

**From:** Rankin, Jennivine  
**Sent:** Thursday, January 16, 2020 2:54 PM  
**To:** Vogtle PEmails  
**Subject:** Draft LAR for Unit 3 Auxiliary Building Wall 11 Seismic Gap Requirements - Pre-submittal meeting on 1/23/2020  
**Attachments:** LAR-229 PSM Draft.pdf

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**From:** Santos, Cayetano  
**Sent:** Thursday, January 16, 2020 6:47 AM  
**To:** Rankin, Jennivine <Jennivine.Rankin@nrc.gov>; Patel, Chandu <Chandu.Patel@nrc.gov>  
**Subject:** Fwd: RE: LAR-229 PSM tentative date

For Vogtle Public Meeting scheduled on 1/23/2020.

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**From:** "Arafeh, Yasmeen N." <[YNARAFEH@southernco.com](mailto:YNARAFEH@southernco.com)>  
**Subject:** [External\_Sender] RE: LAR-229 PSM tentative date  
**Date:** 14 January 2020 09:52  
**To:** "Santos, Cayetano" <[Cayetano.Santos@nrc.gov](mailto:Cayetano.Santos@nrc.gov)>

Begin Forwarded Message:

**From:** "Arafeh, Yasmeen N." <[YNARAFEH@southernco.com](mailto:YNARAFEH@southernco.com)>  
**Subject:** [External\_Sender] RE: LAR-229 PSM tentative date  
**Date:** 14 January 2020 09:52  
**To:** "Santos, Cayetano" <[Cayetano.Santos@nrc.gov](mailto:Cayetano.Santos@nrc.gov)>

Hi Tanny, attached is the draft for LAR-229. Could you please forward this to the appropriate staff, and let us know a good date for a PSM? SNC is currently targeting 1/23, but I understand if the staff would need more time to review beforehand.

Best,

**Yasmeen Arafeh**

Nuclear Development, Licensing

Work: (205)992-7190

[ynarafeh@southernco.com](mailto:ynarafeh@southernco.com)



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**From:** Santos, Cayetano <[Cayetano.Santos@nrc.gov](mailto:Cayetano.Santos@nrc.gov)>  
**Sent:** Monday, January 6, 2020 10:43 AM  
**To:** Arafeh, Yasmeen N. <[YNARAFEH@southernco.com](mailto:YNARAFEH@southernco.com)>  
**Cc:** Rankin, Jennivine <[Jennivine.Rankin@nrc.gov](mailto:Jennivine.Rankin@nrc.gov)>  
**Subject:** RE: LAR-229 PSM tentative date

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Yasmeen,

Happy New Year.

I guess it would depend on when you could provide a draft LAR to us. We would need enough time to ensure the right branches are represented and have enough time to review it before the meeting. When do you think you could provide it to us?

Tanny

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**From:** Arafeh, Yasmeen N. <[YNARAFEH@southernco.com](mailto:YNARAFEH@southernco.com)>

**Sent:** Monday, January 06, 2020 10:59 AM

**To:** Santos, Cayetano <[Cayetano.Santos@nrc.gov](mailto:Cayetano.Santos@nrc.gov)>

**Subject:** [External\_Sender] LAR-229 PSM tentative date

Hi Tanny, SNC would like to hold a PSM for LAR-229, Change to separation criteria between Nuclear Island and Turbine building structural elements, on 1/23/20 via teleconference to support a LAR submittal on 1/31/20. Could you please let me know if the staff could be available on 1/23/20, or if we'd need to choose another date? Thanks so much.

Best,

**Yasmeen Arafeh**

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**Hearing Identifier:** Vogtle\_COL\_Docs\_Public  
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**Received Date:** 1/16/2020 2:54:12 PM  
**From:** Rankin, Jennivine

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"Vogtle PEmails" <Vogtle.PEmails@nrc.gov>  
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**Southern Nuclear Operating Company**

**ND-20-XXXX**

**Enclosure 1**

**Vogtle Electric Generating Plant (VEGP) Unit 3**

**Request for License Amendment:**

**Unit 3 Auxiliary Building Wall 11 Seismic Gap Requirements**

**(LAR-20-001)**

(Enclosure 1 consists of 14 pages, including this cover page.)

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DRAFT

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby requests an amendment to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3.

## 1. SUMMARY DESCRIPTION

The proposed changes would revise VEGP Unit 3 COL Appendix C (and VEGP Unit 3 plant-specific Tier 1) Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), and corresponding UFSAR Tier 2\* and Tier 2 information applicable only to VEGP Unit 3, to modify the seismic gap requirements above grade between the nuclear island and the adjacent annex building/turbine building between Column Lines I and J from El. 141' through El. 154' in the licensing basis to accommodate construction as-built localized nonconformances at VEGP Unit 3.

The requested amendment requires departures from the Updated Final Safety Analysis Report (UFSAR) Tier 2 Appendix 2.5E Section 5.2 and Subsection 3.7.2.8.1 information, and UFSAR Tier 2\* Subsection 3.8.5.1 information, that involve changes to the VEGP Unit 3 COL Appendix C (and VEGP Unit 3 plant-specific Tier 1) information in ITAAC Table 3.3-6. This enclosure requests approval of the license amendment necessary to implement these changes. All discussions of changes to VEGP Unit 3 COL Appendix C are also understood to impact the corresponding VEGP Unit 3 plant-specific Tier 1 information.

## 2. DETAILED DESCRIPTION

### **Background and Affected Design Functions**

As described in the VEGP Units 3 and 4 Updated Final Safety Analysis Report (UFSAR) and plant-specific Tier 1 and COL Appendix C Section 3.3, the nuclear island structures include the containment (the steel containment vessel and the containment internal structure) and the shield and auxiliary buildings. The containment, shield and auxiliary buildings are structurally integrated on a common basemat which is embedded below the finished plant grade level. The nuclear island structures provide protection for the safety-related equipment against the consequences of either a postulated internal or external event. The nuclear island structures are designed to withstand the effects of natural phenomena such as hurricanes, floods, tornados, tsunamis, and earthquakes without loss of capability to perform safety functions. The nuclear island structures are designed to withstand the effects of postulated internal events such as fires and flooding without loss of capability to perform safety functions. The nuclear island structures are classified as seismic Category I and are designed to withstand the safe shutdown earthquake (SSE) loads.

As described in UFSAR Subsection 3.7.2.8.1, the portion of the annex building adjacent to the nuclear island is a structural steel and reinforced concrete seismic Category II structure, designed not to collapse in SSE.

As stated in UFSAR Subsection 3.7.8.2.3, the turbine building is a braced steel frame structure with the first bay (adjacent to the nuclear island) classified as seismic Category II and with the rest of the bays classified as non-seismic.

As described in UFSAR Subsection 3.8.5.1, the turbine building and annex building are structurally separated from the nuclear island structures by a 3-inch minimum gap above grade. This provides space to prevent interaction between the nuclear island structures and the adjacent seismic Category II structures during a seismic event. The maximum relative seismic displacement between the roof of the nuclear island and the turbine and annex buildings is less than 2 inches. This results in a clearance (gap) between buildings greater than 1 inch during a seismic event. Therefore, there are no interactions between the nuclear island and adjacent seismic Category II buildings during a seismic event.

### **Detailed Description of Unit 3 Auxiliary Building Wall 11 Seismic Gap Requirements**

In order to facilitate the construction of the nuclear island and adjacent buildings, and to maintain the seismic gap in compliance with the licensing basis, it is proposed to modify the seismic gap requirements above grade between the nuclear island and the adjacent annex building/turbine building between Column Lines I and J from El. 141' through El. 154' in the licensing basis to accommodate construction as-built localized nonconformances at VEGP Unit 3. Specifically, the minimum gap between the nuclear island and the annex building/turbine building (in a region between Column Lines I and J from El. 141' through El. 154') is 2-3/16 inches based on the as-built configuration at VEGP Unit 3.

Currently, the requirement in the licensing basis for the minimum gap between the nuclear island and annex building/turbine building is 3 inches, as specified in COL Appendix C ITAAC No. 3.3.00.13, UFSAR Appendix 2.5E Section 5.2, and UFSAR Subsections 3.7.2.8.1 and 3.8.5.1. UFSAR Subsection 3.8.5.1 requires that a minimum 1-inch gap be maintained between the nuclear island and annex building/turbine building considering the displacements of the buildings during the SSE events. The purpose of the licensing basis requirements is to prevent interaction between the nuclear island and annex building/turbine building during SSE events.

The proposed changes are to relax the minimum gap requirements above grade in the VEGP Unit 3 licensing basis between the nuclear island and the annex building/turbine building between Column Lines I and J from El. 141' through El. 154' from a 3-inch gap to a minimum gap of 2-1/16 inches in COL Appendix C ITAAC No. 3.3.00.13, UFSAR Appendix 2.5E Section 5.2, and UFSAR Subsections 3.7.2.8.1 and 3.8.5.1, to bound the nonconforming measured minimum gap of 2-3/16 inches in this localized area. Due to the proposed less than 1-inch reduction in the minimum gap above grade at the area of the localized nonconformance, the maximum relative displacement between the roof of the nuclear island and the annex building/turbine building described in UFSAR Subsection 3.8.5.1 remains unchanged (i.e., max relative displacement less than 2-inches). The maximum relative seismic displacement between the nuclear island and the annex building/turbine building is such that the reduction of the seismic gap requirements does not affect the requirement to maintain a 1-inch minimum gap during SSE events in UFSAR Subsection 3.8.5.1.

The proposed change does not impact any additional COL Appendix C descriptions or Figures because the minimum gap between the nuclear island and the annex building/turbine building is not specified or dimensioned elsewhere in COL Appendix C text or figures. The proposed changes do not affect the gap below grade between the

nuclear island and the annex building/turbine building as defined in the licensing basis. The proposed changes do not affect the displacements in the east-west direction between the nuclear island and the annex building in the licensing basis. Additionally, the proposed changes do not affect the gap above grade between the nuclear island and the annex building/turbine building outside the area of the localized nonconformance. In other words, the proposed change only applies to the minimum gap between the nuclear island and the annex building/turbine building between Column Lines I and J from El. 141' through El. 154' at VEGP Unit 3.

### **Description of Changes to Current Licensing Basis Documents**

#### COL Appendix C (and plant-specific Tier 1) Changes:

The following changes to VEGP Unit 3 COL Appendix C (and VEGP Unit 3 plant-specific Tier 1) are proposed:

1. VEGP Unit 3 COL Appendix C (and VEGP Unit 3 plant-specific Tier 1) Table 3.3-6, ITAAC No. 3.3.00.13 Acceptance Criteria, is revised to add “; except that the minimum horizontal clearance between elevations 141'-0" and 154'-0" between structural elements of the annex building and the nuclear island between column lines I and J is 2-1/16 inches.”
2. VEGP Unit 3 COL Appendix C (and VEGP Unit 3 plant-specific Tier 1) Table 3.3-6, ITAAC No. 3.3.00.13 Acceptance Criteria, is revised to add “; except that the minimum horizontal clearance between elevations 141'-0" and 154'-0" between structural elements of the turbine building and the nuclear island between column lines I and J is 2-1/16 inches”

#### UFSAR Changes:

The following changes to the UFSAR applicable to VEGP Unit 3 only are proposed:

1. UFSAR Appendix 2.5E Section 5.2 is revised to add “and which is less than the 2-1/16 inches minimum gap at Unit 3 between nuclear island and annex building between elevations 141'-0" and 154'-0" between column lines I and J”
2. UFSAR Subsection 3.7.2.8.1 is revised to add “; except that the minimum clearance at Unit 3 between elevations 141'-0" and 154'-0" between structural elements of the annex building and the nuclear island between column lines I and J is 2-1/16 inches”
3. UFSAR Subsection 3.8.5.1 Tier 2\* is revised to add “; except that the minimum gap for Unit 3 between elevations 141'-0" and 154'-0" between column lines I and J is 2-1/16 inches”

### **3. TECHNICAL EVALUATION**

The structures adjacent to the nuclear island are the annex building, the radwaste building, and the turbine building. The portion of the annex building adjacent to the nuclear island is a structural steel and reinforced concrete seismic Category II structure. The turbine building is a braced steel frame structure with the first bay (adjacent to the nuclear island) consisting of structural steel and reinforced concrete classified seismic Category II and the rest of the bays are classified as non-seismic. Seismic Category II structures are



designed so that an SSE does not cause unacceptable structural failure or interaction with seismic Category I items.

#### AP1000 Generic Soil-Structure Interaction (SASSI) Analysis

The current licensing basis, including COL Appendix C ITAAC No. 3.3.00.13, UFSAR Appendix 2.5E Section 5.2 and UFSAR Subsections 3.7.2.8.1 and 3.8.5.1, defines a minimum 3-inch gap above grade between the nuclear island and adjoining buildings. The purpose of the gap is to avoid contact between the nuclear island and seismic Category II structures (annex building/turbine building) when the buildings deflect during an SSE event. The seismic response analyses including soil structure interaction between the nuclear island and the adjoining building are performed using the System for Analysis of Soil-Structure Interaction (SASSI) program. The maximum relative seismic displacement is established from the 2D SASSI analyses, as specified in UFSAR Subsection 3.7.2.8.4. The SASSI models consist of soil profiles and properties, basemat models and structure models, which include the coupled auxiliary and shield building stick model, containment internal structures stick model and steel containment vessel stick model. The SASSI models also include the annex building east-west and the turbine building first bay as stick models. The latest AP1000 generic 2D SASSI analyses show that the maximum relative seismic displacement between the turbine building and the nuclear island is 1.04 inches in the north-south direction, which is less than the 2-inch maximum relative seismic displacement requirement; note that this maximum north-south relative seismic displacement is outside the area of the localized nonconformance and bounds any north-south relative displacement in the nonconforming area.

As the AP1000 Generic SASSI analysis does not explicitly model the north-south displacements between the nuclear island and the annex building, an assessment of the bounding nature of the north south displacements between the nuclear island and the turbine building was performed. Specifically, a comparison of the stiffness of the annex building and turbine building first bay was made to demonstrate that for the north-south seismic motion, the annex building is much stiffer than the turbine building which confirms that the turbine building displacements are larger under SSE demand. Therefore, the turbine building-to-auxiliary building relative displacements calculated in the generic SASSI analysis can be used to compare to the nonconforming measured gaps. Comparison of SSE maximum standard plant relative displacements between the north face of the auxiliary building and south face of the turbine building first bay measured gaps is performed and the maximum relative displacements represent building response under SSE where the nuclear island and the adjacent building will potentially be closest together. Linear interpolation is used to estimate the relative displacements between the walls at elevations between 100' and the roof. Using linear interpolation is a conservative estimate because the base restraint of each structure will minimize rotation at the lower elevations and using a straight-line interpolation conservatively overestimates how close the building will be.

The gap between auxiliary building and annex/turbine building at locations with nonconformances during a seismic event calculated based on generic SASSI is equal to or larger than 1.32 inches which is larger than the licensing basis requirement of a 1-inch minimum gap.

### Site-Specific SASSI Analysis

A site-specific 2D SASSI analysis was performed for VEGP Units 3&4 to show the acceptability of the AP1000 plant at the Vogtle site. The site-specific SASSI analysis performed for the Vogtle site includes site-specific soil properties and embedment effects, and site-specific SSE. The site-specific SASSI was performed before AP1000 plant DCD, Rev. 19 was approved and does not include the recent changes in the nuclear island (e.g., polar crane mass change) and adjacent buildings (e.g., change in structures of turbine building first bay). A study has since been performed to compare the deflections at the perimeter walls from the generic SASSI analysis using models including the significant building changes to those that do not include the changes. The results of the study confirmed that the recent changes to the building structures do not have significant impact on the result of the relative displacement between buildings.

As was demonstrated for the generic SASSI analysis, the turbine building-to-auxiliary building relative displacements calculated in the site-specific SASSI analysis can be used to compare to the nonconforming measured gaps. Comparison of SSE maximum site-specific relative displacements between the north face of the auxiliary building and south face of the turbine building first bay measured gaps is performed and the maximum relative displacements represent building response under SSE where the nuclear island and the adjacent building will potentially be closest together. The gap between auxiliary building and annex/turbine building at locations with nonconformances during a seismic event calculated based on the VEGP Unit 3 site-specific SASSI is equal to or larger than 1.73 inches which is larger than the licensing basis requirement of a 1-inch minimum seismic gap. As such, the proposed change to the seismic gap at VEGP Unit 3 between the Nuclear Island and the annex building/turbine building between Column Lines I and J from El. 141' through El. 154' provides sufficient separation between the nuclear island and adjacent seismic Category II buildings under site specific conditions.

### Settlement Evaluation

In addition to the effect of SSE, differential settlement of foundations may impact the gaps between the nuclear island and adjacent buildings. Therefore, differential settlement of foundations is evaluated based on the VEGP Units 3 settlement survey data collected from the site-specific settlement monitoring program for potential impact on the gap between the nuclear island and adjacent buildings. The settlement monitoring program monitors the settlement of building foundations during the construction stages to verify the structural displacements due to construction loads and continues to monitor after construction is complete. The VEGP Unit 3 settlement survey data of the past few years indicates that the nuclear island basemat has deflected more in the center and less at the perimeter which would tend to cause the perimeter walls to lean towards the center of the nuclear island. Theoretically, this suggests that the nuclear island tends to tilt away from the turbine building and annex building. The survey data also indicates the foundation deflection contour of the turbine building and the annex building is uniform in the vicinity of the nuclear island, which does not result in tilt of the perimeter structures towards the nuclear island. From a practical perspective, as construction load induced settlement occurs, even if walls were to lean towards the gap, construction means and methods require that, as wall construction progresses upward, walls are installed at original design

location, offsetting any minor tilt that may have occurred in the walls below, effectively minimizing building tilt induced by the short-term settlement. The long-term (consolidation) settlement is expected to be relatively small because the Vogtle site has very thick engineered compacted fill and over consolidated Blue Bluff Marl overlying the lower sand stratum. Therefore, the differential settlement does not have an adverse impact on the gaps between the nuclear island and adjacent buildings.

### Conclusion

Nonconforming gaps between the annex building and the auxiliary building in the north south direction and between the turbine building first bay and the auxiliary building in the north south direction are identified. The gaps between the annex building and auxiliary building are smaller and are compared to relative displacements calculated in the seismic analyses performed using SASSI. The SASSI analyses are performed to calculate relative displacements between the turbine building and auxiliary building in the north south direction. Because the annex building is stiffer than the turbine building in the north south direction, the results can conservatively be used for comparison to gaps measured between the annex building and auxiliary building in the north south direction. The comparison shows that the gap between the auxiliary building and annex/turbine buildings at locations with nonconformances during a seismic event calculated based on generic SASSI is equal to or larger than 1.32 inches. In addition, review of the measured gaps demonstrates that the nonconforming locations are localized and not at the top of the auxiliary building where the maximum relative displacements between the auxiliary building and adjoining buildings occur. The results demonstrate that the buildings will not contact under SSE and the gap between auxiliary building and annex/turbine buildings at locations with nonconformances always exceeds the 1" clearance gap licensing basis requirement.

The proposed change reduces the minimum gap requirement for VEGP Unit 3 between the nuclear island and the annex building/turbine building between Column Lines I and J from El. 141' through El. 154' to 2-1/16" (to bound the nonconforming measured minimum gap of 2-3/16-inch in this localized area) which leaves at least a 1-inch gap between the nuclear island and the annex building/turbine building during a seismic event. The proposed change to the VEGP Unit 3 gap requirement does not reduce the 1-inch gap margin in a seismic event, as specified in UFSAR Subsection 3.8.5.1. The proposed change to the gap requirement does not affect the structural integrity requirements on seismic Category I structures. The safety functions of the seismic Category I structures are not impacted. The performance of the seismic Category II structures is not impacted and will not degrade the function of a seismic Category I structure, system or component.

#### 4. REGULATORY EVALUATION

##### 4.1 Applicable Regulatory Requirements/Criteria

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a combined license (COL). The proposed changes involve changes to VEGP Unit 3 COL Appendix C (and VEGP Unit 3 plant-specific DCD Tier 1) Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) information. Therefore, NRC approval is required prior to making the VEGP Unit 3 plant-specific proposed changes in this License Amendment Request.

10 CFR 52, Appendix D, Section VIII.B.6, requires prior NRC approval for departure from Tier 2\* information. The proposed amendment includes a departure from Tier 2\* information. Therefore, a License Amendment Request is required.

10 CFR 52, Appendix D, Section VII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2\* information, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section. The proposed changes involve changes to VEGP Unit 3 COL Appendix C (and VEGP Unit 3 plant-specific DCD Tier 1) ITAAC information and Tier 2\* information. Therefore, NRC approval is required prior to making the changes to Tier 2 information.

10 CFR 52.97(b) requires that the Commission shall identify within the combined license the inspections, tests, and analyses, including those applicable to emergency planning, that the licensee shall perform, and the acceptance criteria that, if met, are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission's rules and regulations. Based on the technical evaluations provided in Section 3 above, the proposed changes to the ITAAC continue to meet the requirements of 10 CFR 52.97(b).

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1, "Quality standards and records," requires that structures, systems, and components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The nuclear island, and the portions of the annex building and turbine building first bay adjacent to the nuclear island, continue to meet the design codes committed to in the UFSAR Subsections 3.3.2.3 and 3.8. GDC 1 also requires that appropriate records of the design, fabrication, erection, and testing of structures, systems, and components (SSCs) important to safety be maintained by or under the control of the nuclear power unit licensee throughout the life of the unit. The quality assurance requirements of Appendix B to 10 CFR 50 are applied to activities affecting the nuclear island, and the portions of the annex building and turbine building first bay adjacent to the nuclear island. Thus, GDC 1 compliance is not affected by the proposed changes.

10 CFR Part 50, Appendix A, GDC 2, "Design Bases for Protection Against Natural Phenomena," requires that SSCs important to safety shall be designed to withstand the

effects of natural phenomena such as earthquakes, tornados, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions. Seismic Category II structures, including the portions of the annex building and turbine building first bay adjacent to the nuclear island, are designed so that an SSE does not cause unacceptable structural failure or interaction with seismic Category I items. The proposed changes to the minimum 3-inch gap above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island to a minimum gap of 2-1/16 inches, which leaves at least a 1-inch gap between the nuclear island and the annex building/turbine building during a seismic event consistent with the current licensing basis, are acceptable to prevent contact between the nuclear island and these seismic Category II structures (annex building/turbine building) when the buildings deflect during an SSE event. The proposed changes to the VEGP Unit 3 gap requirements do not reduce the 1-inch gap margin in a seismic event, as identified in UFSAR Subsection 3.8.5.1. The proposed changes to the gap requirements do not affect the structural integrity requirements on seismic Category I structures. The safety functions of the seismic Category I structures are not impacted. The performance of the seismic Category II structures is not impacted and will not degrade the function of a seismic Category I SSC. Thus, GDC 2 compliance is not affected by the proposed changes.

10 CFR Part 50, Appendix A, GDC 4, "Environmental and Dynamic Effects Design Bases, requires SSCs important to safety 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 proposed changes to the minimum 3-inch gap above grade between the nuclear island and the portions of the annex building and turbine building first bay adjacent to the nuclear island to a minimum gap of 2 1/16 inches do not involve a change to the design of the nuclear island, annex building, or turbine building. The affected portions of the annex building and turbine building first bay adjacent to the nuclear island do not house SSCs important to safety and remain designed such that the portions of the buildings adjacent to the nuclear island maintain structural integrity during an SSE. Thus, GDC 4 compliance is not affected by the proposed changes.

#### **4.2 Precedent**

None.

#### **4.3 Significant Hazards Consideration**

The proposed amendment changes COL Appendix C (and associated plant-specific Tier 1), Tier 2\*, and Tier 2 material applicable only to Vogtle Electric Generating Plant (VEGP) Unit 3, to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island.



An evaluation to determine whether a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The proposed changes would revise the COL and licensing basis for VEGP Unit 3 to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island.

The proposed changes to the gap requirement do not affect the structural integrity requirements on seismic Category I structures. The safety functions of the seismic Category I structures are not impacted. The performance of the seismic Category II structures is not impacted and will not degrade the function of a seismic Category I structure, system, or component (SSC). The proposed changes do not involve a change to the design of the nuclear island, annex building, or turbine building, and no SSC design or function is affected. No design or safety analysis is affected. The proposed changes do not affect any accident initiating event or component failure, thus the probabilities of the accidents previously evaluated are not affected. No function used to mitigate a radioactive material release and no radioactive material release source term is involved, thus the radiological releases in the accident analyses are not affected.

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

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

Response: No.

The proposed changes would revise the COL and licensing basis for VEGP Unit 3 to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island.

The proposed changes do not involve a change to the design of the nuclear island, annex building, or turbine building, and no SSC design or function is affected. The performance of the seismic Category II structures is not impacted and will not degrade the function of a seismic Category I SSC. The proposed changes would not introduce a new failure mode, fault or sequence of events that could result in a radioactive material release.

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

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

Response: No.

The proposed changes would revise the COL and licensing basis for VEGP Unit 3 to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island.

The proposed changes do not involve a change to the design of the nuclear island, annex building, or turbine building, and no SSC design or function is affected. The performance of the seismic Category II structures is not impacted and will not degrade the function of a seismic Category I SSC, and would not affect any design parameter, function or analysis. There would be no change to an existing design basis, design function, regulatory criterion, or analysis. No safety analysis or design basis acceptance limit/criterion is involved.

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

**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. Therefore, it is concluded that the requested amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

**5. ENVIRONMENTAL CONSIDERATIONS**

The details of the proposed changes are provided in Section 2 of this License Amendment Request.

The proposed amendment changes COL Appendix C (and associated plant-specific Tier 1), Tier 2\*, and Tier 2 material applicable only to Vogtle Electric Generating Plant (VEGP) Unit 3, to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island.

This review has determined the proposed changes require an amendment to the COL. However, a review of the anticipated construction and operational effects of the requested amendment has determined the requested amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

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

As documented in Section 4.3, Significant Hazards Consideration, of this License Amendment Request, an evaluation was completed to determine whether 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 requested amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the requested amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the requested amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the requested amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

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

The proposed amendment changes COL Appendix C (and associated plant-specific Tier 1), Tier 2\*, and Tier 2 material applicable only to Vogtle Electric Generating Plant (VEGP) Unit 3, to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island.

The proposed changes would revise VEGP Unit 3 COL and licensing basis documents to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island. The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Therefore, it is concluded that the requested amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

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

The proposed changes would revise VEGP Unit 3 COL and licensing basis documents to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island. Plant radiation zones (addressed in UFSAR Section 12.3) are not affected, and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure. Therefore, the requested amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.



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

## 6. REFERENCES

None

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**Southern Nuclear Operating Company**

**ND-20-XXXX**

**Enclosure 2**

**Vogtle Electric Generating Plant (VEGP) Unit 3**

**Exemption Request:**

**Unit 3 Auxiliary Building Wall 11 Seismic Gap Requirements**

**(LAR-20-001)**

(Enclosure 2 consists of 7 pages, including this cover page)

## 1.0 Purpose

Southern Nuclear Operating Company (the Licensee) requests a permanent exemption from the provisions of 10 CFR 52, Appendix D, Section III.B, *Design Certification Rule for the AP1000 Design, Scope and Contents*, to allow a departure from elements of the certification information in Tier 1 of the generic AP1000 Design Control Document (DCD). The regulation, 10 CFR 52, Appendix D, Section III.B, requires an applicant or licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in DCD Tier 1.

This request for exemption provides the technical and regulatory basis to demonstrate that 10 CFR 52.63, §52.7, and §50.12 requirements are met and will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow departures from generic Tier 1 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) information to modify the seismic gap requirements above grade between the nuclear island and the adjacent annex building/turbine building between Column Lines I and J from El. 141' through El. 154' in the licensing basis to accommodate construction as-built localized nonconformances at Vogtle Electric Generating Plant (VEGP) Unit 3.

## 2.0 Background

The Licensee is the holder of Combined License No. NPF-91, which authorizes construction and operation of a Westinghouse Electric Company AP1000 nuclear plant named VEGP Unit 3. The proposed changes would revise VEGP Unit 3 ITAAC affecting the seismic gap requirements above grade between the nuclear island and the adjacent annex building/turbine building. This activity requests exemption from the Generic DCD Tier 1 tables which support the associated COL Appendix C ITAAC.

An exemption from elements of the AP1000 certified (Tier 1) design information is requested to allow VEGP Unit 3 plant-specific departures to be taken from the VEGP Unit 3 Tier 1 ITAAC No. 3.3.00.13.

## 3.0 Technical Justification of Acceptability

The proposed changes would revise the VEGP Unit 3 COL and licensing basis documents to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island.

Currently, the requirement in the licensing basis for the minimum gap between the nuclear island and annex building/turbine building is 3 inches, as specified in COL Appendix C ITAAC No. 3.3.00.13, UFSAR Appendix 2.5E Section 5.2, and UFSAR Subsections 3.7.2.8.1 and 3.8.5.1. UFSAR Subsection 3.8.5.1 requires that a minimum 1-inch gap be maintained between the nuclear island and annex building/turbine building considering the displacements of the buildings during the safe shutdown earthquake (SSE) events. The purpose of the licensing basis requirements is to ensure there is no interaction between the nuclear island and annex building/turbine building during SSE events.

The proposed changes reduce the minimum gap requirements for VEGP Unit 3 between the nuclear island and the annex building/turbine building between Column Lines I and J from El. 141' through El. 154' to 2-1/16 inches (to bound the nonconforming measured

minimum gap of 2-3/16 inches in this localized area) which leaves at least a 1-inch gap between the nuclear island and the annex building/turbine building during a seismic event. The proposed changes to the VEGP Unit 3 gap requirements do not reduce the 1-inch gap margin in a seismic event, as identified in UFSAR Subsection 3.8.5.1. The proposed changes to the gap requirements do not affect the structural integrity requirements on seismic Category I structures. The safety functions of the seismic Category I structures are not impacted. The performance of the seismic Category II structures is not impacted and does not degrade the function of a seismic Category I structure, system or component (SSC).

Detailed technical justification supporting this request for exemption is provided in Section 2 of the associated License Amendment Request in Enclosure 1 of this letter.

#### **4.0 Justification of Exemption**

10 CFR Part 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. Since SNC has identified changes to the Tier 1 information for VEGP Unit 3 as discussed in Enclosure 1 of the accompanying License Amendment Request, an exemption from the certified design information in Tier 1 is needed.

10 CFR Part 52, Appendix D, and 10 CFR 50.12, §52.7, and §52.63 state that the NRC may grant exemptions from the requirements of the regulations provided six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the changes do not result in a significant decrease in the level of safety [Part 52, App. D, VIII.A.4].

The requested exemption satisfies the criteria for granting specific exemptions, as described below.

##### **1. This exemption is authorized by law**

The NRC has authority under 10 CFR 52.63, §52.7, and §50.12 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR 50.12 and §52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

Accordingly, this requested exemption is "authorized by law," as required by 10 CFR 50.12(a)(1).

**2. This exemption will not present an undue risk to the health and safety of the public**

The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the VEGP Unit 3 plant-specific Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information. The VEGP Unit 3 plant-specific DCD Tier 1 will continue to reflect the approved licensing basis for VEGP Unit 3 and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the DCD. Therefore, the affected VEGP Unit 3 plant-specific DCD Tier 1 ITAAC will continue to serve its required purpose.

The proposed changes would revise the VEGP Unit 3 plant-specific Tier 1 information to modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island. These changes do not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor do they modify or remove any design controls, operational controls, or safeguards intended to mitigate any existing on-site hazards. Furthermore, the proposed changes would 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 fuel cladding failures. Accordingly, the changes do not present an undue risk from any existing or proposed equipment or systems.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

**3. The exemption is consistent with the common defense and security**

The requested exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow the licensee to depart from elements of the VEGP Unit 3 plant-specific DCD Tier 1 design information. The proposed exemption does not alter the design, function, or operation of any structures or plant equipment that is necessary to maintain a safe and secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

**4. Special circumstances are present**

10 CFR 50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection defines special circumstances as when "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The rule under consideration in this request for exemption is 10 CFR 52, Appendix D, Section III.B, which requires that a licensee referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The VEGP Unit 3 COL references the AP1000 Design Certification Rule and incorporates by reference the

requirements of 10 CFR Part 52, Appendix D, including Tier 1 information. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the AP1000 design certification, and to require compliance with the design certification information in Appendix D.

The proposed exemption would modify the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island. The proposed changes do not affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. No safety-related SSC or function is involved. The proposed changes do not involve nor interface with any SSC accident initiator or initiating sequence of events related to the accidents evaluated and therefore do not have an adverse effect on any SSC's design function. Accordingly, this exemption from the certification information will enable the Licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

**5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.**

Based on the nature of the changes to the VEGP Unit 3 plant-specific Tier 1 information and the understanding that these changes support the design function of the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island, it is expected that this exemption may be requested by other AP1000 licensees and applicants. However, a review of the reduction in standardization resulting from the departure from the standard DCD determined that even if other AP1000 licensees and applicants do not request this same departure, the special circumstances will continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the structures associated with this request will continue to be maintained. Furthermore, the justification provided in the License Amendment Request and this exemption request and the associated mark-ups demonstrate that there is a limited change from the standard information provided in the generic AP1000 DCD, which is offset by the special circumstances identified above.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

**6. The design change will not result in a significant decrease in the level of safety.**

The exemption revises the VEGP Unit 3 plant-specific DCD Tier 1 information by revising the seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island as discussed in Section 2.0. The changes to the seismic gap requirements do not change the design requirements for the nuclear island and portions of the annex building and turbine building



first bay adjacent to the nuclear island. Because these functions continue to be met, there is no reduction in the level of safety.

## **5.0 Risk Assessment**

A risk assessment was not determined to be applicable to address the acceptability of this proposal.

## **6.0 Precedent Exemptions**

None

## **7.0 Environmental Consideration**

The Licensee requests a departure from elements of the certified information in Tier 1 of the generic AP1000 DCD. The Licensee has determined that the proposed departure would require a permanent exemption from the requirements of 10 CFR 52, Appendix D, Section III.B, *Design Certification Rule for the AP1000 Design, Scope and Contents*, with respect to installation or use of facility components located within the restricted area, as defined in 10 CFR Part 20, or which changes an inspection or a surveillance requirement; however, the Licensee evaluation of the proposed exemption has determined that the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Based on the above review of the proposed exemption, the Licensee has determined that the proposed activity does 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 exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed exemption is not required.

Specific details of the environmental considerations supporting this request for exemption are provided in Section 5 of the associated License Amendment Request provided in Enclosure 1 of this letter.

## **8.0 Conclusion**

The proposed changes to VEGP Unit 3 Tier 1 seismic gap requirements above grade between the nuclear island and portions of the annex building and turbine building first bay adjacent to the nuclear island are necessary to accommodate construction as-built localized nonconformances at VEGP Unit 3. The exemption request meets the requirements of 10 CFR 52.63, *Finality of design certifications*, 10 CFR 52.7, *Specific exemptions*, 10 CFR 50.12, *Specific exemptions*, and 10 CFR 52 Appendix D, *Design Certification Rule for the AP1000*. Specifically, the exemption request meets the criteria of 10 CFR 50.12(a)(1) in that the request is authorized by law, presents no undue risk to public health and safety, and is consistent with the common defense and security. Furthermore, approval of this request does not result in a significant decrease in the level of safety, satisfies the underlying purpose of the AP1000 Design Certification Rule, and

does not present a significant decrease in safety as a result of a reduction in standardization.

## **9.0 References**

None

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**Southern Nuclear Operating Company**

**ND-20-XXXX**

**Enclosure 3**

**Vogtle Electric Generating Plant (VEGP) Unit 3**

**Proposed Changes to Licensing Basis Documents  
(LAR-20-001)**

**Note:**

Added text is shown as bold Blue Underline

Deleted text is shown as bold ~~Red Strikethrough~~

Omitted text is shown as bold \* \* \*

(Enclosure 3 consists of 5 pages, including this cover page)

**VEGP Unit 3 COL Appendix C (and VEGP Unit 3 Plant-Specific Tier 1) Table 3.3-6 is revised as follows:**

Table 3.3-6 Inspections, Tests, Analyses, and Acceptance Criteria				
No.	ITAAC No.	Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria

\* \* \*

819	3.3.00.13	13. Separation is provided between the structural elements of the turbine and annex buildings and the nuclear island structure. This separation permits horizontal motion of the buildings in the safe shutdown earthquake without impact between structural elements of the buildings.	An inspection of the separation of the nuclear island from the annex and turbine building structures will be performed. The inspection will verify the specified horizontal clearance between structural elements of the adjacent buildings, consisting of the reinforced concrete walls and slabs, structural steel columns and floor beams.	The minimum horizontal clearance above floor elevation 100'-0" between the structural elements of the annex building and the nuclear island is 3 inches; <u>except that the minimum horizontal clearance between elevations 141' 0" and 154' 0" between structural elements of the annex building and the nuclear island between column lines I and J is 2-1/16 inches.</u> The minimum horizontal clearance above floor elevation 100'-0" between the structural elements of the turbine building and the nuclear island is 3 inches; <u>except that the minimum horizontal clearance between elevations 141' 0" and 154' 0" between structural elements of the turbine building and the nuclear island between column lines I and J is 2-1/16 inches.</u>
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\* \* \*

**UFSAR Appendix 2.5E, AP1000 Site Specific Seismic Evaluation Report, Section 5.2, is revised as follows:**

## **5.2 Adjacent Building Seismic Demand**

\* \* \* The maximum relative displacement between nuclear island and at top of the Annex building for the ESP Best Estimate soil case is 2", which is less than the 3 inch minimum gap between nuclear island and annex building and which is less than the 2-1/16 inches minimum gap at Unit 3 between nuclear island and annex building between elevations 141'-0" and 154'-0" between column lines I and J. \* \* \*

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**UFSAR Subsection 3.7.2.8.1, Annex Building, is revised as follows:**

**3.7.2.8.1 Annex Building**

\* \* \*

The minimum space required between the annex building and the nuclear island to avoid contact is obtained by absolute summation of the deflections of each structure obtained from either a time history or a response spectrum analysis for each structure. The maximum displacement of the roof of the annex building is 1.6 inches in the east-west direction. The minimum clearance between the structural elements of the annex building above grade and the nuclear island is 3 inches; except that the minimum clearance at Unit 3 between elevations 141'-0" and 154'-0" between structural elements of the annex building and the nuclear island between column lines I and J is 2-1/16 inches.

\* \* \*

**UFSAR Subsection 3.8.5.1, Description of the Foundations, is revised as follows:**

**3.8.5.1 Description of the Foundations**

\* \* \*

*[The turbine building and annex building are structurally separated from the nuclear island structures by a 2-inch gap at and below the grade. A 3-inch minimum gap is provided above grade; except that the minimum gap for Unit 3 between elevations 141'-0" and 154'-0" between column lines I and J is 2-1/16 inches.]* \* \* \*

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