J. A. "Buzz" Miller
Senior Vice President
Nuclear Development

Southern Nuclear Operating Company, Inc.
42 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.5754
Fax 205.992.6165

SOUTHERN COMPANY

FEB 10 2009

Docket Nos.: 52-025
52-026

ND-09-0004

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. 020

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 information, involving probabilistic risk assessment (PRA) analysis, required to complete their review of the COL application's Final Safety Analysis Report (FSAR) Section 19.59, "PRA Results and Insights." By letter dated December 17, 2008, the NRC provided SNC with Request for Additional Information (RAI) Letter No. 020 concerning this PRA analysis information need. This RAI letter contains two RAI questions numbered 19-1 and 19-2. 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 10 *day of* February, *2009*

Notary Public: Gloria H. Bui

My commission expires: 05/06/09

JAM/BJS/dmw

Enclosure: Response to NRC RAI Letter No. 020 on the VEGP Units 3 & 4 COL Application Involving PRA Analysis

cc: Southern Nuclear Operating Company
Mr. J. H. Miller, III, President and CEO (w/o enclosure)
Mr. J. T. Gasser, Executive Vice President, Nuclear Operations (w/o enclosure)
Mr. T. E. Tynan, Vice President - Vogtle (w/o enclosure)
Mr. D. M. Lloyd, Vogtle Deployment Director
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
Mr. L. A. Reyes, Region II Administrator (w/o enclosure)
Ms. S. M. Coffin, AP1000 Manager of New Reactors (w/o enclosure)
Mr. C. J. Araguas, Lead Project Manager of New Reactors
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
Mr. W. F. Burton, Chief – Environmental Technical Support
Mr. M. D. Notich, Environmental Project Manager
Mr. J. H. Fringer, III, Environmental Project Manager
Mr. G. J. McCoy, Senior Resident Inspector of VEGP

Georgia Power Company
Mr. O. C. Harper, IV, Vice President, Resource Planning and Nuclear Development (w/o enclosure)

Oglethorpe Power Corporation
Mr. M. W. Price, Executive Vice President and Chief Operating Officer (w/o enclosure)

Municipal Electric Authority of Georgia
Mr. C. B. Manning, Jr., Senior Vice President, Participant and Corporate Affairs (w/o enclosure)

Dalton Utilities
Mr. D. Cope, President and Chief Executive Officer (w/o enclosure)

Bechtel Power Corporation
Mr. J. S. Prebula, Project Engineer (w/o enclosure)
Mr. R. W. Prunty, Licensing Engineer

Tetra Tech NUS, Inc.
Ms. K. K. Patterson, Project Manager

Shaw Stone & Webster, Inc.
Mr. K. B. Allison, Project Manager (w/o enclosure)
Mr. J. M. Oddo, Licensing Manager
Mr. D. C. Shutt, Licensing Engineer

Westinghouse Electric Company, LLC
Mr. N. C. Boyter, Vice President, AP1000 Vogtle 3 & 4 Project (w/o enclosure)
Mr. J. L. Whiteman, Principal Engineer, Licensing & Customer Interface

Southern Nuclear Operating Company

ND-09-0004

Enclosure

Response to NRC RAI Letter No. 020

on the VEGP Units 3 & 4 COL Application

Involving

PRA Analysis

FSAR Section 19.59, PRA Results and Insights

eRAI Tracking No. 1526

NRC RAI Number 19-1:

Part of AP1000 DCD COL Information Item 19.59.10-2 calls for the following action by COL applicants:

> The Combined License applicant will confirm that the High Winds, Floods, and Other External Events analysis documented in Section 19.58 is applicable to the COL site. Further evaluation will be required if the COL site is shown to be outside of the bounds of the High Winds, Floods, and Other External Events analysis documented in Section 19.58.

The above requirement is replaced by the following words in STD COL 19.59.10-2:

> It has been confirmed that the High Winds, Floods, and Other External Events analysis documented in Section 19.58 is applicable to the site…

Please provide supporting information or appropriate references that ensure that all of the key site-related assumptions in the Section 19.58 External Events analyses are valid for the Vogtle site.

SNC Response:

A generic PRA has been performed by Westinghouse (Reference 1) for the AP1000. The key elements of this PRA are presented in Chapter 19 of the AP1000 DCD. As part of the COLA, applicants are required to demonstrate that the PRA performed for the AP1000 is applicable to the specific site. To facilitate the determination of applicability, Westinghouse developed an External Events Bounding Assessment Worksheet which was used initially in February 2007 to gather information related to external hazard event frequencies for the various AP1000 COLA sites. This information was used in APP-GW-GLR-101 (Reference 2) by Westinghouse to perform an external hazards evaluation that demonstrated the AP1000 PRA remained applicable with bounding site parameters.

To support resolution of AP1000 COL Item 19.59.10-2, Westinghouse gathered site-specific, external event information from the NuStart utilities interested in the AP1000 design. The process began when Westinghouse developed a list of PRA external events and provided this list to the utilities which were considering the AP1000 design at that time.

External events considered in the AP1000 PRA are those events whose cause is external to all systems associated with normal and emergency operations situations. Some external events may not pose a significant threat of a severe accident. Some external events were considered at the design stage and have a sufficiently low contribution to core damage frequency or plant risk.

Based upon the guidelines provided in Generic Letter 88-20, Supplement 4 and NUREG-1407, the following is a list of external events that are considered for evaluation:

- High Winds
  - Tornados
  - Hurricanes
  - Extra-tropical Storms
- External floods
- Transportation and nearby facility accidents

- Aviation (commercial/general/military)
- Marine (ship/barge)
- Pipeline (gas/oil)
- Railroad
- Truck

Each utility then evaluated each external event for applicability to their proposed sites. Events that were not applicable to any of the surveyed sites were screened from the evaluation. For events determined by the utility to be applicable to their proposed sites, the utility provided to Westinghouse an external event initiating event frequency. Westinghouse gathered initiating event frequencies from the utilities and compiled them. The highest initiating event frequency was selected to "bound" each event. Westinghouse then selected the largest initiating event frequency for each initiating event category and evaluated the frequency versus modified criteria in NUREG-1407.

The criteria developed in the report (Reference 2) are that external events with a frequency of less than 1.0E-07 events per year can be screened from the evaluation. For external event frequencies greater than 1.0E-07 events per year, a quantitative evaluation was performed. If the evaluation showed the resulting core damage frequency (CDF) was less than 1.0E-08 events per year, then that external event was also screened from the evaluation. Events that were not screened from the evaluation were considered for further evaluation.

Table 1 documents the site-specific external events evaluation that has been performed for VEGP Units 3 and 4. This table provides a general explanation of the evaluation and resultant conclusions and provides a reference to applicable sections of the COL or ESP application where more detailed supporting information (including data used, methods and key assumptions) regarding the specific event is located. Based upon this evaluation, it is concluded that the VEGP Units 3 and 4 site is bounded by the High Winds, Floods and Other External Events analysis documented in DCD Section 19.58 and APP-GW-GLR-101 (Reference 2) and no further evaluations are required at the COL application stage.

REFERENCES:

1. Westinghouse Electric Company LLC, APP-GW-GL-022, Rev. 8, "AP1000 Probabilistic Risk Assessment," July 30, 2004.

2. Westinghouse Electric Company LLC, APP-GW-GLR-101, Rev. 0, "AP1000 Probabilistic Risk Assessment Site-Specific Considerations," May 11, 2007 (ML071340353).

Table 1 – External Event Frequencies for VEGP

Category	Event	Applicable to site? (Y/N)[1]	Explanation of Applicability Evaluation	Event Frequency
High Winds	F0 Tornado	Y	The tornado strike probability for the VEGP site area is discussed in VEGP ESPA SSAR Subsection 2.3.1.3.2. Vogtle has conservatively assumed that the strike probability for a tornado of a given intensity is equal to the overall strike probability for any tornado. Since the event frequencies are all greater than 1E-07, this event is applicable to the VEGP site. These event frequencies are bounded by the limiting initiating event frequencies given in Table 3.0-1 of APP-GW-GLR-101. Also, as documented in COLA FSAR Table 2.0-201, the VEGP site characteristic tornado wind loadings are equal to the AP1000 DCD site characteristic tornado wind loadings. Therefore, the safety features of the AP1000 are unaffected and the CDFs given in APP-GW-GLR-101 Table 3.0-1 for these events are applicable to VEGP Units 3 and 4.	7.74E-05
	F1 Tornado	Y		7.74E-05
	F2 Tornado	Y		7.74E-05
	F3 Tornado	Y		7.74E-05
	F4 Tornado	Y		7.74E-05
	F5 Tornado	Y		7.74E-05
	Cat. 1 Hurricane	Y	Tropical cyclones are discussed in VEGP ESPA SSAR Subsection 2.3.1.3.3. The event frequencies are based on the number of recorded events over the 154 year period of record. There were no recorded events for Category 4 or 5 hurricanes. However, a conservative event frequency of <1E-02 was assigned for these events. These event frequencies were provided to Westinghouse during the development of APP-GW-GLR-101 (Reference 2). In 3 of the categories (Cat. 1, 3 Hurricanes and Extra-tropical storms), the event frequencies slightly exceed those given in Table 3.01-1 of APP-GW-GLR-101. This has been attributed to rounding of the values originally provided to Westinghouse by SNC. This change does not impact the conclusion in APP-GW-GLR-101 that none of	1.04E-01
	Cat. 2 Hurricane	Y		2.60E-02
	Cat. 3 Hurricane	Y		3.25E-02
	Cat. 4 Hurricane	Y		<1E-02
	Cat. 5 Hurricane	Y		<1E-02

Category	Event	Applicable to site? (Y/N)[1]	Explanation of Applicability Evaluation	Event Frequency
High Winds (Continued)	Extra-tropical storms	Y	the limiting event frequencies are sufficiently low to be removed from further consideration. As documented in COLA FSAR Table 2.0-201, the VEGP site characteristic tornado wind loadings are equal to the AP1000 DCD site characteristic tornado wind loadings. The VEGP site characteristic operating basis wind speed (104 mph) is below the DCD site characteristic operating basis wind speed of 145 mph. Therefore, it is concluded that the safety features of the AP1000 are unaffected and the resultant CDFs given in APP-GW-GLR-101 Table 3.0-1 for these events are applicable to VEGP Units 3 and 4.	3.25E-02
External Flood	External Flood	N	As discussed in COLA FSAR Subsection 2.4.10 and ESPA SSAR Subsection 2.4.2, the site grade of 220 ft msl is well above the maximum Savannah River flood elevation of 178.10 ft msl. Additionally, as discussed in COLA FSAR Subsections 2.4.2 and 2.4.10, the maximum water level in the power block area due to the local PMP flood event is 219.45 ft msl, which is below the entrance and openings to all safety related structures (elevation 220 ft msl). Therefore, no external flood protection measures are required for VEGP Units 3 and 4. As discussed in COLA FSAR Subsection 1.2.2, the VEGP site grade elevation of 220 ft msl corresponds to DCD grade elevation 100 ft. Based upon the quantitative evaluations performed, the VEGP site is not susceptible to any external floods which would adversely impact safe operation of VEGP Units 3 and 4. This is consistent with the evaluation presented in Section 4.0 of APP-GW-GLR-101. Therefore, it is concluded that the resultant CDF of 5.85E-15 events per year given in APP-GW-GLR-101, Section 4.0 is bounding.	Note 2

Category	Event	Applicable to site? (Y/N)[1]	Explanation of Applicability Evaluation	Event Frequency
Transportation and Nearby Facility Accidents	Aviation (commercial/general/ military)	N	Aircraft hazards are addressed in VEGP ESPA SSAR Subsection 3.5.1.6. All airports, airways, and military training routes, with the exception of commercial airway V185, were determined to be below the Regulatory Standard RS-002 screening threshold of 1E-07 for evaluating aircraft hazards. Due to the unavailability of traffic data for Airway V185, an evaluation was performed to calculate the maximum number of airway flights per year, above which the acceptance guideline of 1E-07 per year contained in RS-002 and NUREG-0800 are exceeded. The evaluation determined that approximately 51,100 flights per year would be required to reach the limiting crash probability of 1E-07. This value is higher than the total of all projected itinerant flights expected to utilize the airway. Therefore, based on the regulatory screening criteria and the airway traffic analysis, it can be concluded that the probability of a crash that would adversely impact VEGP Units 3 and 4 is less than 1E-07. This event frequency is bounded by the limiting value of 1.21E-06 events per year given in APP-GW-GLR-101.	<1.0E-07
	Marine (ship/barge)	N	As discussed in VEGP ESPA SSAR Subsection 2.2.3.1.3, there is no barge traffic past the VEGP site; therefore, this event is not applicable to the VEGP site. Since the CDF given in APP-GW-GLR-101 Subsection 5.2 is based on the premise that a marine accident is a concern, the CDF value given in APP-GW-GLR-101 is considered bounding.	Note 2
	Pipeline (gas/oil)	N	As discussed in VEGP ESPA SSAR Subsection 2.2.3.1.2, there are no natural gas pipelines within 10 miles of the VEGP site. No other pipelines carrying potentially hazardous materials are located within 5 miles of the VEGP site. APP-GW-GLR-101 evaluates a 30″ gas pipeline approximately 1 mile from the AP1000 and concludes that the initiating event frequency for an event is expected to be less than 1E-07. Because	Note 2

Category	Event	Applicable to site? (Y/N)[1]	Explanation of Applicability Evaluation	Event Frequency
	Pipeline (gas/oil) (Continued)		the pipeline hazards at VEGP are well beyond this distance, it is concluded that the APP-GW-GLR-101 evaluation is bounding. Therefore, the potential for hazards from these sources are minimal and will not adversely affect the safe operation of VEGP Units 3 and 4.	
	Railroad	N	Potential explosion and flammable vapor cloud hazards to VEGP Units 3 and 4 resulting from railroad accidents are discussed in VEGP ESPA SSAR Subsection 2.2.3.1.4. The potential hazard resulting from railroad cars was evaluated using the methodology of RG 1.91. The maximum probable cargo based on RG 1.91 was used, along with a conservative TNT equivalency, which resulted in a safe standoff distance that was significantly less than the actual distance from the nearest railroad line to the site boundary (approximately 4.5 miles). Potential toxic hazards to control room habitability due to a release of hazardous chemicals resulting from a railcar accident are addressed in VEGP ESPA SSAR Subsection 2.2.3.2.1. This hazard was evaluated using the methodology of RG 1.78. The results of this evaluation concluded that no adverse impacts to VEGP Units 3 and 4 are expected. Based upon the quantitative consequence evaluations performed, no risk-important events related to rail transportation have been identified for VEGP Units 3 and 4. This is consistent with the evaluation provided in Subsection 5.4 of APP-GW-GLR-101. Therefore, because no risk-important consequences were identified in the evaluation, the potential for hazards from these sources are minimal and will not adversely affect safe operation of VEGP Units 3 and 4.	Note 2

Category	Event	Applicable to site? (Y/N)[1]	Explanation of Applicability Evaluation	Event Frequency
Transportation and Nearby Facility Accidents (Continued)	Truck	N	Potential explosion and flammable vapor cloud hazards to VEGP Units 3 and 4 resulting from truck accidents are discussed in VEGP ESPA SSAR Subsection 2.2.3.1.1. The potential hazard resulting from trucks was evaluated using the methodology of RG 1.91. The maximum probable cargo based on RG 1.91 was used, along with a conservative TNT equivalency, which resulted in a safe standoff distance that was significantly less than the actual distance from the nearest highway to the site boundary (approximately 4.7 miles). Potential toxic hazards to control room habitability due to a release of hazardous chemicals resulting from a truck accident are addressed in VEGP ESPA SSAR Subsection 2.2.3.2.1. This hazard was evaluated using the methodology of RG 1.78. The results of this evaluation concluded that no adverse impacts to VEGP Units 3 and 4 are expected. Based upon the quantitative consequence evaluations performed, no risk-important events related to truck transportation have been identified for VEGP Units 3 and 4. This is consistent with the evaluation provided in Subsection 5.4 of APP-GW-GLR-101. Therefore, because no risk-important consequences were identified in the evaluation, the potential for hazards from these sources are minimal and will not adversely affect safe operation of VEGP Units 3 and 4.	Note 2
Other events:	A number of external events beyond those evaluated in DCD Subsection 19.58 and APP-GW-GLR-101 (Reference 2) were evaluated for the Vogtle site. These events and the applicable subsections are	N	For these events, quantitative consequence evaluations were performed as documented in the referenced ESPA SSAR sections, and it has been concluded that none of these events will adversely impact safe operation of VEGP Units 3 and 4. Therefore, these events are not considered to be risk-important and it can be concluded that the VEGP Units 3 and 4 site is within the bounds of the Floods and Other External Events analysis documented in DCD Section 19.58 and APP-GW-GLR-101.	Note 2

Category	Event	Applicable to site? (Y/N)[1]	Explanation of Applicability Evaluation	Event Frequency
Other events (Continued)	listed below: • Major Depots and Storage Areas (ESPA SSAR Subsection 2.2.3.2.2) • On-site Storage Tanks (ESPA SSAR Subsection 2.2.3.2.3) • External Fires (ESPA SSAR Subsection 2.2.3.3) • Radiological Hazards (ESPA SSAR Subsection 2.2.3.4)			

Notes:

1. An event is applicable (Y) to the VEGP site if the initiating event frequency is greater than 1E-07, or if a quantitative consequence evaluation has demonstrated that there are site specific parameters that exceed the parameters used in APP-GW-GLR-101. An event is not applicable (N) to the VEGP site if the initiating event frequency is less than 1E-07 or if the quantitative consequence evaluation performed in the FSAR/SSAR has demonstrated that the event will not adversely impact the safe operation of VEGP Units 3 and 4.
2. A specific event frequency for this event has not been determined. A deterministic quantitative consequence evaluation has been performed that has demonstrated that the event does not adversely impact the safe operation of VEGP Units 3 and 4. Additional details are provided in the "Explanation of Applicability Evaluation" along with references to the applicable FSAR/SSAR Subsections.

Associated VEGP COL Application Revision:

None

NRC RAI Number 19-2:

STD COL 19.59.10-2 states that "The PRA will be updated to reflect these differences [between the as-built plant and design used as the basis for the AP1000 PRA and DCD Table 19.59-18] if they potentially result in a significant increase in core damage frequency or large release frequency."

(a) Please clarify how the Vogtle PRA (to be completed by fuel load) will be updated to account for Vogtle site-specific information per 10 CFR 52.79(d)(1) and 10 CFR 50.71(h)(1) as well as as-built information.

(b) Please define "significant increase."

SNC Response:

(a) The PRA will be updated as described in COLA FSAR Subsection 19.59.10.6. The process for development of the plant-specific PRA will include evaluation of plant as-built differences, departures from certified design and the results of the plant-specific review of DCD Table 19.59-18. The update process described in COLA FSAR Subsection 19.59.10.6 is consistent with the requirements of 10 CFR 52.79(d)(1) and 10 CFR 50.71(h)(1).

(b) Any difference in the AP1000 PRA-based insights of DCD Table 19.59-18 could potentially result in an increase in core damage frequency (CDF) or large release frequency (LRF). Plant-specific PRA-based insight differences will be evaluated and the plant-specific PRA model modified as necessary to reflect the plant-specific design and the PRA-based insight; as such, the FSAR will be revised to remove "significant increase."

Associated VEGP COL Application Revision:

COLA Part 2, FSAR Chapter 19, Subsection 19.59.10.5, second paragraph, will be revised as follows:

> "A review of the differences between the as-built plant and the design used as the basis for the AP1000 PRA and DCD Table 19.59-18 will be completed prior to fuel load. The plant-specific PRA-based insight differences will be evaluated and the plant-specific PRA model modified as necessary to account for plant-specific design and any design changes or departures from the design certification PRA."