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SOUTHERN COMPANY
Energy to Serve Your World℠

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Vogtle Electric Generating Plant
Response to Request for Additional Information Regarding
Technical Specification Revision Request
DC Sources and TSTF-360, Revision 1

Ladies and Gentlemen:

On October 13, 2003, Southern Nuclear Operating Company (SNC) submitted a proposed change to the Vogtle Electric Generating Plant (VEGP) Unit 1 and Unit 2 Technical Specifications (TS). The proposed changes would revise TS Limiting Conditions for Operation (LCO) 3.8.4, "DC Sources – Operating," LCO 3.8.5, "DC Sources – Shutdown," and LCO 3.8.6, "Battery Cell Parameters." The proposed changes are based on Industry/TSTF Standard Technical Specification Change Traveler TSTF-360, Revision 1.

During telephone conferences on February 13, 2004, and February 17, 2004, the NRC staff requested additional information concerning the VEGP TSTF-360, Revision 1 Submittal. SNC responses to the questions asked by the NRC staff are enclosed.

(Affirmation and signature are on the following page).

A001

Mr. J. T. Gasser 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.

This letter contains no NRC commitments. If you have any questions, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Jeffrey T. Gasser

Sworn to and subscribed before me this 12th *day of* April, *2004*

Notary Public

My commission expires: 11/10/06

JTG/TDH/daj

Enclosure: VEGP Response to RAI Regarding TSTF 360, Revision

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley, Jr., Executive Vice President
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Mr. M. Sheibani, Engineering Supervisor – Plant Vogtle
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U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
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State of Georgia
Mr. L. C. Barrett, Commissioner – Department of Natural Resources

Enclosure

Vogtle Electric Generating Plant
Response to Request for Additional Information Regarding
TSTF 360, Revision 1

Vogtle Electric Generating Plant
Response to Request for Additional Information Regarding
TSTF 360, Revision 1

NRC Request 1

When a single battery charger is removed from service due to testing or other factors, how is the load transferred to the remaining battery charger?

SNC Response

There are two redundant 100% capacity battery chargers in each DC subsystem, and only one charger is required for DC subsystem operability in accordance with Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.4. While only one charger is required for operability, both safety-related chargers for their associated battery are normally operated in the "load sharing" mode. Load sharing circuitry is provided to ensure that the DC load is properly shared between the two chargers. Both chargers are connected to the bus, with each supplying approximately half of the load. When one charger is removed from service due to testing or other factors, the other automatically assumes the balance of the load.

NRC Request 2

With respect to the proposed 24-hour Battery Completion Time (Condition A to Limiting Condition of Operation 3.8.4), discuss the compensatory measures that will be implemented when a battery is declared inoperable.

SNC Response

The compensatory measures for this condition involve work controls, electrical system alignment, and whether or not an emergency diesel generator is affected by the inoperable battery. With respect to work controls, there will be no scheduled work or surveillance testing that could result in a reactor or turbine-generator trip hazard, that could cause a plant transient, or that impacts safety-related systems. This includes testing of the solid state protection system and the sequencer. In addition, if necessitated by the weather, the severe weather checklist will be put into effect. Implementing the severe weather checklist will help to minimize the impact of impending severe weather on the safe operation of the plant. With respect to electrical system alignment, both chargers for the inoperable battery will be verified to be available, and one of the chargers will be aligned for service. The affected vital buses will be powered from the associated regulated transformer. If the inoperable battery affects one of the emergency diesel generators, that diesel would be declared inoperable, but would be available in the slow start mode. This has the effect of allowing the diesel to be manually started in response to an event. The battery is necessary to flash the diesel generator field under fast automatic start conditions, but when slow started, field flashing is not required. This will allow the generator to self excite. In addition, the capability exists to provide power to the standby auxiliary transformer (SAT) from Plant Wilson via the combustion turbines. The SAT can be connected to one of the 4160 V ESF buses as necessary.

NRC Request 3

Describe what procedures are available to verify that the standby auxiliary transformer is available to supply power to any of the safety buses prior to entering the extended Completion Time for the battery (i.e., battery inoperability greater than 2 hours)?

SNC Response

Procedure 14230, AC Source Verification, provides guidance to demonstrate the operability of the offsite transmission network to the onsite Class 1E Distribution System by verifying correct breaker alignment and indicated power availability. The line-up procedure, which provides guidance for the standby auxiliary transformer (SAT), is 11418-C, and procedure 13418-C provides the necessary instructions for energizing and operating the standby auxiliary transformer.

NRC Request 4

How frequently are the operators trained on Procedure 18034-1(2), "Loss of Class 1E 125V DC Power?"

SNC Response

Procedure 18034-1(2), "Loss of Class 1E 125V DC Power," provides guidance in the event that power is lost to one of the 125V DC Vital Buses. Operators are trained on this procedure a minimum of once every two years (i.e., once per 2-year re-qualification cycle).

NRC Request 5

Describe the impact of WOG peer review findings.

SNC Response

The VEGP PRA model reviewed by the WOG peer review team in December 2001 was Revision 2c dated 08-28-2001. The peer group had findings on certain PRA elements they designated as "Contingency Grade 3." "Contingency Grade 3" items are broken apart into four levels of significance (A, B, C, or D), with Level "A" being the most significant. None of the "Contingency Grade 3" items were judged by the peer group to be Level "A" which would have required prompt resolution to ensure the technical adequacy of the PRA. Thirteen Level "B" observations were identified, and even though considered important for the long-term enhancement of the PRA model, their resolution is allowed to be deferred until the next periodic PRA model update.

After the WOG peer review, the VEGP PRA model was updated to Revision 2cy, dated 05-13-2003, in order to resolve three items which were considered to be the most significant among 13 Level "B" items. Those three resolutions were:

1) re-evaluation of RHR pump common cause failure (CCF) probabilities using the most recent NRC CCF data base (observation DA-02),
2) re-binning all steam generator tube rupture sequences into containment bypass sequences in the LERF model (observation AS-08), and
3) adding RHR pump demand failures to Low pressure recirculation fault tree for small LOCA (observation QU-06).

The battery AOT calculation used the VEGP PRA model Revision 2cy. As discussed below, the impacts of not incorporating the remaining ten Level "B" items on the battery AOT evaluations were determined not to be significant enough to adversely affect the conclusions made for the battery AOT extension. Since Level "C" and "D" items have less risk significance, their impacts were not further evaluated.

(1) Observation IE-06: *Evaluation of CCF probability between normally running and normally standby Nuclear Service Cooling Water (NSCW) pumps.*

The VEGP PRA model has a single event which represents the failure to run of all NSCW pumps (four running and two standby pumps) due to a common cause failure (CCF). In order to evaluate the probability of the CCF event, the fraction of historical CCF events which could affect both normally running and standby pumps was calculated and multiplied by the probability of CCF event only among normally running pumps. The fractional number was estimated to be 0.4 based on the recent NRC CCF database. The observation suggested that the use of 0.4 as the fractional number might be non-conservative because the difference in system size between the VEGP NSCW system and the other systems in the database were not adjusted in calculating the fraction. However, according to recent VEGP-specific CCF evaluations, the fraction is less than 0.4 if the size difference is adjusted.

Furthermore, since the CCF event is a single event core damage minimal cutset and has no relationship to the battery failures, the core damage frequency due to the CCF event would not be affected by the battery AOT extension. Thus, the CCF event's CDF contribution was cancelled out when delta CDF (LERF) and ICCDP (ICLERP) were calculated. Consequently, the impact of not incorporating this item will not adversely affect the conclusion made for the battery AOT extension.

(2) Observation AS-05: *ISLOCA and mitigating system.*

The major issue in this observation was that for some of the ISLOCA scenarios which include breaks at the suction of high pressure safety injection systems, high pressure safety injection could not be credited as it was credited in the VEGP PRA model. For those scenarios, an ISLOCA initiating event would directly lead to core damage, which could increase base line CDF and LERF values.

The review of the ISLOCA frequency evaluation revealed that the frequencies for those ISLOCA scenarios which could affect the high pressure safety injection system were based on very conservative assumptions such as no credit for operator recovery actions

and no credit for relief valves. Use of more realistic assumptions would reduce the frequency of such scenarios by several orders of magnitude and their contribution to the total ISLOCA risk would become insignificant.

Furthermore, if those ISLOCA scenarios are assumed to cause direct core damage, they would have no relationship to the battery failures, and the CDF due to such ISLOCA scenarios would not be affected by the battery AOT extension. Thus, their contribution would be cancelled out when delta CDF (LERF) and ICCDP (ICLERP) are calculated. Consequently, the impact of not incorporating this item will not adversely affect the conclusion made for the battery AOT extension.

(3) Observation DA-05: *Probability of Relief valve failure to re-close under two-phase flow condition in ATWS.*

During the initial phase of an ATWS, two phase flow may pass through relief valves. Relief valves under a two phase flow condition could have a higher probability of failure to re-close than when under a single phase (steam) flow condition. The VEGP PRA model uses the same probability for both flow conditions, which may be a non-conservative assumption. However, the impact of not incorporating this item is not expected to adversely impact the conclusions made for the battery AOT extension because ATWS contributes less than 0.01% of the total CDF and less than 0.1 % of the total LERF.

(4) Observation HR-02: *No specific references for Timing for HRA.*

The WOG peer review finding recommended the addition of a reference, or basis, for the time window for each operator action. The timing information for the HRA for the VEGP PRA was based on generic timing information from Westinghouse and information from interviews with groups of Senior Reactor Operators and Operators at VEGP. Any deviation of plant-specific timing information from generic timing information is not expected to adversely impact the conclusions made for the battery AOT extension. This belief is held because the VEGP HRA methods (SLIM for procedure-based actions and THERP for recovery actions) are not time-sensitive enough to produce significantly different operator error probabilities for small differences in timing information.

(5) Observation DE-01: *Need of re-examining internal flooding analysis to determine the need to re-evaluate any screening.*

Since the VEGP PRA internal flooding results were based on a thorough analysis which included a pre-walk down screening, plan walk down, and final evaluation, it is expected that re-examining the internal flooding analysis would not identify any new significant contributors to the risk associated to the internal flooding. Thus, the impact of not incorporating this item will not adversely affect the conclusion made for Battery AOT extension.

(6) Observation QU-01: *No formal search for and evaluations of the impact of unique or unusual sources of uncertainty. No sensitivity analysis to identify and address the effect of key LERF issues.*

The circumstance described by this WOG PEER review finding is not expected to adversely affect the conclusions made for the battery AOT extension because of the conservatism used in the VEGP PRA model.

(7) Observation QU-02: *"Station blackout sequences, SBO-17,23,31, and 38 involve failure to restore offsite power before one hour and a subsequent failure to restore power by some later time. The later time for recovery ranges from 6 hours to 16 hours. The same probability of 0.1 is used for all of these sequences (probability of event: OA-OSPR----H). This is inappropriate since the probability of power recovery at subsequent times in not constant in this time frame."*

This comment originated from the reviewer's misunderstanding of the event OA-OSPR----H. OA-OSPR-----H is not the probability of offsite power recovery within X hours. It is an operator error probability for failure to restore AC power from reserve aux transformers. The VEGP PRA model uses different offsite power (LOSP) non-recovery probabilities in different time frames. Thus, this item will not affect the conclusions made for the battery AOT extension.

(8) Observation HR-05: *Use of a high screening value for Operator error in cross-tying opposite unit DGs.*

In the VEGP PRA model, failure to cross-tie the opposite unit's Diesel Generators (DG) is represented by a basic event, 'operator fails to cross-tie the opposite unit diesel'. Since failure to cross-tie is dominated by human error, a relatively high screening value of 0.2 was assigned for this event based on engineering judgment. The WOG peer review finding recommended that a detailed HRA be performed to estimate a realistic operator error probability and that the contribution of the opposite unit's DGs hardware failure probability, especially CCFs, be included. A sensitivity study on the value of the event, which was performed along with DG mission time (see item (9), observation QU-03), revealed that the impact of not incorporating this item is not expected to adversely affect the conclusions made for the battery AOT extension.

(9) Observation QU-03: *DG mission time.*

The mission time (2 hours) for DGs used in the VEGP PRA model is the weighted time DGs must run during the 24-hour mission time considering the probability of offsite power recovery. A sensitivity study on the DG mission time and the failure probability of DG X-tie (see item (8)) was performed, even though the current modeling is considered to be more realistic. The results showed that the delta CDF and ICCDP would be 6.1E-7/yr and 4.3E-7, respectively, if DG mission time was increased from 2 hours to 8 hours and the failure probability of DG X-tie was more than doubled (increased from 0.2 to 0.5). Thus, criteria of Regulatory Guides 1.174 and 1.177 would still be met. Consequently, it was determined that the circumstance described by this WOG PEER review finding will not adversely impact the conclusion made for the battery AOT extension.

(10) Observation QU-05: *No comparison of results with other similar plants.*

Each VEGP PRA model revision including the original IPE was reviewed either by in-house independent reviewers or independent consultants. An additional major review was performed by the WOG Peer Review Group. Thus, given the developmental history

of the VEGP PRA, the lack of a systematic comparison of VEGP PRA results with other similar plants' results is not expected to adversely affect the conclusions made for battery AOT extension.

NRC Request 6

Describe the impact of external events.

SNC Response

(1) Seismic

Although a seismic PRA has not been developed, a seismic margins assessment (SMA) for resolution of the seismic portion of NRC GL 88-20, Supplement 4 entitled "Individual Plant Examination of External Events (IPEEE) for Severe Accidents," was performed for VEGP. The SMA review level earthquake for VEGP is a 0.3 g peak ground acceleration (PGA) NUREG/CR-0098 spectrum. VEGP structures and equipment were designed for a safe shutdown earthquake (SSE) defined by a Regulatory Guide 1.60 spectrum tied to a PGA of 0.2 g. However, due to conservatisms applied to the demand and/or evaluation techniques, most of the Seismic Category I structures and equipment were designed and qualified for a 0.3 g PGA capacity. Based on the results of the SMA evaluations, VEGP Units 1 and 2 have a high-confidence-low-probability-of-failure capacity of at least 0.3 g PGA.

Furthermore, the probability of an earthquake greater than the design basis earthquake (0.2 SSE) occurring during the additional time of the battery AOT extension (22 hrs) is very low. Therefore, any seismic-related increase in risk due to extending the battery AOT from 2 to 24 hours, although not quantified, is expected to be negligible. Consequently, it is expected that the conclusion made for the battery AOT extension will not change even when the increase in seismic risk is included.

(2) Fire

A fire PRA was performed for Vogtle in response to the request of Generic Letter 88-20, Supplement 4 entitled "Individual Plant Examination of External Events (IPEEE) for Severe Accidents." The objective of the analysis was to identify fire and smoke induced plant-specific vulnerabilities to severe accidents. Based on the results of the analyses, the total fire core damage frequency (CDF) was reported to be 1E-05 per year. Using the fire CDF reported in the IPEEE, the total combined base line CDF (internal events plus fire risk) is 1.71E-05 + 1.01E-05 = 2.72E-05 per year, which is less than 1E-04 per year. Therefore, Regulatory Guide 1.174 criteria can still be used to determine acceptability of the total (internal plus fire) CDF increase resulting from increasing the battery AOT from 2 to 24 hours.

An analysis was performed to determine the sensitivity of the fire CDF reported in the IPEEE for the top three fire zones to an increase in battery maintenance unavailability, from 2 to 24 hours, resulting from the AOT extension.

Based on a review of the IPEEE fire analyses results, the main control room, the 4160 volt train A switchgear room, and the 4160 volt train B switchgear room are the top three

fire zones in terms of fire CDF. The dominant impacts in the fire core damage sequences analyzed in the IPEEE for these three fire zones are fire-related LOSP and failure of AC power equipment. In these sequences, core damage is mitigated by an operator action to manually open the steam admission valve and local/manual operation of the TDAFW pump. Since the success or failure of these TDAFW pump-related operator actions are not affected by battery unavailability, it is expected that the increase in fire risk due to the battery AOT extension would be small. Consequently, it is expected that the conclusion made for the battery AOT extension will not change even when the increase in fire risk is included.

(3) High Winds

According to VEGP IPEEE, VEGP conforms to the Standard Review Plan, NUREG-75/087, criteria regarding high winds and tornadoes. Also there have been no significant changes that would adversely affect the high winds design basis at VEGP since the issuance of the operating license. Thus, it is expected that the risk associated with high winds is small and that the conclusion made for the battery AOT extension will not change even when the increase in high wind risk is included.

(4) Freezing rains

According to the VEGP FSAR, freezing rain is rare at the VEGP site. Furthermore, loss of offsite power events due to freezing rains was included in the calculation of the loss of offsite power initiating event frequency. Thus, the impact of freezing rain has already been considered in the battery AOT calculation.