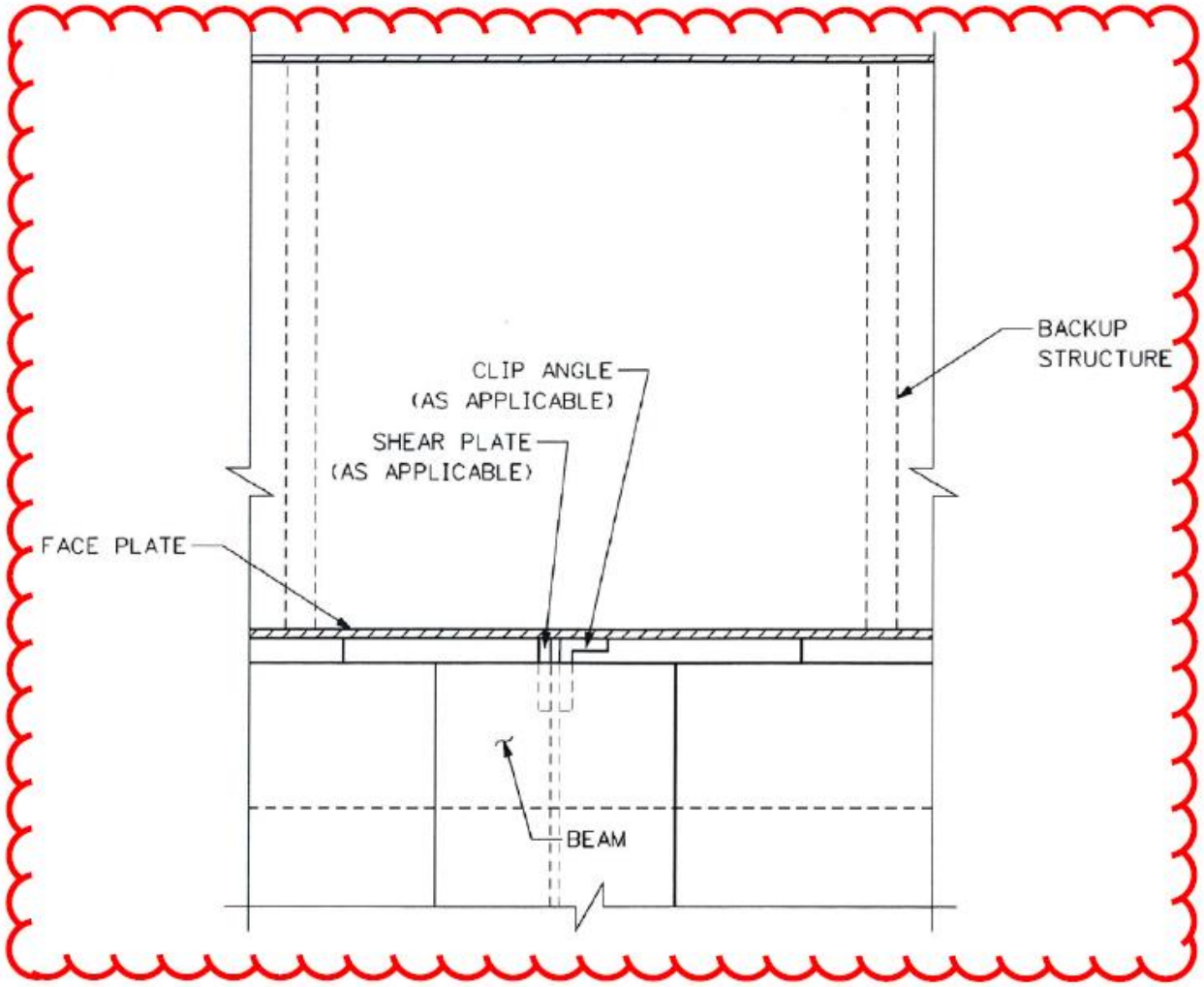
NOTES:

1. DETAILS SHOWN ARE REPRESENTATIVE OF FLOOR MODULES AT EL 107'-2" AND 135'-3" AND THE CONNECTIONS OF FLOOR MODULES TO WALL MODULES INSIDE CONTAINMENT. REFER TO SUBSECTION 3.8.3.1.3 AND OTHER NOTES FOR ADDITIONAL INFORMATION ABOUT DESIGN DETAILS AND VARIATIONS FOR FLOOR MODULE TO WALL MODULE CONNECTIONS. DETAILS ARE NOT REPRESENTATIVE OF THE CONNECTION BETWEEN THE OPERATING DECK FLOOR AND THE WALL MODULES THAT FORM THE SIDES OF THE REFUELING CANAL; SEE SUBSECTION 3.8.3.5.8.1.
2. REINFORCEMENT USE, SIZE, AND SPACING IN THE FLOOR MODULE CONCRETE SATISFY THE REQUIREMENTS IN ACI 349. THE REINFORCEMENT SIZE RANGE IS #7 TO #11.
3. DESIGN OF THE PLATES, BEAMS, AND STIFFENERS IN THE FLOOR, INCLUDING PLATE SIZE AND SPACING, AND TYPE, SIZE, AND SPACING OF STRUCTURAL SHAPES VARIES AND SATISFIES THE REQUIREMENTS OF AISC N690.
4. THE REINFORCEMENT AND FLOOR DESIGN ELEMENTS SHOWN ARE FOR LOCATIONS AWAY FROM OPENINGS, PENETRATIONS, AND OTHER OBSTRUCTIONS.
5. WHERE REINFORCEMENT IS INCLUDED AS PART OF THE CONNECTION DESIGN, THE SIZE, SPACING, AND LENGTH SATISFY THE REQUIREMENTS OF ACI 349. THE DESIGN OF THE STANDARD HOOKS IN THE WALL MODULES AND THE COUPLERS CONNECTING THE FLOOR REINFORCEMENT TO THE HOOKS IN THE WALL MODULES SATISFIES THE REQUIREMENTS OF ACI 349.
6. THE DETAIL DESIGN, LOCATION, AND ATTACHMENT OF THE FLOOR AND BEAM SUPPORTS ARE DESIGNED TO THE REQUIREMENTS OF AISC N690. SUPPORT CONFIGURATIONS, INCLUDING THE USE OF PLATES, STRUCTURAL SHAPES, AND STIFFENERS, ARE BASED ON LOADING AND LOCAL GEOMETRY CONSIDERATIONS.
7. THE DESIGNS OF THE CONNECTIONS AND BACKUP STRUCTURES WITHIN THE MODULES WALL, INCLUDING PLATE SIZE AND SPACING, TYPE, SIZE, AND SPACING OF STRUCTURAL SHAPES, AND USE, SIZE, AND SPACING OF SHEAR STUDS VARY AND SATISFY THE REQUIREMENTS OF AISC N690. THE STRENGTH OF THE STUDS IS BASED ON ACI 349 APPENDIX B.
8. THE THICKNESS OF THE ADJACENT WALL IS BASED ON THE WALL DESIGN REQUIREMENTS AND LOCATION.

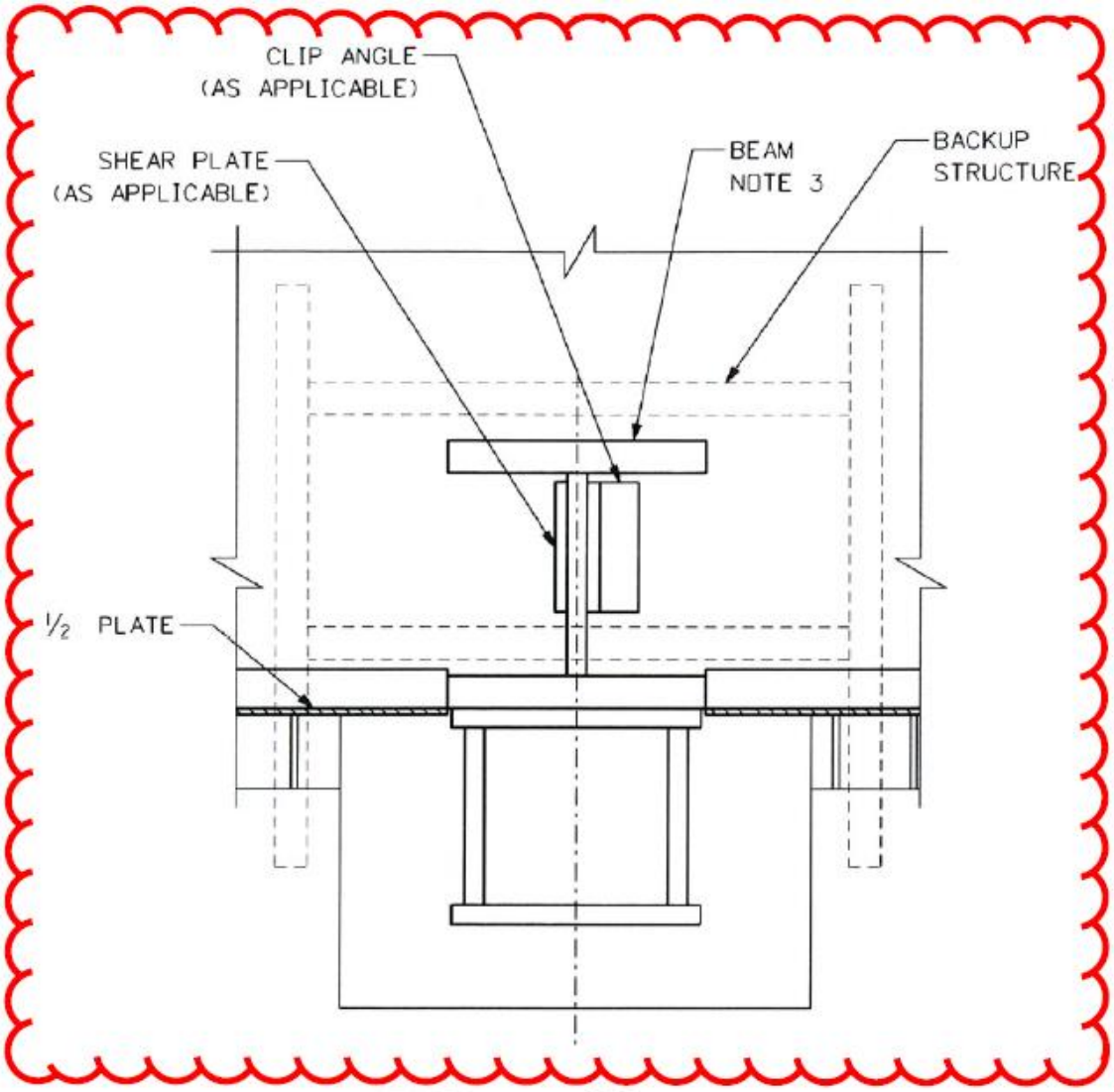
And retain the existing notation of…

SEE SUBSECTION 3.8.3.5.8.1 FOR INFORMATION ON TIER 2* DESIGNATION.

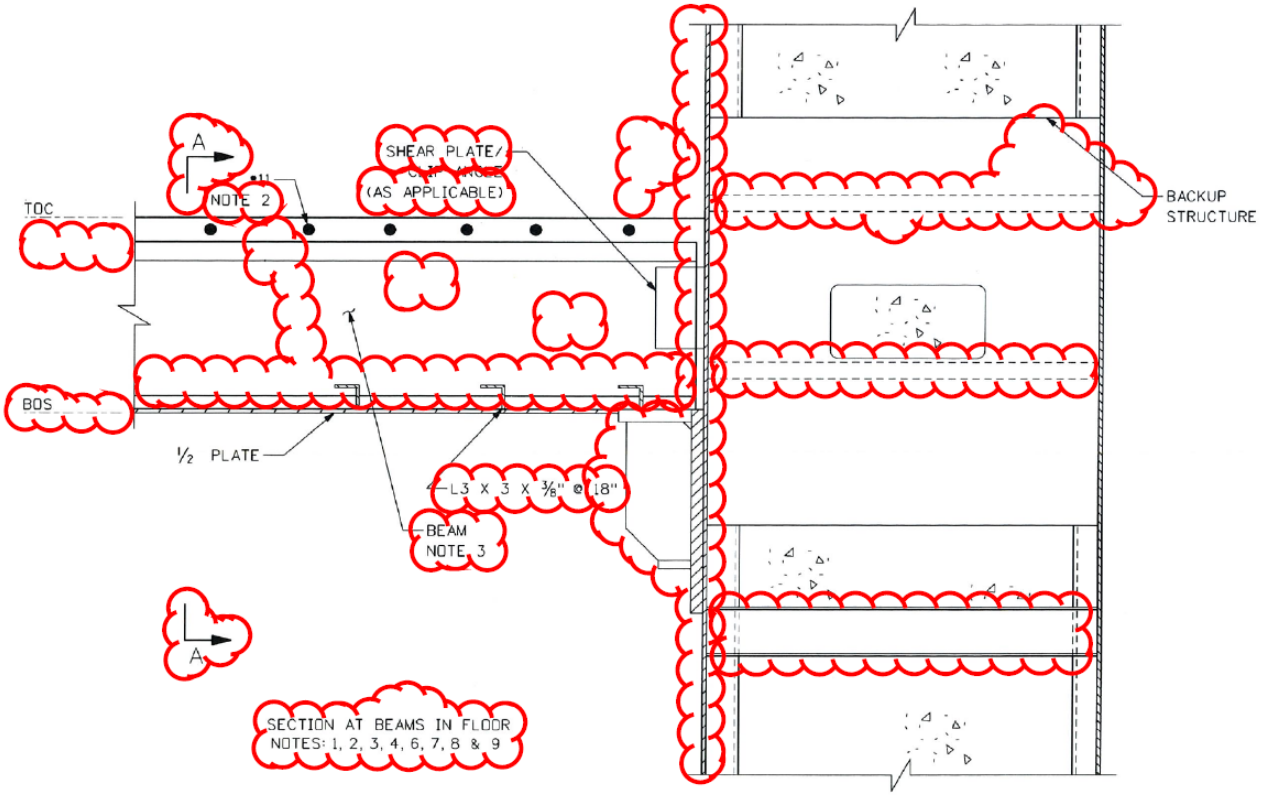
UFSAR Section 3.8, Figure 3.8.3-17, Sheet 2 of 2 [*Structural Modules –Design Details Heavily Loaded Floor Connection*]* - Revise information for the TOP VIEW AT BEAMS IN FLOOR as shown below.



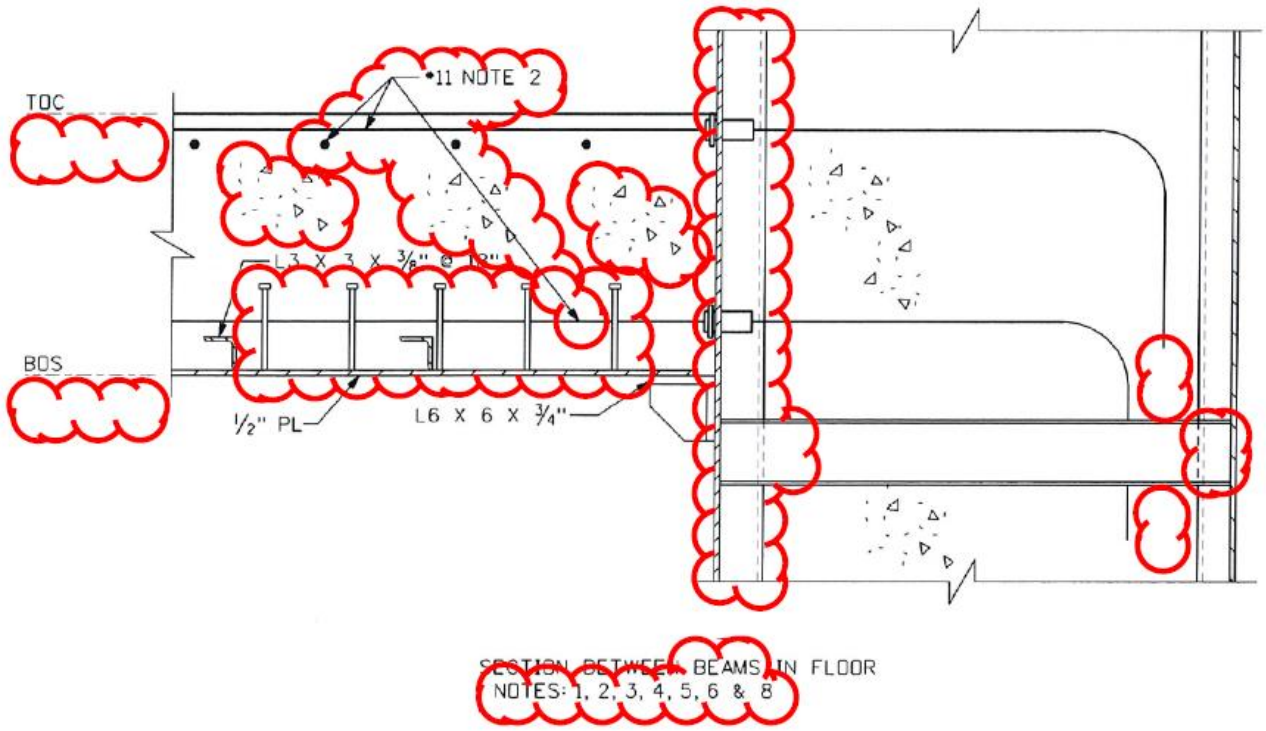
UFSAR Section 3.8, Figure 3.8.3-17, Sheet 2 of 2 [*Structural Modules – Design Details Heavily Loaded Floor Connection*]* - Revise information for the END VIEW AT BEAMS IN FLOOR as shown below.



UFSAR Section 3.8, Figure 3.8.3-17, Sheet 2 of 2 [*Structural Modules – Design Details Heavily Loaded Floor Connection*]* - Revise information for the SECTION AT BEAMS IN FLOOR as shown below.



UFSAR Section 3.8, Figure 3.8.3-17, Sheet 2 of 2 [*Structural Modules – Design Details Heavily Loaded Floor Connection*]* - Revise information for the SECTION BETWEEN BEAMS IN FLOOR as shown below.



UFSAR Section 3.8, Figure 3.8.3-17, Sheet 2 of 2 [*Structural Modules – Design Details Heavily Loaded Floor Connection*]* - Revise information to add Notes as shown below.

NOTES:

1. DETAILS SHOWN ARE REPRESENTATIVE OF FLOOR MODULES AT EL 107'-2" AND 135'-3" AND THE CONNECTIONS OF FLOOR MODULES TO WALL MODULES INSIDE CONTAINMENT. REFER TO SUBSECTION 3.8.3.1.3 AND OTHER NOTES FOR ADDITIONAL INFORMATION ABOUT DESIGN DETAILS AND VARIATIONS FOR FLOOR MODULE TO WALL MODULE CONNECTIONS. DETAILS ARE NOT REPRESENTATIVE OF THE CONNECTION BETWEEN THE OPERATING DECK FLOOR AND THE WALL MODULES THAT FORM THE SIDES OF THE REFUELING CANAL; SEE SUBSECTION 3.8.3.5.8.1.
2. REINFORCEMENT USE, SIZE, AND SPACING IN THE FLOOR MODULE CONCRETE SATISFY THE REQUIREMENTS IN ACI 349. THE REINFORCEMENT SIZE RANGE IS #7 TO #11.
3. DESIGN OF THE PLATES, BEAMS, AND STIFFENERS IN THE FLOOR, INCLUDING PLATE SIZE AND SPACING, AND TYPE, SIZE, AND SPACING OF STRUCTURAL SHAPES VARIES AND SATISFIES THE REQUIREMENTS OF AISC N690.
4. THE REINFORCEMENT AND FLOOR DESIGN ELEMENTS SHOWN ARE FOR LOCATIONS AWAY FROM OPENINGS, PENETRATIONS, AND OTHER OBSTRUCTIONS.
5. WHERE REINFORCEMENT IS INCLUDED AS PART OF THE CONNECTION DESIGN, THE SIZE, SPACING, AND LENGTH SATISFY THE REQUIREMENTS OF ACI 349. THE DESIGN OF THE STANDARD HOOKS IN THE WALL MODULES AND THE COUPLERS CONNECTING THE FLOOR REINFORCEMENT TO THE HOOKS IN THE WALL MODULES SATISFIES THE REQUIREMENTS OF ACI 349.
6. THE DETAIL DESIGN, LOCATION, AND ATTACHMENT OF THE FLOOR AND BEAM SUPPORTS ARE DESIGNED TO THE REQUIREMENTS OF AISC N690. SUPPORT CONFIGURATIONS, INCLUDING THE USE OF PLATES, STRUCTURAL SHAPES, AND STIFFENERS, ARE BASED ON LOADING AND LOCAL GEOMETRY CONSIDERATIONS.
7. THE DESIGNS OF THE CONNECTIONS AND BACKUP STRUCTURES WITHIN THE MODULES WALL, INCLUDING PLATE SIZE AND SPACING, TYPE, SIZE, AND SPACING OF STRUCTURAL SHAPES, AND USE, SIZE, AND SPACING OF SHEAR STUDS VARY AND SATISFY THE REQUIREMENTS OF AISC N690. THE STRENGTH OF THE STUDS IS BASED ON ACI 349 APPENDIX B.
8. THE THICKNESS OF THE ADJACENT WALL IS BASED ON THE WALL DESIGN REQUIREMENTS AND LOCATION.
9. THE BEAM SEAT SHOWN IS NOT USED AT ALL BEAM LOCATIONS. THE SEAT ANGLE SHOWN ON SHEET 1 IS USED AT OTHER LOCATIONS.

And retain the existing notation of…

SEE SUBSECTION 3.8.3.5.8.1 FOR INFORMATION ON TIER 2* DESIGNATION.