

FEB 14 2012



Docket Nos.: 52-025  
52-026

ND-12-0101

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

Southern Nuclear Operating Company  
Vogtle Electric Generating Plant Units 3 and 4  
Request for License Amendment: Containment Internal Structural Module  
Shear Stud Size and Spacing (LAR 12-001)

Ladies and Gentlemen:

The U.S. Nuclear Regulatory Commission (NRC) issued the Vogtle Electric Generating Plant (VEGP) Units 3 and 4 combined licenses (COLs) (License Nos. NPF-91 and NPF-92, respectively) to Southern Nuclear Operating Company (SNC) on February 10, 2012. In accordance with the provisions of 10 CFR 50.90, SNC hereby requests an amendment to the COLs for VEGP Units 3 and 4. The proposed amendment will revise the structural module shear stud size and spacing requirements presented in plant-specific Design Control Document (DCD) Figure 3.8.3-8, Sheet 1, Note 2.

The proposed stud size and spacing provided in this License Amendment Request was previously provided to the NRC in Westinghouse Letter DCP\_NRC\_003071, Ziesing to USNRC, "AP1000 Response to Request for Additional Information (SRP 3)," dated October 21, 2010 transmitting the response to Request for Additional Information RAI-SRP3.8.3-SEB1-05 R4 [ML102990048]. However, this change was inadvertently omitted from generic DCD Revision 19; therefore, this change is a conforming change included to make the VEGP Units 3 and 4 plant-specific DCD consistent with the above referenced RAI response.

Please note that subsequent to this change, an additional departure from the plant-specific DCD was identified by Westinghouse to allow the use of higher strength carbon steel plate material (ASTM A572, Grade 60) for certain structural modules. In accordance with Code requirements, the higher strength carbon steel plate material will result in 3/4-inch diameter by 6-inch studs on a 6-inch by 6-inch stud spacing. As discussed in DCD Sections 3.8.3.1.3 and 3.8.3.5.3, Figure 3.8.3-8 shows a typical configuration. The carbon steel stud spacing in Note 2 of Figure 3.8.3-8, Sheet 1, represents a typical detail for 36 ksi yield strength carbon steel as described in DCD Section 3.8.3.3.2; therefore, Note 2 will not be revised to show the stud spacing requirements for ASTM A572, Grade 60 carbon steel plate material.

D092  
NRD

Note 2 was determined to adequately address the more dense stud spacing for the higher strength carbon steel, because Figure 3.8.3-8 depicts a typical configuration and because adherence to the invoked Codes and Standards, per DCD Section 3.8.3.5.3.6, will provide the appropriate design criteria for the use of the alternate higher strength material. Note 2 is clarified in this LAR to specifically reference adherence to the invoked codes and standards, which is consistent with Section 3.8.3.5.3.6.

The requested revisions are necessary to support changes identified during design finalization of the structural modules, including the containment internal structures. The background, description, Technical Analysis, and Regulatory Analysis (including No Significant Hazards Consideration determination) for the proposed changes in the License Amendment Request are contained in Enclosure 1 to this letter. The proposed markups depicting the requested changes to Note 2 in plant-specific DCD Tier 2\* Figure 3.8.3-8, Sheet 1 is contained in Enclosure 2 to this letter, and the clean page depicting the changes are contained in Enclosure 3. This letter contains no regulatory commitments.

SNC requests staff approval of the license amendment by August 31, 2012, which will allow sufficient time to support its implementation prior to installation of the structural modules that would be impacted by this change. Delayed approval of this license amendment would result in a delay in the installation of containment internal structural module CA-20 and subsequent construction activities that are dependent upon the completion of this module. This license amendment will be implemented within 30 days of approval.

Should you have any questions, please contact Mr. Wesley A. Sparkman at (205) 992-5061.

Ms. Amy G. Aughtman states that she is a Licensing Manager of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of her knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY



A. G. Aughtman

AGA/NH/dmw

Sworn to and subscribed before me this 14<sup>th</sup> day of February, 2012

Notary Public: Dana M. Williams

My commission expires: 12/1/2014

NOTARY PUBLIC STATE OF ALABAMA AT LARGE  
MY COMMISSION EXPIRES: Dec 1, 2014  
BONDED THRU NOTARY PUBLIC UNDERWRITERS

- Enclosure 1: Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment Regarding Containment Internal Structural Module Shear Stud Size and Spacing
- Enclosure 2: Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Licensing Document Pages – Proposed Markups
- Enclosure 3: Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Licensing Document Pages – Clean

cc: Southern Nuclear Operating Company

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File AR.01.02.06

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**Southern Nuclear Operating Company**

**ND-12-0101**

**Enclosure 1**

**Vogtle Electric Generating Plant (VEGP) Units 3 and 4**

**Request for License Amendment**

**Regarding**

**Containment Internal Structural Module Shear Stud Size and Spacing**

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Pursuant to 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby requests an amendment to Combined License Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively.

SNC requests staff approval of this license amendment by August 31, 2012 to support installation of the structural modules that would be impacted by this change.

## **1. Summary Description**

The proposed change would revise Note 2 to plant-specific DCD Figure 3.8.3-8, Sheet 1, which presents typical structural wall module details. This information needs to be changed to be consistent with the design basis calculations. As noted in plant-specific DCD Section 3.8.3.1.3, Structural Wall Modules, the information in the Note is designated as Tier 2\*. The change to Note 2 was inadvertently overlooked when the design basis calculations were previously revised and incorporated into the AP1000 generic DCD.

## **2. Detailed Description**

Plant-specific DCD Figure 3.8.3-8, Sheet 1, Note 2 includes information on the size and spacing of the shear studs in the structural modules. This information needs to be updated to reflect the current design basis. The existing Note 2 shows welded studs for stainless steel plate with 3/4-inch diameter and a spacing of 10 inches horizontal and 8 inches vertical. The design basis calculations show the size and spacing of the studs is 5/8-inch diameter with a 6-inch horizontal by 6-inch vertical spacing. For carbon steel plate, Note 2 shows welded studs with 3/4-inch diameter and spacing of 9.6 inches vertical and 10 inches horizontal. The design basis size and spacing of the studs for carbon steel plate is 3/4-inch diameter with a 10-inch by 10-inch spacing. The change is required to make Note 2 consistent with the design basis. The text of the note is changed to clarify that spacing may be changed to satisfy codes and standards.

The proposed Tier 2\* amendment changes the containment internal structural module stud size and spacing on Tier 2\* Figure 3.8.3-8, Sheet 1.

The correct shear stud size and spacing was noted in a mark-up of AP1000 generic DCD Figure 3.8.3-8, Sheet 1, Note 2 which was first brought before the NRC as part of a Response to Request for Additional Information RAI-SRP3.8.3-SEB1-05 R4 (page 34 of 36), transmitted by WEC letter DCP\_NRC\_003071, dated October 21, 2010 [ML102990048]. The staff did not specifically acknowledge the portion of the RAI response dealing with stud sizing or spacing in writing; however, in the Final Safety Evaluation Report, NUREG-1793, Supplement 2, the NRC staff does not identify any open confirmatory items or unresolved RAIs.



### 3. Technical Evaluation

#### System Description

Structural wall modules, constructed as steel plate concrete filled composite, are used for the primary shield wall around the reactor vessel, the wall between the vertical access and the chemical volume control system (CVS) room, and the secondary shield walls around the steam generators and pressurizer; for the east side of the in-containment refueling water storage tank (IRWST); for the spent fuel pool, fuel transfer canal, cask loading pit, and the cask washdown pit; and for the refueling cavity. The modules are Seismic Category I structures. The structural modules are designed as reinforced concrete elements with the steel face plates serving as reinforcement. Because the face plates do not have deformation patterns typical of reinforcement, shear studs are provided to transfer shear forces and ensure that the concrete and steel respond in a composite manner.

#### Applicable Text, Table and Figure Changes

##### Tier 2\* Departure:

Note 2 on Sheet 1 of plant-specific DCD Figure 3.8.3-8 will be revised as shown below.

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

$\frac{3}{4}$ "  $\varnothing$  x 6" @ ~~9.6"~~ 10" VERTICAL FOR CS

$\frac{3}{4}$ "  $\varnothing$  x 6" @ 10" HORIZONTAL FOR CS

~~$\frac{3}{4}$ "  $\frac{5}{8}$ "~~  $\varnothing$  x 6" @ ~~8"~~ 6" VERTICAL FOR SS

~~$\frac{3}{4}$ "  $\frac{5}{8}$ "~~  $\varnothing$  x 6" @ ~~10"~~ 6" HORIZONTAL FOR SS

#### Supporting Technical Details

The proposed activity would change the description of the internal design of structural modules including containment internal structures with no change in the amount of steel for reinforcement or the concrete properties. The thickness and strength of these structures are not altered. The design function of the containment internal structures is to support the reactor coolant system components and related piping systems and equipment. This change corrects a drawing note regarding shear stud size and spacing for containment internal modules to be consistent with the underlying design basis calculations. This change corrects the description of a design detail of the internal structure of the modules. The note is also clarified to reflect the design philosophy of adherence with applicable codes and standards throughout the DCD.

The shear studs are welded to the plates on the inside of the modules and are designed to the requirements of AISC-N690-1994. Stud spacing and sizing are such that stud loadings are within acceptable limits and that the structural module acts in a composite manner. Conformance of the design of the structure with AISC N-690 and the design requirements in plant-specific DCD Section 3.8.3 is maintained.

There is no test of plant systems or experiment involved with this change. The attachment of the shear studs to the steel plates and placement within the concrete is not changed in service or during operation of the plant. There are no procedures or controls for plant

systems and components that would change the performance of the shear stud design function.

The activity has no adverse affect on the ex-vessel severe accident. The thickness, geometry, and strength of the structures are not altered. The material and thickness of the steel plates are not altered. The properties of the concrete included in the containment internal structures are not altered by this change. The design 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 size and 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 size and spacing.

The 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. The activity described does not change the design or construction of the shield building.

The 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 thickness of the wall and density of the concrete are not changed therefore, there is no 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.

#### Summary

This activity does not adversely affect any AP1000 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 Significant Hazards Consideration**

The proposed changes would amend Combined License Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively, in regard to the containment internal structural module stud size and spacing by increasing the carbon steel vertical stud spacing, decreasing the stainless steel stud diameter, and decreasing the stainless steel vertical and horizontal stud spacing in accordance with the design basis.

The departure from Tier 2\* information involves changes to Sheet 1 of plant-specific DCD Figure 3.8.3-8. 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:

**4.1.1 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 modules is to support the reactor coolant system components and related piping systems and equipment. The design function of the shear studs is to transfer loads into the concrete of the containment modules. The proposed change corrects a drawing note regarding shear stud size and spacing for structural wall modules to be consistent with the underlying design basis calculations, which are more conservative. The thickness, geometry, and strength of the structures are not altered. The material and thickness of the steel plates are not altered. The properties of the concrete included in the containment internal structures are not altered. As a result, the design function of the containment 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 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, there is no significant increase in the probability or consequences of an accident previously evaluated.

**4.1.2 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 corrects a drawing note regarding shear stud size and spacing for structural wall modules to be consistent with the underlying design basis calculations. Stud spacing and sizing are updated such that stud loadings are within acceptable limits and that the structural module acts in a composite manner. The thickness, geometry, and strength of the structures are not altered. The material and thickness of the steel plates are not altered. The properties of the concrete included in the containment internal structures are not altered. The change to the internal design of the structural modules does not create any new accident precursors. As a result, the design function of the modules is not adversely affected by the proposed change. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

Response: No

The criteria and requirements of AISC N-690 provide a margin of safety to structural failure. The design of the shear studs for the structural wall modules conforms to criteria and requirements in AISC N-690 and therefore maintain the margin of safety. The proposed change corrects a drawing note regarding

shear stud size and spacing for the structural wall modules so as to be consistent with the underlying design basis calculations. There was no change to the method of evaluation from that used in the design basis calculations. Therefore, the proposed change will not result in a significant reduction in a margin of safety in the design and analysis of the structural modules including the containment internal structures.

Based on the above, Southern Nuclear Operating Company concludes that the proposed changes present no 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.

#### **4.2 Applicable Regulatory Requirements/Criteria**

10 CFR 50, Appendix A, General Design Criterion (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, tsunamis, 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.

10 CFR 50, Appendix A, General Design Criterion (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.

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

#### **4.3 Precedent**

No precedent is identified.

#### **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 Consideration**

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 20, or would change an inspection or surveillance requirement. However, 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 criterion 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. References**

- 1.) AP1000 DCD, Rev 19, Section 3.8.3, "Concrete and Steel Internal Structures of Steel Containment" including Figure 3.8.3-8
- 2.) WEC Letter DCP\_NRC\_003071, Ziesing to USNRC, "AP1000 Response to Request for Additional Information (SRP 3)", dated October 21, 2010 and transmitting the response to Request for Additional Information RAI-SRP3.8.3-SEB1-05 R4 [ML102990048]
- 3.) American Institute of Steel Construction (AISC), AISC-N690-1994, Specification for the Design, Fabrication and Erection of Steel Safety Related Structures for Nuclear Facilities

**Southern Nuclear Operating Company**

**ND-12-0101**

**Enclosure 2**

**Vogtle Electric Generating Plant (VEGP) Units 3 and 4**

**Licensing Document Pages - Proposed Markups**

**This enclosure includes this cover page and 1 marked-up licensing document page.**

**Southern Nuclear Operating Company**

**ND-12-0101**

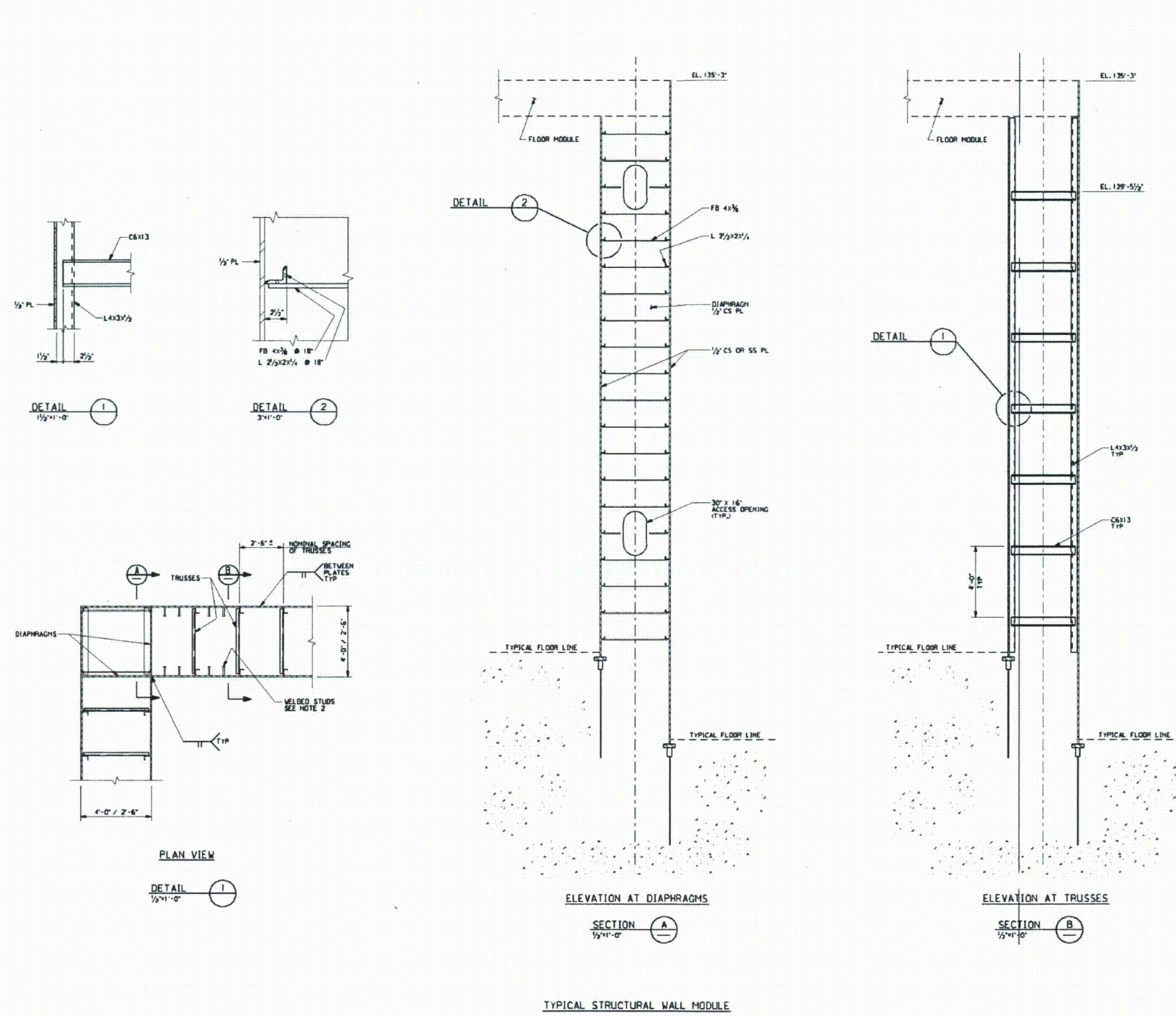
**Enclosure 3**

**Vogtle Electric Generating Plant (VEGP) Units 3 and 4**

**Licensing Document Pages - Clean**

**This enclosure includes this cover page and 1 clean licensing document page with proposed changes shown.**





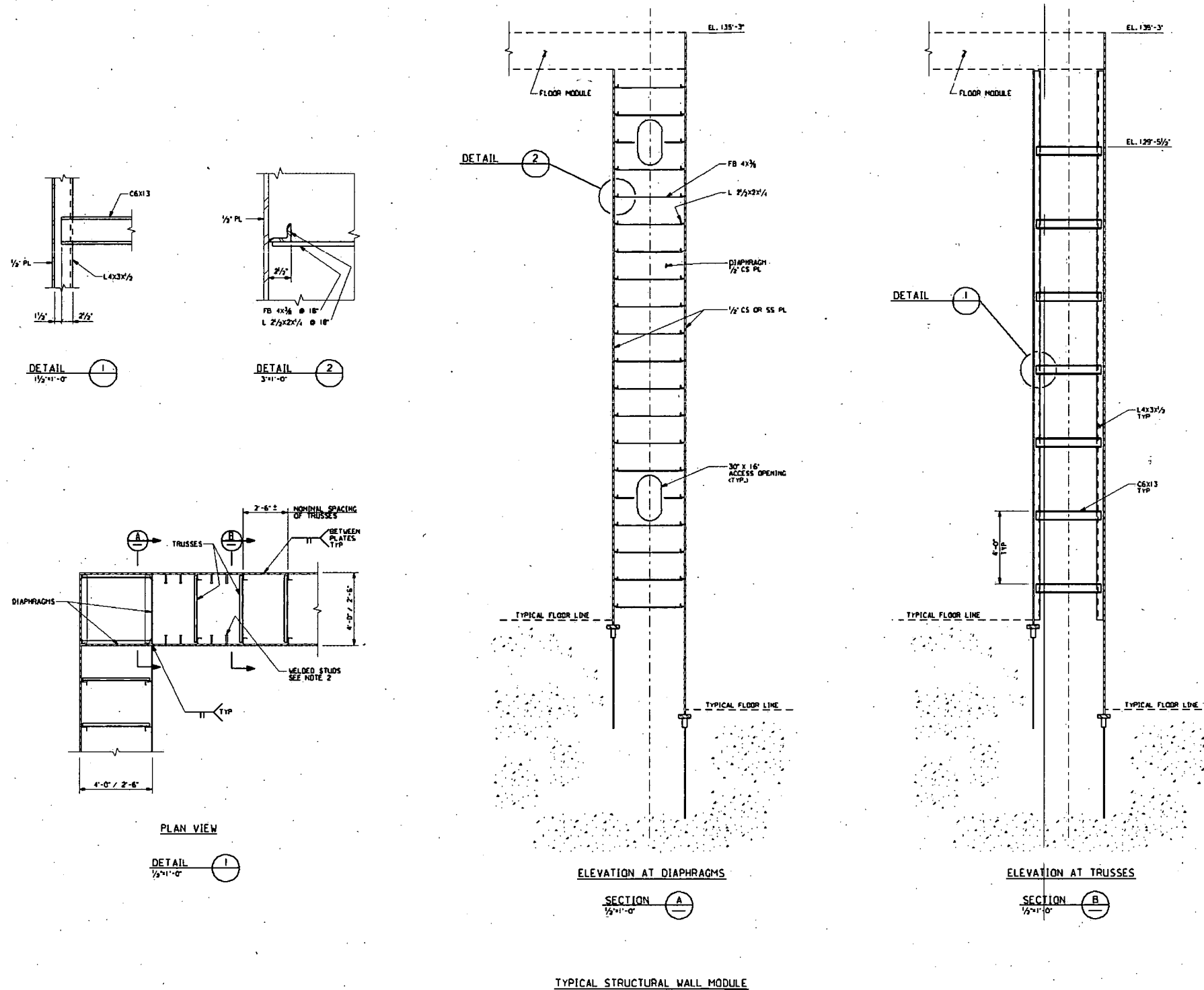
See subsection 3.8.3.1.3 for information that is designated as Tier 2\*.

Figure 3.8.3-8 (Sheet 1 of 3)

[Structural Modules – Typical Design Details]\*

\*NRC Staff approval is required prior to implementing a change in this information





- NOTES:**
1. ALL WORK SHOWN ON THIS DRAWING IS SEISMIC CATEGORY 1.
  2. WELDED STUDS SHALL BE SPACED AS FOLLOWS, UNLESS OTHERWISE REQUIRED BY THE SPECIFIC CODES AND STANDARDS INVOKED:  
 1/2" x 6" @ 12" VERTICAL FOR CS  
 1/2" x 6" @ 12" HORIZONTAL FOR CS  
 1/2" x 6" @ 12" VERTICAL FOR SS  
 1/2" x 6" @ 12" HORIZONTAL FOR SS
  3. THE TYPICAL DETAILS SHOWN REPRESENT THE FUNDAMENTAL APPROACH FOR THE COMPOSITE WALL MODULES. THE FINAL DESIGN DETAILS MAY DIFFER FROM THOSE SHOWN FOR THE FOLLOWING REASONS:  
 • ACCESSIBILITY FOR INSPECTION DURING FABRICATION AND CONSTRUCTION  
 • LESSONS LEARNED FROM IMPLEMENTATION OF THE DESIGN  
 • EASE OF FABRICATION AND CONSTRUCTION  
 • RESOLUTION OF CONSTRUCTABILITY ISSUES AND SEQUENCES  
 • VARIATION IN MODULE SIZE AND CONFIGURATION  
 CHANGES MADE DURING DETAILED DESIGN ARE IN ACCORDANCE WITH THE SPECIFIC CODES AND STANDARDS INVOKED.

See subsection 3.8.3.1.3 for information that is designated as Tier 2\*.

Figure 3.8.3-8 (Sheet 1 of 3)

[Structural Modules – Typical Design Details]\*

\*NRC Staff approval is required prior to implementing a change in this information