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SOUTHERN COMPANY

DEC 11 2008

Docket Nos.: 52-025
52-026

ND-08-1821

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

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4 Combined License Application
Response to Request for Additional Information Letter No. 013

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. During the NRC's detailed review of this application, the NRC identified a need for additional geotechnical information required to complete their review of the COL application's Final Safety Analysis Report (FSAR) Section 2.5, "Geology, Seismology, and Geotechnical Engineering." By letter dated November 13, 2008, the NRC provided SNC with Request for Additional Information (RAI) Letter No. 013 concerning this geotechnical information need. This RAI letter contains two RAI questions numbered 02.05.04-1 and 02.05.04-2. The enclosure to this letter provides the SNC response to these RAIs.

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

D092
NRO

Mr. J. A. (Buzz) Miller states he is a Senior 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

Joseph A. (Buzz) Miller

Sworn to and subscribed before me this 11 *day of* December, *2008*

Notary Public: Lori H. Bell

My commission expires: 05/06/09

JAM/BJS/lac

Enclosure: Response to NRC RAI Letter No. 013 on the VEGP Units 3 & 4 COL Application Involving Geotechnical Information

cc: Southern Nuclear Operating Company
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Mr. C. R. Pierce, Vogtle Development Licensing Manager
Mr. M. J. Ajluni, Nuclear Licensing Manager
Mr. W. A. Sparkman, COL Project Engineer
Document Services RTYPE: AR01.1053
File AR.01.02.06

Nuclear Regulatory Commission
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Mr. D. B. Matthews, Director of Division of New Reactor Licensing (w/o enclosure)
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Mr. B. Hughes, Project Manager of New Reactors
Mr. R. G. Joshi, Project Manager of New Reactors
Ms. T. E. Simms, Project Manager of New Reactors
Mr. B. C. Anderson, Project Manager of New Reactors
Mr. M. M. Comar, Project Manager of New Reactors
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Oglethorpe Power Corporation
Mr. M. W. Price, Chief Operating Officer (w/o enclosure)

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Westinghouse Electric Company, LLC
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Southern Nuclear Operating Company

ND-08-1821

Enclosure

Response to NRC RAI Letter No. 013

on the VEGP Units 3 & 4 COL Application

Involving Geotechnical Information

FSAR Section 2.5, Geology, Seismology, and Geotechnical Engineering

eRAI Tracking No. 1453

NRC RAI Number 02.05.04-1:

COL Action Item 2.5-11 requires an applicant referencing the AP1000 DCD to describe the methodology used to determine the static and dynamic lateral earth pressures and the hydrostatic pressures acting on the safety-related structures. The applicant referred to ESP SSAR Section 2.5.4 for the information to resolve this action item. However, in the SSAR, the applicant did not address in sufficient detail either the lateral earth pressure or the hydrostatic pressures at the site. Please provide an explanation of the methodologies used to determine the pressures as required by the DCD.

SNC Response:

The following application revision is provided in response to NRC RAI Number 02.05.04-1 and will be included in COLA FSAR Section 2.5 in a new Subsection 2.5.4.

Associated VEGP COL Application Revision:

The development of lateral earth pressures, static and dynamic (seismic), against the below-grade walls of safety-related structures is expected to be minimized with the construction of the mechanically stabilized earth (MSE) walls. As described in ESPA SSAR Subsection 2.5.4.5.7, the MSE walls are constructed adjacent to the Nuclear Island (NI) to facilitate the placement of backfill in the powerblock excavation. This bottom-up construction occurs prior to construction of the NI, and the MSE walls serve as the outside form for the NI below-grade walls. Although the MSE walls are expected to relieve much of the lateral earth pressures exerted on the below-grade walls, over time these pressures may be transferred to the below-grade structure. Thus, the evaluation of site-specific lateral earth pressures for safety-related structures does not consider any influence from the MSE walls.

The influence of adjacent permanent building loads is not considered; however the influence of an areal surcharge of 500 psf and close-in compaction are considered in the evaluation of site-specific lateral earth pressures. The inclusion of compaction-induced pressures is conservative given that these pressures will be exerted on the MSE wall prior to construction of the below-grade NI walls.

Static lateral earth pressures, assuming frictionless vertical walls and horizontally-placed backfill, are evaluated using Rankine's theory for active, at-rest, and passive conditions (Reference 1). The active and passive earth pressure coefficients, k_a and k_p, respectively, are based on a drained friction angle of 36 degrees for the compacted structural fill and are presented in ESPA SSAR Table 2.5.4-1a. The at-rest earth pressure coefficient, k_o, for the compacted structural fill is conservatively taken as 0.5.

Seismic lateral earth pressures are evaluated for active and at-rest conditions using methods presented by Mononobe-Okabe (see Reference 2) for active conditions and ASCE 4-98 (Reference 3) for at-rest conditions. The ground acceleration at a frequency of 100 hertz for the Vogtle 3 and 4 site is taken as 0.266g.

Lateral earth pressures resulting from an areal surcharge applied at the ground surface alongside the below-grade walls were evaluated for active and at-rest conditions.

Lateral earth pressures increase as a result of compaction close-in to the below-grade walls. These pressures are controlled at the construction stage by limiting the size of compaction equipment and its proximity to below-grade walls. The influence of compaction close-in was evaluated based on the characteristics of the vibratory compactor used for the Phase 1 Test Pad program (ESPA SSAR Appendix 2.5D). Compaction-induced lateral earth pressure under active conditions was evaluated using procedures in NAVFAC 7.2 (Reference 4). Compaction-induced lateral earth pressure under at-rest conditions was evaluated using procedures developed by Duncan, et al. (Reference 5).

Hydrostatic pressures, attributed to the groundwater level, exert lateral pressure on below-grade structures. At the VEGP Units 3 and 4 site, in the power block areas, the design groundwater elevation of 165 ft msl, as noted in ESPA SSAR Subsection 2.4.12, is about 15 feet below the NI basemat elevation of approximately 180 ft msl. The post-construction groundwater level, as indentified in ESP SSAR Appendix 2.4B, will also be well below the basemat elevation. Since the groundwater level is located well below the basemat, hydrostatic forces will not be exerted on the below-grade walls and hydrostatic pressures are not considered in the evaluation of lateral earth pressure for the NI.

Sample earth pressure diagrams for the maximum height of the NI wall (about 40 ft) are developed in Figure 1 for active conditions and in Figure 2 for at-rest conditions. These diagrams were developed assuming level ground surface, a post-construction groundwater level below the basemat elevation (no hydrostatic pressure), an areal surcharge pressure of 500 psf, and compaction-induced pressure increases. A saturated unit weight of 133 pcf was used to calculate the static and seismic lateral earth pressures.

References

1. Lambe, T.W. and R.V. Whitman (1969). *Soil Mechanics*, John Wiley & Sons, Inc., New York, NY.

2. Seed, H.B. and R.V. Whitman (1970). "Design of Earth Retaining Structures for Dynamic Loads," *Proc. Specialty Conf. on Lateral Stresses in the Ground and Design of Earth-Retaining Structures*, ASCE, NY, pp. 103-147.

3. ASCE 4-98 (1998). *Seismic Analysis of Safety-Related Nuclear Structures and Commentary.* ASCE. Reston, VA.

4. Department of Navy (1982). *Foundations and Earth Structures, Design Manual 7.2.* Alexandria, VA. pp 7.2-76-77.

5. Duncan, JM, GW Williams, AL Sehn and RB Seed (1993). "Closure of 'Estimation of Earth Pressures due to Compaction'", *Journal of Geotechnical Engineering*, ASCE, New York, NY, 119(7):1172-1177.

Figure 1 – Active Lateral Earth Pressure Diagrams for NI Below Grade Walls

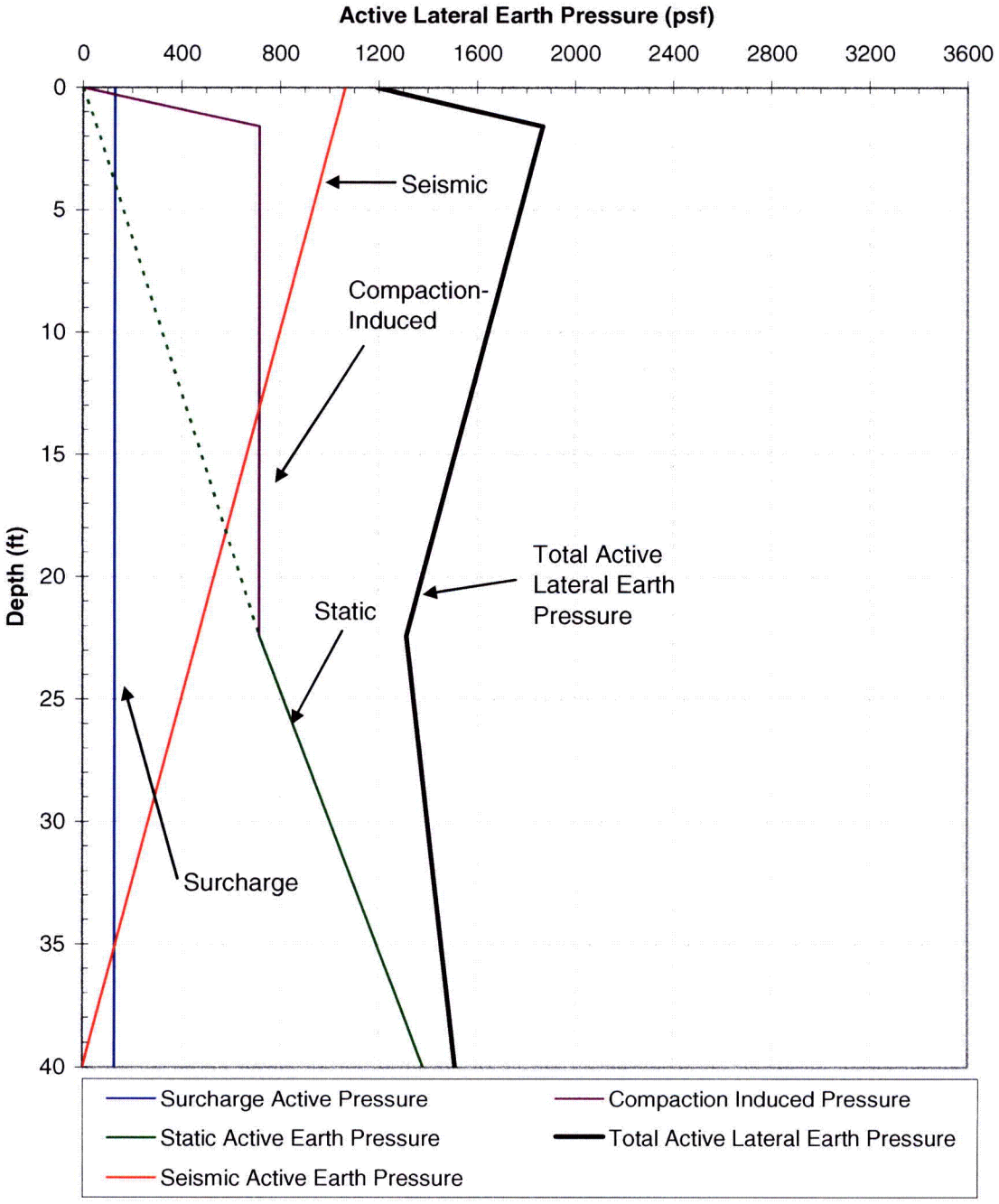
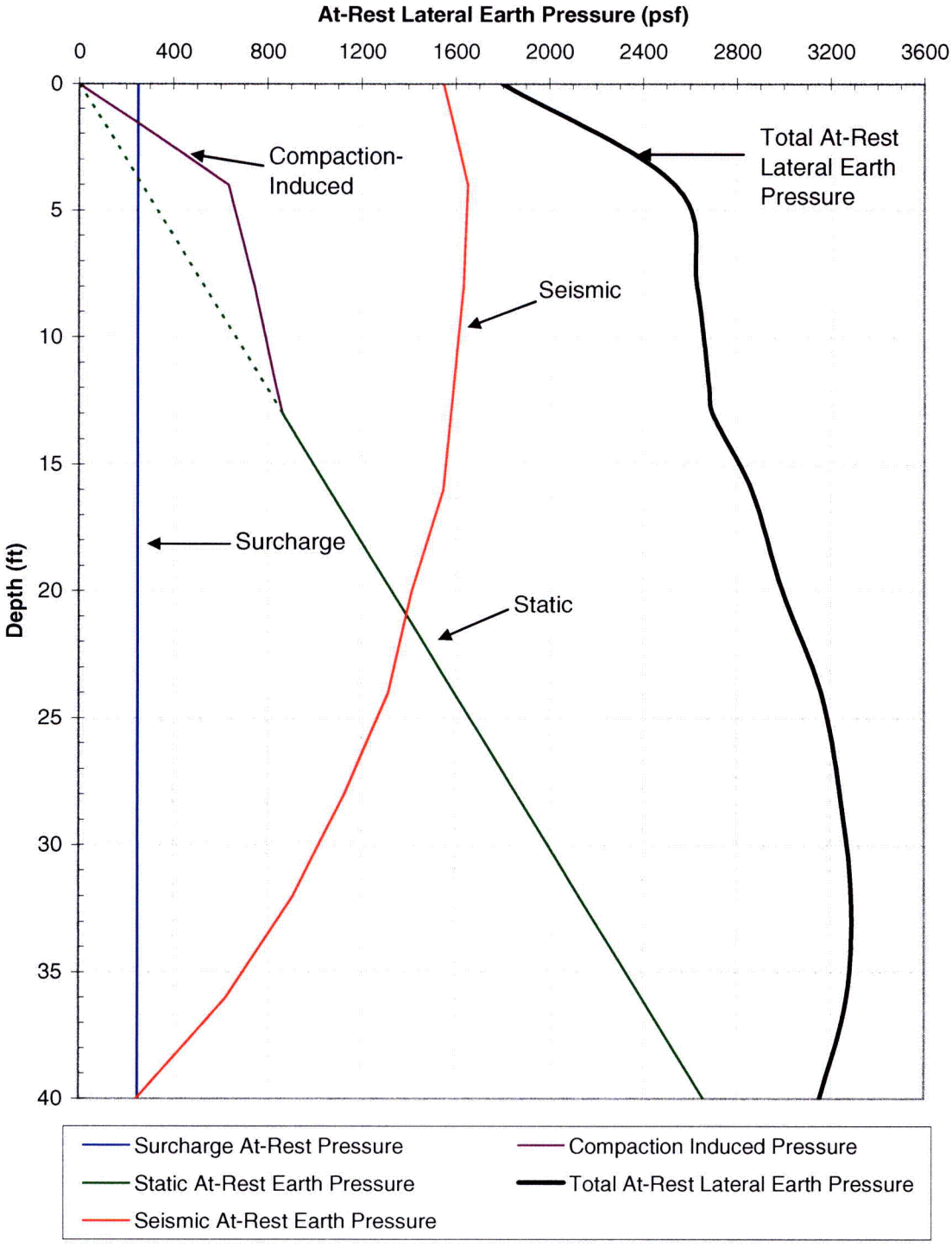


Figure 2 – At-Rest Lateral Earth Pressure Diagrams for NI Below Grade Walls



NRC RAI Number 02.05.04-2:

COL Action Item 2.5-13 requires the applicant referencing the AP1000 DCD to provide a description of the subsurface instrumentation to be used to monitor the settlement and performance of foundations of the nuclear island, as well as to provide the locations of benchmarks and other markers to be used to monitor settlement. The applicant referred to ESP SSSAR Section 2.5.4 for the information to address this action item. The applicant presented information on the instrumentation that would be used to monitor the settlement. However, the applicant did not provide sufficiently detailed explanations of the locations of benchmarks and other markers that would be used to monitor settlement in Section 2.5.4 of the ESP SSAR. Please provide the staff with the location that addresses this COL Action Item.

SNC Response:

Information on markers for the proposed settlement monitoring program is provided in the Vogtle ESPA SSAR Section 2.5, Appendix 2.5E, Section 9.0 "Settlement Monitoring Program." Section 9.0 has a Figure 9-1 "Proposed Monitoring Points for Vogtle" which shows the location of the settlement markers. In regards to benchmarks, it is currently planned to use the permanent benchmarks used for the Vogtle Unit 1 & 2 settlement monitoring program. To assure there is no influence from the Unit 3 & 4 construction, one of these benchmarks may be relocated.

Associated VEGP COL Application Revision:

COLA Part 2, FSAR Chapter 2, Section 2.5.7, "Combined License Information," will be revised to read:

2.5.7.13 Subsurface Instrumentation

VEGP COL 2.5-13 This COL item is addressed in ESPA SSAR Section 2.5, Appendix 2.5E.