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ND-09-1714

U.S. Nuclear Regulatory Commission
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Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4 Combined License Application
Revised Response to Request for Additional Information Number 19-4

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 severe accident evaluations, required to complete their review of the COL application's Final Safety Analysis Report (FSAR) Chapter 19, "Probabilistic Risk Assessment." By letter dated April 22, 2009, the NRC provided SNC with Request for Additional Information (RAI) Letter No. 033 concerning this information need. That RAI letter contained seven RAI questions numbered 19-3 through 19-9. By letter dated May 22, 2009, SNC provided a response for these RAIs. Subsequent to that submittal, SNC determined that a value taken from a reference document was incorrectly represented in the response to RAI 19-4. No application revisions are affected; thus, the attachment to the original RAI 19-4 response is not included. The enclosure to this letter provides SNC's revised response to this RAI.

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

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NRC

Mr. Charles R. Pierce states he is the AP1000 Licensing Manager of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Charles R. Pierce

Charles R. Pierce

Sworn to and subscribed before me this 23rd day of October, 2009.

Notary Public: Deborah A. Jaworski

My commission expires: October 24, 2012

CRP/BJS/dmw

Enclosure: Revised Response to NRC RAI Number 19-4 on the VEGP Units 3 & 4 COL
Application Involving Severe Accident Evaluations

cc: Southern Nuclear Operating Company

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Nuclear Regulatory Commission

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Southern Nuclear Operating Company

ND-09-1714

Enclosure

Revised Response to NRC RAI Number 19-4

on the

VEGP Units 3 & 4 COL Application

Involving

Severe Accident Evaluations

FSAR Chapter 19, Severe Accident Evaluations

eRAI Tracking No. 2306

NRC RAI Number 19-4:

(Follow-up to Question 19-1) Section 2.3.1.3.3 of the Site Safety Analysis Report (SSAR) prepared for the VEGP early site permit (ESP) lists 77 "tropical cyclones" of lesser magnitude than hurricanes occurring over a 154-year period. Of these, five are the "extra-tropical storms," identified in the response to Question 19-1. However, the impact of hurricanes downgraded to tropical storms (or less) before reaching the VEGP site is not addressed in the response. Please revise the FSAR to discuss the level of risk associated with these storms and the systematic method used to assess or screen the hazard (for example, by demonstrating that the resulting CDF is less than $1E-8/\text{yr}$), including the basis for numerical values used.

SNC Response:

Westinghouse requested in 2007 that NuStart utilities complete an "External Hazards Checklist" with a goal to determine "bounding" initiating event frequencies for external events used in the AP1000 PRA. The evaluation of any category of events requires that the full spectrum of intensity or magnitude of that phenomenon be included. For the Wind Events category, that means evaluating the effects of all wind speeds up to the maximum credible value.

The External Hazards Checklist requested information on hurricane and tornado frequencies associated with the proposed AP1000 plant sites. This information was used in the development of the external events write-ups in DCD Section 19.58 and Westinghouse Technical Report APP-GW-GLR-101. The Saffir-Simpson scale for hurricanes starts at 74 mph wind speed which is the lower bound for the "hurricane" category of storms.

APP-GW-GLR-101 evaluated the CDF associated with high wind events using the following conservative assumptions:

- For all wind events that had, at any time during the life of that storm, a wind speed greater than 145 mph, LOOP occurs and all nonsafety-related systems are unavailable.
- For all wind events that did not have a wind speed greater than 145 mph, LOOP occurs (nonsafety-related systems remain available).

The "Extratropical Cyclone" subcategory of storms, used in APP-GW-GLR-101, was assigned an initiating event frequency of $3E-02$ events per year. Even applying the conservative assumption that a LOOP occurs for all of these events, the result of the Wind Events evaluation showed that the Wind Events category of external events could be screened out from further PRA consideration. For proposed AP1000 sites that have a history of wind events with maximum wind speeds less than 74 mph (ESPA Subsection 2.3.1.3.3 indicates 77 such storms for the VEGP Units 3 and 4 site), it is unreasonable to assume, for the APP-GW-GLR-101 evaluation, that all of these weather systems cause a LOOP. The logic of the APP-GW-GLR-101 assumption that offsite power is lost as a result of a high wind event is that the switchyard is vulnerable because it is not designed to withstand hurricane-force winds. As shown in FSAR Table 2.0-201, the site characteristic operating basis wind speed for VEGP Units 3 and 4 is 104 mph. This site characteristic value provides confidence that the switchyard can withstand wind speeds at least up to 74 mph. It is also unreasonable to assign a threshold value to a storm

wind speed that causes a LOOP because there are other factors, such as lightning and precipitation, which occur during a storm that influence the LOOP frequency and likely dominate the effect of wind speeds at the lower end of the wind speed range. The AP1000 PRA includes LOOP as an initiating event and the frequency of LOOP includes events due to lightning, precipitation and other factors. The probability of LOOP due to the wind portion of the "Extratropical Cyclone" subcategory of wind events is conservatively estimated by the frequency of 3E-02 events per year used in APP-GW-GLR-101.

An alternate representation of the LOOP frequency due to wind events of lower than hurricane intensity is presented in the data reported in NUREG/CR-6890, Volume 1, "Reevaluation of Station Blackout Risk at Nuclear Power Plants - Analysis of Loss of Offsite Power Events: 1986-2004." That report shows **four-eight** LOOP events due to high winds (defined in this report as wind speed less than 125 mph) during 1,984.7 reactor years (including both critical and non-critical conditions) which yields a frequency of **2E4E-03** LOOP events per reactor year due to high wind events with less than 125 mph wind speed. This wind speed range includes Category 1 and Category 2 hurricanes and would therefore be a conservative value to apply to the range of wind speeds less than 74 mph. Applying this value of **2E4E-03** LOOP events per reactor year to the "Extratropical Cyclone" subcategory of wind events in the APP-GW-GLR-101 evaluation would reduce the CDF calculated in APP-GW-GLR-101. Therefore, the evaluation of Wind Events in APP-GW-GLR-101 remains applicable for the AP1000 at the Vogtle site.

Based on the above, it is concluded that winds below 74 mph (tropical storms, depressions, etc.) are not considered to have an adverse impact on VEGP Units 3 and 4 as the switchyard and non-safety buildings will be designed to function at a higher wind speed (104 mph). Therefore no additional PRA considerations are required for winds below hurricane force.

"Table 1 – External Event Frequencies for VEGP" provided in response to NRC Request for Additional Information Letter No. 20, SNC letter no. ND-09-0004, dated February 10, 2009, (ADAMS No. ML090490095) RAI 19-1 is revised in this response to reflect this discussion and will be added to the FSAR as new table 19.58-201 in a future revision to the COLA.

This response is PLANT-SPECIFIC.

Associated VEGP COL Application Revisions:

COLA Part 2, FSAR Chapter 19, Section 19.58 will be revised to include the high winds information in FSAR Table 19.58-201. Refer to the response to RAI 19-3 for the details of COLA changes.

Attachments/Enclosures:

See attached table 19.58-201. (Included with original response.)