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U.S. Nuclear Regulatory Commission  
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Southern Nuclear Operating Company  
Vogtle Electric Generating Plant Units 3 and 4 Combined License Application  
Voluntary Revision to Final Safety Analysis Report Chapter 19

Ladies and Gentlemen:

By letter dated March 28, 2008, Southern Nuclear Operating Company (SNC) submitted an application for combined licenses (COLs) for proposed Vogtle Electric Generating Plant (VEGP) Units 3 and 4 to the U.S. Nuclear Regulatory Commission (NRC) for two Westinghouse AP1000 reactor plants, in accordance with 10 CFR Part 52. SNC is supplementing the COL Application (COLA) Part 2, Final Safety Analysis Report (FSAR), to address a recently identified AP1000 Design Control Document (DCD) revision to a Chapter 19 COL information item regarding seismic margin. The enclosure to this letter provides the supplemented COLA FSAR Chapter 19 information.

If you have any questions regarding this letter, please contact Mr. Wes Sparkman at (205) 992-5061 or Ms. Amy Aughtman at (205) 992-5805.

DO92  
NRO

Mr. B. L. Ivey states he is a Vice President 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. L. Ivey

Sworn to and subscribed before me this 20<sup>th</sup> day of September, 2010

Notary Public: Nancy Louise Henderson

My commission expires: March 23, 2014.

BLI/BJS

Enclosure: VEGP Units 3 and 4 COL Application - Voluntary Revision to FSAR Chapter 19  
Regarding Seismic Margin



cc: Southern Nuclear Operating Company

Mr. J. H. Miller, III, President and CEO (w/o enclosure)  
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Mr. J. T. Gasser, Executive Vice President, Nuclear Operations (w/o enclosure)  
Mr. D. H. Jones, Site Vice President, Vogtle 3 & 4 (w/o enclosure)  
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Nuclear Regulatory Commission

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Mr. T. Miller, DOE/PM

**Southern Nuclear Operating Company**

**ND-10-1811**

**Enclosure**

**VEGP Units 3 and 4 COL Application –  
Voluntary Revision to FSAR Chapter 19  
Regarding Seismic Margin**

**NuStart Qb Tracking No. 4233**

**NRC RAI / OI Number: n/a**

Westinghouse recently provided a response to OI-SRP19.0-SPLA-12 (Westinghouse letter No. DCP\_NRC\_003013, dated August 23, 2010) related to seismic margin. The response to the Design Control Document (DCD) open item (OI) included revisions to the COL information item identified in DCD Subsection 19.59.10.5. In accordance with the letter, DCD Subsection 19.59.10.5 will be revised to include a new COL Item and a change to an existing COL Item. In addition, a change was proposed to DCD Table 1.8-2 to add the new COL Item. The following provides proposed revisions to VEGP Units 3 and 4 FSAR based on corresponding DCD changes.

**1- Addition of new COL Item 19.59.10-6**

As specified in the above identified Westinghouse letter, DCD Subsection 19.59.10.5 will be revised to include the following language:

**19.59.10.5 Combined License Information**

The Combined License applicant referencing the AP1000 certified design will confirm that the Seismic Margin Assessment analysis documented in Section 19.55 is applicable to the COL site. This will include a confirmation that the COL site seismic demand based on the site GMRS is enveloped by the Certified Seismic Design Response Spectra (CSDRS) seismic demand as defined by Tier 1 criteria for SSE as well as an assessment that no site specific effects such as seismically induced liquefaction settlements, slope stability, foundation failure, and relative displacements have the potential to lower the HCLPF values calculated for the certified design. Further evaluation will be required if the COL site is shown to be outside of the bounds of the SMA analysis documented in Section 19.55.

As required by the above COL item, SNC has confirmed the following:

Even though the VEGP GMRS exceeds the AP1000 CSDRS over certain frequency ranges, site-specific seismic soil-structure interaction analyses of the AP1000 Nuclear Island (NI) using the VEGP GMRS ground motion and VEGP soil profile demonstrated that the resulting VEGP in-structure response spectra (ISRS) at the six key locations are enveloped by the AP1000 CSDRS-broadened ISRS by a significant margin except for minor exceedances at very low frequency ranges. These slight exceedances have been shown to have no impact on the NI structures, systems, and components (SSCs). Therefore, the Tier 1 criteria for SSE have been satisfied. This evaluation is presented in VEGP Units 3 and 4 COL Application FSAR Section 3.7 and Appendix 3GG. In regards to seismic demand for the NI SSCs, it can be concluded that the Seismic Margin Assessment analysis documented in FSAR Section 19.55 is applicable to the VEGP COL site.

For seismic stability of the NI with regards to sliding and overturning, it was demonstrated that VEGP margins against sliding and overturning were greater than the limiting margins calculated for the standard AP1000 design cases. For seismic stability it can be concluded that the Seismic Margin Assessment analysis documented in FSAR Section 19.55 is applicable to the VEGP COL site.

For site specific conditions relating to soil-related failure modes, the demonstration of adequate seismic margin of the AP1000 design at the VEGP site is performed for a review level earthquake of 1.67 x VEGP GMRS, where the VEGP site-specific review level earthquake seismic responses and seismic loads are defined as 1.67 x VEGP GMRS seismic responses and seismic loads.

Potential for soil liquefaction was evaluated at 1.67 x VEGP GMRS which produces a peak ground acceleration (PGA) of 0.44g. The liquefaction potential factor of safety was found to be high such that liquefaction potential was screened out as a contributor to design-specific plant-level HCLPF capacity. Similarly, bearing pressure capacity to demand still demonstrated sufficient margin so this potential failure mode was screened out as a contributor to design specific plant-level HCLPF capacity.

Details of the VEGP seismic margin assessment, as described above, are provided in SNC's response to NRC RAI No. 19-10, eRAI Tracking No. 3512 (SNC letter ND-09-1768, dated October 30, 2009).

Appropriate changes corresponding to the above discussion will be included in VEGP FSAR Subsections 19.55.6 and 19.59.10 as identified in the Application Revisions section below. In addition, FSAR Table 1.8-202 will be revised to include COL Item 19.59.10-6.

These changes will be included in a future COLA revision.

This response is SITE SPECIFIC; however, the addition of new COL Item 19.59.10-6 is expected to be STANDARD for the S-COLAs. The changes to FSAR Section 19.55 and Table 1.8-202 are SITE SPECIFIC.

## **2- Revision to DCD Subsection 19.59.10.5, Item 1:**

As specified in the above identified Westinghouse letter, DCD Subsection 19.59.10.5 Item 1 will be revised as shown below:

1. Specific minimum seismic requirements consistent with those used to define the Table 19.55-1 HCLPF values.

This includes the known frequency range used to define the HCLPF by comparing the required response spectrum (RRS) and test response spectrum (TRS). The test response spectra must be chosen so as to demonstrate that no more than one percent rate of failure would be expected when the equipment is subjected to the applicable seismic margin ground motion for the equipment identified to be applicable in the Seismic Margin Insights of the Site-Specific PRA. The range of frequency response that is required for the equipment with its structural support is defined.

Appropriate changes corresponding to the above referenced AP1000 DCD proposed revision are identified in the Application Revisions section below. These changes will be included in a future COLA revision.

This portion of the response is expected to be STANDARD for the S-COLAs.

Westinghouse has indicated that the above noted changes to the DCD will be included in an upcoming amendment to the AP1000 DCD, and as such, these changes to the COL application are not considered to be a departure from the DCD. Should Westinghouse not incorporate these changes as expected, a revision to this response will be provided to address the differences.

**Associated VEGP COL Application Revisions:**

1. COLA Part 2, FSAR Chapter 19, Subsection 19.59.10.5, Combined License Information, will be revised to add the following as the last paragraph with LMAs STD COL 19.59.10-6 and VEGP COL 19.59.10-6:

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As discussed in Subsection 19.55.6.3, it has been confirmed that the Seismic Margin Analysis (SMA) documented in DCD Section 19.55 is applicable to the site. The site-specific effects (i.e., soil-related failure modes, etc.) have been evaluated and it was concluded that the plant-specific plant-level HCLPF value is equal to or greater than 1.67 times the site-specific GMRS peak ground acceleration.

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2. COLA Part 2, FSAR Chapter 19, Section 19.55, Seismic Margin Analysis, will be revised from:

**19.55 SEISMIC MARGIN ANALYSIS**

This section of the referenced DCD is incorporated by reference with no departures or supplements.

To read:

**19.55 SEISMIC MARGIN ANALYSIS**

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

3. COLA Part 2, FSAR Chapter 19, Subsection 19.55.6 will be revised to add the following subsection with LMA VEGP COL 19.59.10-6:

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**19.55.6.3 Site Specific Seismic Margin Analysis**

The VEGP GMRS exceeds the AP1000 CSDRS over certain frequency ranges, site-specific seismic soil-structure interaction analyses of the AP1000 Nuclear Island (NI) using the VEGP GMRS ground motion and VEGP soil profile demonstrated that the resulting VEGP in-structure response spectra (ISRS) at the six key locations are enveloped by the AP1000 CSDRS broadened ISRS by a significant margin except for minor exceedances at very low frequency ranges. These slight exceedances have been shown to have no impact on the NI structures, systems, and components. Therefore, the Tier 1 criteria for SSE have been satisfied. This evaluation is presented in Section 3.7. In regards to seismic demand for the NI structures, systems, and components, it can be concluded that the Seismic Margin Assessment analysis documented in Section 19.55 is applicable to the VEGP site.



For seismic stability of the NI with regards to sliding and overturning, it was demonstrated that VEGP NI margins against sliding and overturning were greater than the limiting margins calculated for the standard AP1000 design cases. For seismic stability, it can be concluded that the Seismic Margin Assessment analysis documented in DCD Section 19.55 is applicable to the VEGP site.

For site specific conditions relating to soil-related failure modes, the demonstration of adequate seismic margin of the AP1000 design at the VEGP site is performed for a review level earthquake of 1.67 x VEGP GMRS, where the VEGP site-specific review level earthquake seismic responses and seismic loads are defined as 1.67 x VEGP GMRS seismic responses and seismic loads.

Potential for soil liquefaction was evaluated at 1.67 x VEGP GMRS which produces a peak ground acceleration of 0.44g. The liquefaction potential factor of safety was found to be high such that liquefaction potential was screened out as a contributor to design-specific plant-level HCLPF capacity. Similarly, bearing pressure capacity to demand still demonstrated sufficient margin so this potential failure mode was screened out as a contributor to design specific plant-level HCLPF capacity.

4. COLA Part 2, FSAR Chapter 1, Table 1.8-202, will be revised to add new COL Item Number 19.59.10-6 as shown below:

COL ITEM	SUBJECT	DCD SUBSECTION	FSAR SUBSECTION(S)	COL APPLICANT (A), HOLDER (H), OR BOTH (B)
19.59.10-6	Confirm that the Seismic Margin Assessment analysis is applicable to the COL site	19.59.10.5	19.55.6.3 19.59.10.5	A

5. COLA Part 2, FSAR Chapter 19, Subsection 19.59.10.5, Combined License Information 19.59.10-1, Item 1 will be revised from:
- Specific minimum seismic requirements consistent with those used to define the Table 19.55-1 HCLPF values. This includes the known frequency range used to define the HCLPF by comparing the required response spectrum (RRS) and test response spectrum (TRS). The range of frequency response that is required for the equipment with its structural support is defined.

To read:

- Specific minimum seismic requirements consistent with those used to define the AP1000 DCD Table 19.55-1 HCLPF values.

This includes the known frequency range used to define the HCLPF by comparing the required response spectrum (RRS) and test response spectrum (TRS). The test response spectra are chosen so as to demonstrate that no more than one percent rate of failure is expected when the equipment is subjected to the applicable seismic margin ground motion for the equipment identified to be applicable in the seismic margin insights

of the site-specific PRA. The range of frequency response that is required for the equipment with its structural support is defined.

6. COLA Part 10, License Conditions and ITAAC, Section 2, COL Item No. 19.59.10-1, Item 1 will be revised from:

1. Specific minimum seismic requirements consistent with those used to define the Table 19.55-1 HCLPF values. This includes the known frequency range used to define the HCLPF by comparing the required response spectrum (RRS) and test response spectrum (TRS). The range of frequency response that is required for the equipment with its structural support is defined.

To read:

1. Specific minimum seismic requirements consistent with those used to define the Table 19.55-1 HCLPF values. This includes the known frequency range used to define the HCLPF by comparing the required response spectrum (RRS) and test response spectrum (TRS). The test response spectra are chosen so as to demonstrate that no more than one percent rate of failure is expected when the equipment is subjected to the applicable seismic margin ground motion for the equipment identified to be applicable in the seismic margin insights of the site-specific PRA. The range of frequency response that is required for the equipment with its structural support is defined.

**ASSOCIATED ATTACHMENTS/ENCLOSURE:**

None