

SUPPLEMENTAL SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

STATION BLACKOUT RULE (10 CFR 50.63)

CAROLINA POWER & LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

1.0 INTRODUCTION

The NRC staff's Safety Evaluation (SE) for H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2), pertaining to the licensee's initial response to the Station Blackout (SBO) Rule, 10 CFR 50.63, was transmitted to the licensee by letter dated February 4, 1991. 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 staff's SE, and specifically to the staff recommendations, in a letter from G. E. Vaughn, Carolina Power & Light Company (CP&L), to the Document Control Desk, U. S. Nuclear Regulatory Commission, dated March 13, 1991.

2.0 EVALUATION

The licensee's responses to each of the staff's recommendations and certain clarifications are evaluated below:

2.1 Proposed Alternate AC (AAC) Power Source, SE Section 2.2.2

SE Recommendation: The licensee, in accordance with their stated commitment, should test the AAC source to show that it can be started and connected to the safe shutdown loads within one hour. The test results should be included in the documentation supporting the SBO submittals which is to be maintained by the licensee.

Licensee Response: The licensee will demonstrate that the AAC source can be started and is connectable to the safe shutdown loads within one hour as outlined by NUMARC 87-00, Appendix B, Item 12. Documentation of this demonstration will be maintained with the SBO supporting documentation files.

Staff Evaluation: We find this to be acceptable.

2.2 Class 1E Battery Capacity, SE Section 2.3.2

SE Recommendation: The licensee should reevaluate the adequacy of the B battery to power the necessary SBO loads for one hour considering the aging factor and an allowance for additional loads that may be added. Also, the licensee should confirm that the B battery is not needed after one hour for the SBO scenario and what steps, if any, will be taken to prevent the battery from discharging to the point where reverse polarity could occur. The results of the reevaluation and confirmation should be included in the documentation supporting the SBO submittals that is to be maintained by the licensee.

Licensee Response: The licensee stated that the B battery does not support any equipment required to operate during the SBO 8-hour coping period. The licensee indicated that the B battery supports two switchyard breakers; however, normal alignment for restoration of offsite power does not include these breakers. The licensee also indicated that the loss of the B battery due to reverse polarity, or deactivation, will not adversely affect coping during or a recovery from a station blackout. The basis for the licensee's response to the above recommendation will be maintained in the documentation supporting the SBO submittals.

Staff Evaluation: We find this to be acceptable.

2.3 Compressed Air, SE Section 2.3.3

SE Recommendation: The licensee should describe in detail what specific procedures would be used to supply compressed air during an SBO and how the procedures will assure adequate air supply to the power-operated relief valves (PORVs). This information should be included in the documentation supporting the SBO submittals that is to be maintained by the licensee.

Licensee Response: The licensee stated that the backup nitrogen gas supplies will be connected to the main steam PORVs per existing SBO procedures. Also the procedure DSP-010 provides instructions for connecting the main steam PORVs to the steam dump nitrogen accumulator. Hence, a reliable source of compressed gas can be provided to these valves. The licensee also clarified that an instrument air compressor may be available but is not considered as a required component.

Staff Evaluation: Based on its review the staff finds that the provisions discussed above are consistent with the guidance of Regulatory Guide (RG) 1.155 and are, therefore, acceptable.

2.4 Effects of Loss of Ventilation, SE Section 2.3.4

SE Recommendations: (1) The licensee should reevaluate the temperature rise in the above identified areas, other than containment, using conservative initial temperatures corresponding to the maximum bounding design temperatures, including the Technical Specification temperature limits, and confirm that there is a reasonable assurance of SBO equipment operability in these areas during an 8-hour SBO, and (2) the licensee should include in their SBO procedures a provision to open the control room cabinet doors within 30 minutes after the onset of an SBO. These evaluations and verifications and any resulting modification should be included in the documentation supporting the SBO submittals that is to be maintained by the licensee.

Licensee Response: The licensee stated that the maximum indoor temperatures of 104°F for the Reactor Auxiliary Building (which includes the CCW Pump Room, Charging Pump Room, Battery Room, and Cable Spreading Room) and 75°F for the Control Room per the HBR2 Updated Final Safety Analysis Report (UFSAR) Section 9.4.1.1(b) were used in the heatup calculations. The licensee further indicated that the control room temperature will not exceed 120°F during the 8-hour

coping period based on (1) opening three instead of only two control room doors per SBO procedures, (2) the fact that the heat load from Battery B will only be present for approximately one hour during an SBO, and (3) other conservatism used in the calculation. The licensee also indicated that an additional detailed transient analysis will be performed to confirm the conservatism of the NUGSBO* formula which was used for the calculations. The licensee stated that the NRC will be notified if the heatup calculation is nonconservative and the results will be maintained with the documentation supporting the SBO submittal. Also, the licensee committed to revise the SBO procedure to include opening the control room cabinet doors within 30 minutes after the onset of an SBO.

Staff Evaluation: The staff does not consider 75°F as an initial temperature as conservative enough for the control room heatup at HBR2. The control room initial temperature for conservative analytical purposes should be based on a value representing the maximum bounding temperature (with proper documentation) that has occurred in the past in the control room. If the maximum bounding temperature is not known, an initial temperature of an average value between the maximum control room Heating, Ventilation and Air Conditioning (HVAC) system design temperature and 104°F, the assumed initial temperature for a non-HVAC area, is considered by the NRC staff to be conservative enough for the HBR2 control room heatup evaluation. Therefore, the licensee should reevaluate the control room heatup and confirm that there is reasonable assurance of SBO equipment operability in the control room during an 8-hour SBO event. This evaluation and any resulting modifications should be included in the documentation supporting the SBO submittals that is to be maintained by the licensee.

2.5 Containment Isolation, SE Section 2.3.5

SE Recommendation: The licensee should provide a means to detect the mispositioning of SI-860B or SI-861B during normal operation and provide for corresponding corrective measures to maintain appropriate containment integrity during the 8-hour SBO duration. The evaluation and proposed actions addressing the above should be included in the documentation supporting the SBO submittal that is to be maintained by the licensee.

Licensee Response: The licensee indicated that adequate measures to detect the mispositioning of valves SI-860B and SI-861B are already in place. These valves are aligned, verified, and checked to be in the closed position per OP-202. The closed position of both valves are verified monthly as required by Technical Specification 4.5.2.2 per procedure OST-158. Access to these valves is controlled by a locked barrier under security control. Also the valves' position is indicated in the control room.

* "Calculating Station Blackout Room Temperatures for Events Lasting Longer Than Four Hours", Nuclear Utility Groups on Station Blackout, October 1988.

The licensee further stated that if both valves were not properly closed, the refueling water storage tank (RWST) would drain to the containment sump. The RWST level is indicated in the control room and a low-level alarm is annunciated in the control room. RWST level is checked each shift by two individuals, independently, using RWST level indicators. This combination of measures provides adequate assurance that these valves will be in the closed position prior to a postulated SBO.

SE Evaluation: The staff finds that the provisions discussed above will ensure that the valves SI-860B and SI-861B will be in the closed position prior to a postulated SBO and are, therefore, acceptable.

2.6 Proposed Modification, SE Section 2.5

SE Recommendation: The licensee should include a full description of the nature and objective of all modifications in the documentation supporting the SBO submittal that is to be maintained by the licensee. (These modifications pertained to structural changes to the 4160V switchgear room, the Appendix R Dedicated Shutdown (DSD) system's conduits and electrical ducts, and a battery storage cabinet.)

Licensee Response: The licensee stated that the recommended description will be maintained with the applicable modification package and the existing design control process will ensure continued compliance with 10 CFR 50.63.

Staff Evaluation: We find this to be acceptable.

2.7 EDG Reliability Program, SE Section 2.7

SE Recommendation: It is the staff's position that an emergency diesel generator (EDG) reliability program should be developed in accordance with the guidance of RG 1.155, Position 1.2. Confirmation that such a program is in place or will be implemented should be included in the documentation supporting the SBO submittal that is to be maintained by the licensee.

Licensee Response: The licensee will establish an emergency diesel generator (EDG) reliability program which meets the guidance of RG 1.155, Position 1.2, in accordance with Appendix D of NUMARC 87-00.

SE Evaluation: We find this to be acceptable.

2.8 Reactor Coolant Inventory, SE Section 2.3.6

SE Statement: The staff agrees with the SAIC Technical Evaluation Report that the assumed reactor coolant system (RCS) leakage of 100 gpm (25 gpm per reactor coolant pump and 25 gpm for Technical Specification allowable RCS leakage) will not result in core uncover during an 8-hour SBO event, if a 77 gpm charging pump is kept operating when the AAC power source is established within one hour following the SBO.

Licensee Clarification: The licensee clarified that normal Reactor Coolant System (RCS) leakage and a seal leakage of 25 gpm per pump would not result in core uncover without a charging pump during an 8-hour SBO based on the

Westinghouse Emergency Response Guideline (WERG) ECA 0.0.

Staff Evaluation: The staff does not accept the estimation made in the WERG - ECA 0.0 as a basis for the SBO coping analysis. The licensee should perform a coping analysis using plant specific data for HBR2 to demonstrate that at the end of an 8-hour SBO coping duration, the core remains covered without RCS makeup.

2.9 Quality Assurance and Technical Specification, SE Section 2.6

SE Statement: During the telephone conversation of August 8, 1990, the licensee stated that all the SBO equipment is covered by a NRC-approved quality assurance (QA) program.

Licensee Clarification: The licensee clarified that all equipment subject to Appendix B of RG 1.155 either is, or will be, in compliance with an approved QA program (or an SBO QA program) prior to the compliance date of February 11, 1993.

Staff Evaluation: The staff finds this to be acceptable.

In addition to the above, the licensee provided the following discussion on extremely severe weather (ESW) Group classification (SE Section 2.1):

The licensee concurs that changing the ESW classification from Group 3 to Group 4 would not change the required coping duration for HBR2 and does not affect the HBR2 coping analysis; however, based on site-specific data, the licensee has concluded that the site is correctly classified as ESW3.

The licensee stated that the site-specific data presented in the HBR2 UFSAR Section 2.3.1.7 and noted in Figure 2.3.1.2 indicated winds of 125 mph or more are expected to occur at a rate of once every 475 to 500 years (0.002 per year). Hence the HBR2 ESW Group is 3 per NUMARC Table 3.1.

The staff concluded that since the ESW classification as ESW 3 or ESW 4 does not affect the coping duration, it need not be an issue for the evaluation of SBO rule compliance.

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 4, 1991. The staff found the licensee's proposed method of coping with an SBO to be acceptable, subject to the satisfactory resolution of several recommendations that were itemized in the staff's SE. The licensee's responses to each of the staff's recommendations and clarifications provided by the licensee have been evaluated in this SSE and found to be acceptable contingent upon the licensee's implementation of the control room heatup re-evaluation and reactor coolant inventory analyses. The licensee should submit within 30 days of receipt of the Supplemental SE confirmation of the resolution of these issues and present a schedule for their implementation in accordance with 10 CFR 50.63(c)(4).

Also, the reactor coolant inventory evaluation discussed in the staff's February 4, 1991, SE was based on the guidance provided in NUMARC 87-00 of 25 gpm per reactor coolant pump (RCP) seal leakage for pressurized water reactors. The 25 gpm value was agreed to between NUMARC and the staff pending resolution of Generic Issue (GI)-23. If the final resolution of GI-23 defines higher RCP leakage rates than assumed for this evaluation, the licensee should be aware of the potential impact of this resolution of their analyses and actions addressing conformance to the SBO rule.

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Date: September 16, 1991