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ELV-03551
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Docket Nos. 50-424
50-425

TAC-M68621
M73447

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
REPLY TO NRC SAFETY EVALUATION AND RECOMMENDATIONS
FOR VEGP STATION BLACKOUT COPING ANALYSIS

Georgia Power Company (GPC) letters ELV-00432, ELV-01474, and ELV-02867, dated April 12, 1989, March 28, 1990, and June 7, 1991, transmitted GPC's response to the station blackout (SBO) rule for Vogtle Electric Generating Plant (VEGP). On February 20, 1992, the NRC staff issued its safety evaluation (SE) for that response. In the SE, the NRC staff stated that VEGP's proposed method of coping with a station blackout (SBO) conforms to the SBO rule, subject to the satisfactory resolution of certain items. The attachment to this letter addresses each SE item of concern and provides our plans and schedule for implementing your recommendations or the justification why the recommended action is not required.

Please contact us if you have any questions or need further information regarding this matter.

Sincerely,

C. K. McCoy

CKM/AFS/gmb

Attachment: Reply to NRC SE for VEGP SBO Coping Analysis

xc: Georgia Power Company
Mr. W. B. Shipman
Mr. M. Sheibani
NORMS

U. S. Nuclear Regulatory Commission
Mr. S. D. Ebneter, Regional Administrator
Mr. D. S. Hood, Licensing Project Manager, NRR
Mr. B. R. Bonser, Senior Resident Inspector, Vogtle

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ATTACHMENT

VOGTLE ELECTRIC GENERATING PLANT
REPLY TO SE FOR STATION BLACKOUT

2.2.2 CLASS 1E BATTERY CAPACITY

Staff Evaluation of Licensee Response:

The review of the battery sizing calculations for SBO loads provided by the licensee reveals the following concerns:

1. The licensee needs to verify that the battery room temperature of 70°F as used in the battery capacity calculations is the lowest anticipated electrolyte temperature during normal operation per NUMARC 87-00, Section 7.2.2.

2. The licensee did not consider any design margin (10 percent to 15 percent per IEEE Std. 485) in its battery capacity calculation.

3. The inverter 1DD114 full load efficiency of 74.5 percent as used in the calculation is non-conservative since the load is 80 percent of the rating.

4. The no load loss of 1800W for 25KVA inverters (1DD115 and 1DD116) is non-conservative.

Based on the above, the staff cannot conclude on the adequacy of the battery capacity.

Recommendation:

The licensee needs to re-evaluate the battery capacity considering the above concerns. The battery capacity verification and any resulting modification should be included in the documentation that is to be maintained by the licensee in support of the SBO submittals.

Response:

With the information provided below which addresses the four specific concerns about SBO battery sizing calculations, VEGP is confident the batteries meet the requirements for coping with a 4-hour station blackout without requiring any modifications or load stripping.

1. Per VEGP Technical Specification section 4.8.2.1.b, battery electrolyte temperatures are monitored to ensure that electrolyte temperatures do not fall below 70°F during normal plant operation. In addition, the daily control building operator surveillance rounds verify that the temperature for the class 1E battery rooms is not below 70°F during normal plant operation.

2.2.2 CLASS 1E BATTERY CAPACITY

Response (continued):

2. Additional design margins as recommended in IEEE Standard 485 were not factored into the SBO battery sizing calculation because the SBO battery profiles as currently modeled in conjunction with the applied IEEE methodology are conservative. As an example, the loads fed from the Class 1E inverters used in the calculation are at least 40-percent greater than the actual field loads recorded at VEGP Units 1 and 2 during 100-percent power operation. The actual 100-percent power inverter load is a good representative inverter load for SBO conditions. If actual inverter load currents recorded during 100-percent unit power operation, were used in the calculation, it would show that design margins in excess of 10 percent are available. Design margin is used in initial plant battery design calculations, and is applied to compensate for load expansion, temperature, and maintenance factors. Additionally, temperature correction factors are independently accounted for in the SBO battery sizing calculation. The SBO battery sizing calculations will be revised by February 1993 to document these justifications as the basis for not using the IEEE-recommended design margins and to incorporate changes outlined in 3 and 4 below. Also, note that as currently stated in the SBO battery sizing calculation, all future load additions will be evaluated against this calculation to determine acceptability of the modification.

3. The calculation will be revised to account for an inverter efficiency commensurate with an 80-percent load for inverter 1DD114. This small additional load, however, will not preclude the battery from performing its intended SBO design function.

4. The no load loss of 1800 W for 25-kVA inverters (1CD115 and 1DD116) will be deleted from the SBO battery calculation because these inverters are secured by locking open their corresponding feeder breakers during normal plant operation. Administrative controls are in place during normal plant operation to ensure that these inverters and their loads (residual heat removal isolation valves) are deenergized.

2.2.4 EFFECTS OF LOSS OF VENTILATION

Staff Evaluation of Licensee Response:

With the exception of the calculated temperature (119°F) for the control building inverter and switchgear rooms, the calculated temperatures for all areas are within the acceptance limits described in NUMARC 87-00 for the equipment required to cope with an SBO event. The licensee used the normal room temperature as the initial temperatures for the control building inverter and switchgear rooms heat-up calculations. The staff finds that the licensee should either use as an initial temperature the maximum allowed by TS or the maximum value allowed under administrative procedures. If the licensee's administrative procedures do not specify an operating temperature limit, the licensee should revise their administrative procedures to maintain the normal operating temperatures in these areas at or below the value used in their SBO heat-up analysis.

The licensee has not addressed the containment temperature during an SBO event and the SBO equipment operability inside the containment.

Recommendations:

The licensee should verify that the containment temperature profile during an SBO event is bounded by that of the LOCA/High Energy Line Break temperature profile. This verification should be included with other documentation that is to be maintained by the licensee in support of the SBO submittals. The licensee should use an initial temperature for the SBO control building complex heat-up calculation no lower than that allowed by the TS or the administrative procedures.

Response:

Given the information provided below, VEGP SBO coping equipment can be reasonably assured to be operational during the 4-hour coping duration with respect to the effects of loss of ventilation.

Containment Temperature:

Based on a review of VEGP normal containment heat loads, anticipated SBO heat loads, and the loss of coolant accident (LOCA)/high energy line break accident (HELBA) heat loads, it was determine that the containment SBO environment would be enveloped by the LOCA/HELBA environment. Since all safety-related containment equipment is qualified to VEGP's design bases LOCA/HELBA environment, containment equipment will not be adversely affected by the SBO containment environment.

Control Building Complex Heat-Up Calculations:

NUMARC 87-00, section 7.2.4, "Effects of Loss of Ventilation," states that the upper bounds for wall temperatures should be determined prior to loss of ventilation. In performing the VEGP SBO heat-up calculations, all upper bound wall temperatures utilized were the VEGP design bases normal maximum room temperatures. At VEGP the normal maximum room temperatures are those temperatures which would not be exceeded when all normal heating, ventilation, and air-conditioning (HVAC) is in operation, and the normal design maximum outside ambient conditions, maximum cooling water temperatures, maximum equipment heat loads, etc., exist. As recommended by NUMARC 87-00, VEGP used the highest calculated normal ambient room temperatures, at the onset of the loss of ventilation, to calculate the final SBO room temperatures. This methodology provides reasonable assurance that calculated SBO maximum average ambient temperature will not be exceeded.

2.2.5 CONTAINMENT ISOLATION

Staff Evaluation of Licensee Response:

The licensee stated that the plant list of containment isolation valves (CIVs) had been reviewed to verify that valves which must be capable of being closed or that must be operated (cycled) under SBO conditions can be positioned (with indication) independent of the preferred and blacked out unit's Class 1E power supplies. The licensee further stated that no plant modifications or procedure changes are required to ensure appropriate containment integrity under SBO conditions.

Based on its review of SAIC's TER and the list of CIVs provided by the licensee, the staff concurs with the SAIC TER that with the exception of the excess letdown and sealwater line penetration (X-49), the containment isolation valve design and operation at Vogtle plant have met the intent of the guidances described in RG 1.155.

Recommendation:

The licensee needs to list the normally open ac motor-operated globe valves in the excess letdown and seal water leakoff line (X-49) in an appropriate procedure and identify the actions necessary to ensure that these valves can be fully closed during an SBO event. The valve closure needs to be confirmed by position indication (local, mechanical, remote, process information, etc.). This information should be included with the other documentation that is to be maintained by the licensee in support of the SBO submittals.

Response:

The excess letdown and seal water line containment isolation valves are nominal 2-inch diameter valves. In accordance with the criteria presented in Regulatory Guide 1.155, paragraph 3.2.7, valves less than 3-inch nominal diameter are excluded from further consideration of containment isolation capabilities. Therefore, containment integrity is maintained under SBO conditions.

2.3 PROCEDURES AND TRAINING

Staff Evaluation of Licensee Response:

The licensee stated that the procedural requirements for coping with an SBO have been reviewed and the grid restoration procedures have been updated to meet the requirements of the SBO Rule. The licensee added the following documents to the SBO procedures:

Black Start Procedures for Plant Vogtle;
Restoration of Offsite AC Power for the Shutdown of VEGP.

The licensee also stated that the plant procedures have been reviewed, and changes, if necessary to meet NUMARC 87-00, will be implemented in the following areas:

Loss of all AC;
Severe Weather; and
System Operating Procedures for Diesel Generator Operation.

The licensee indicated that these procedure changes will be completed within one year after the issuance of the SE.

The staff did not review the affected procedures or training. The staff expects the licensee to maintain and implement these procedures including any others that may be required to ensure an appropriate response to an SBO event. Although personnel training requirements for an SBO response were not specifically addressed in the licensee's submittals, the staff expects the licensee to implement the appropriate training to ensure an effective response to an SBO.

Recommendation:

Not Applicable.

Response:

The applicable plant procedures will be revised by February 1993 and appropriate training completed by June 1993 to meet NUMARC 87-00 and 10 CFR 50.63 requirements for satisfactorily coping with a station blackout event.

2.4 PROPOSED MODIFICATIONS

Staff Evaluation of Licensee Response:

The licensee stated that the following modifications would be required to attain the proposed 4-hour SBO coping duration:

1. Lighting in the common main control room will be augmented to assure sufficient lighting after the 90 minutes of initial lighting provided by self-contained gel-cell battery packs.

2. Six circuit breakers in Unit 1 and seven circuit breakers in Unit 2 will be replaced with larger size circuit breakers to avoid the potential of spurious tripping due to a temperature induced shift in tripping characteristics at elevated ambient temperatures.

The licensee indicated that the above modifications will be completed within one year after the issuance of the SE.

Recommendation:

The licensee should include a full description including the nature and objectives of the required modifications in the documentation that is to be maintained by the licensee in support of the SBO submittals.

Response:

Both proposed modifications needed for coping with SBO are being processed and implemented per plant procedures and will become a Quality Assurance (QA) record retained for the life of the plant.

1. The additional emergency lighting will be installed in the control room by February 1993.

2. The circuit breaker replacements required to avoid spurious trips due to a temperature induced shift in tripping characteristics during SBO, for both Unit 1 and Unit 2, are complete.

2.5 QUALITY ASSURANCE AND TECHNICAL SPECIFICATIONS

Staff Evaluation of Licensee Response:

The licensee did not address quality assurance (QA) or TS pertaining to the SBO equipment.

The TS for the SBO equipment are currently being considered generically by the NRC in the context of the TS Improvement Program and remains an open item at this time. However, the staff would expect that the plant procedures will reflect the appropriate testing and surveillance requirements to ensure the operability of the necessary SBO equipment. If the staff later determines that a TS regarding the SBO equipment is warranted, the licensee will be notified of the implementation requirements.

Recommendation:

The licensee should verify that the SBO equipment is covered by an appropriate QA program consistent with the guidance of RG 1.155, Appendix A. Further, this verification should be documented as part of the package supporting the SBO Rule response.

Response:

Station blackout coping equipment was procured as safety-related; therefore, it is covered by an appropriate QA program. Nonsafety-related equipment utilized by operators during an SBO is emergency lighting and surveillance procedures are in place and performed to verify its continued operability. Therefore, the QA requirements of Regulatory Guide 1.155 are met with SBO coping equipment.

2.6 EDG RELIABILITY PROGRAM

Staff Evaluation of Licensee Response:

The licensee's submittals on SBO did not specifically address the commitment to implement an EDG reliability program to conform to the guidance of RG 1.155, Position 1.2. However, in the submittal of March 28, 1990, the licensee committed to maintain the EDG target reliability of 0.95. Although the licensee has committed to a reliability program pending resolution of GI B-56, "Diesel Generator Reliability," they should implement a program that meets as a minimum the guidance of RG 1.155, Position 1.2.

Recommendation:

The licensee should provide confirmation and include in the documentation supporting the SBO submittals that is to be maintained by the licensee that such a program meeting the guidance of Regulatory Guide 1.155, Position 1.2, is in place or will be implemented.

Response:

A procedure for the diesel generator reliability program is being developed to implement the guidelines of NUMARC 87-00 Appendix D, which incorporates the requirements of Regulatory Guide 1.155. This procedure will be completed by June 1992.