



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SUPPLEMENTAL SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

STATION BLACKOUT RULE (10 CFR 50.63)

GEORGIA POWER COMPANY

VOOTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-424 AND 50-425

1.0 INTRODUCTION

The NRC staff's Safety Evaluation (SE) pertaining to the licensee's initial responses to the Station Blackout (SBO) Rule, 10 CFR 50.63, was transmitted to the licensee by letter dated February 20, 1992. The staff found the licensee's proposed method of coping with an SBO to be acceptable subject to the satisfactory resolution of several recommendations which were itemized in the staff's SE. The licensee responded to the staff's SE, and specifically to the recommendations, by letter dated March 26, 1992.

2.0 EVALUATION

The licensee's response to each of the staff's recommendations are evaluated below.

2.1 Class 1E Battery Capacity (SE Section 2.2.2)

In the SE, the staff identified the following concerns with respect to the Class 1E battery capacity calculations:

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 1DD1I4 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 (1DD1I5 and 1DD1I6) is non-conservative.

Recommendation

In the SE, the staff stated that the licensee needs to reevaluate the battery capacity considering the above concerns. The battery capacity verification

9206260224 920616
PDR ADDOCK 05000424
P PDR

and any resulting modification should be included in the documentation that is to be maintained by the licensee in support of the SBO submittals.

Licensee Response

The licensee addressed each of the concerns as follows about the battery sizing calculations for SBO loads and concluded that the batteries are adequate without requiring any modifications or load stripping.

1. Per Vogtle Electric Generating Plant (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. 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, 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.

Staff Evaluation

Based on the above, the staff finds the licensee's response to be acceptable and considers its concern with respect to the battery sizing calculations for SBO loads resolved.

2.2 Effects of Loss of Ventilation (SE Section 2.2.4)

In the SE, the staff reported that 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. In addition, the licensee had not addressed the containment temperature during an SBO event and the SBO equipment operability inside the containment.

SE Recommendation

In the SE, the staff recommended that the licensee should verify that the containment temperature profile during an SBO event is bounded by that of the LOCA/High Energy Line Break (HELB) 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.

2.2.1 Containment

Licensee Response

In its response, the licensee indicated that:

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

Staff Evaluation

The VEGP containment is a typical large dry containment. Based on its review of similar large dry containments designed for Westinghouse reactors, the staff agrees with the licensee that the LOCA/HELB temperature profile at the VEGP will bound the temperature profile resulting from a 4-hour SBO event. Therefore, the staff considers the containment issue related to the effects of loss of ventilation resolved.

2.2.2 Control Building Complex

Licensee Response

In its response, the licensee indicated that:

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.

Staff Evaluation

Based on its review, the staff finds the licensee's response acceptable. However, the licensee should document the basis and justification for the assumed initial temperatures used in the heat-up analysis for the control room and identified dominant areas of concern. Administrative procedures or other controls should be established to maintain temperatures consistent with the initial temperatures used in the heat-up analysis. The basis and justification should be included in the documentation that is to be maintained by the licensee in support of the SBO submittals. Therefore, the staff considers the part of this SE issue related to the effects of loss of ventilation in the control building complex resolved.

2.3 Containment Isolation (SE Section 2.2.4)

SE Recommendation

In the SE, the staff recommended that the licensee needs to list the normally open ac motor-operated globe valves in the excess letdown and seal water leak off 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.

Licensee Response

In response, the licensee indicated that:

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 isolation capabilities are excluded from further consideration of containment isolation capabilities. Therefore, containment integrity is maintained under SBO conditions.

Staff Evaluation

Based on its review, the staff finds the licensee's response acceptable and, therefore, considers this SE issue related to the containment isolation during an SBO event resolved.

2.4 Procedures and Training (SE Section 2.3)

SE Statement

In the SE, the staff stated that it 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.

Licensee Response

The licensee stated that:

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 an SBO event.

Staff Evaluation

The staff finds the licensee response to be acceptable.

2.5 Proposed Modifications (SE Section 2.4)

SE Recommendation

In the SE, the staff stated that 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.

Licensee Response

The licensee responded that:

Both proposed modifications needed for coping with an 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 an SBO, for both Unit 1 and Unit 2, are complete.

Staff Evaluation

The staff finds the licensee's response acceptable.

2.6 Quality Assurance and Technical Specifications (SE Section 2.5)

SE Recommendation

In the SE, the staff recommended that the licensee should verify that the SBO equipment is covered by an appropriate QA program consistent with the guidance of Regulatory Guide (RG) 1.155, Appendix A. Further, this verification should be documented as part of the package supporting the SBO Rule response.

Licensee Response

The licensee responded that:

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.

Staff Evaluation

The staff accepts the licensee's assurance on this matter and considers this issue resolved.

2.7 EDG Reliability Program (SE Section 2.6)

SE Recommendation

In the SE, the staff recommended that the licensee should confirm, 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 RG 1.155, Position 1.2, is in place or will be implemented.

Licensee Response

The licensee responded that:

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.

Staff Evaluation

The staff finds the licensee's response to be acceptable.

3.0 SUMMARY AND CONCLUSION

The NRC staff's SE pertaining to the licensee's initial responses to the SBO Rule, 10 CFR 50.63, was transmitted to the licensee by letter dated February 20, 1992. The staff found the licensee's proposed method of coping with an SBO to be acceptable, subject to the satisfactory resolution of several recommendations which were itemized in the staff's SE. The licensee's response to each of the staff's recommendations has been evaluated in this SSE and found to be acceptable except for documenting the basis and justification for the initial temperatures used in the heat-up analysis and establishment of an administrative procedure to maintain the initial temperatures consistent with those used (SSE Section 2.2.2). This SSE documents the NRC's final regulatory assessment of the licensee's proposed conformance to the SBO Rule. Therefore, no further submittals are required. The staff considers the 2-year clock for implementation of the SBO Rule in accordance with 10 CFR 50.63(c)(4) to begin upon receipt by the licensee of this SSE. Therefore, the licensee should take the necessary action to assure complete compliance with the SBO Rule indicated in the staff's SE and SSE.

The licensee should maintain all analyses and related information in the documentation supporting the SBO submittals for further inspection and assessment as may be undertaken by the NRC to audit conformance with the SBO Rule.

Principal Contributor: S. K. Mitra, SELB/DST

Date: June 16, 1992