



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

ENCLOSURE 1

SUPPLEMENTAL SAFETY EVALUATION
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
REGARDING STATION BLACKOUT RULE (10 CFR 50.63)
CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1
DOCKET NO. 50-400

1.0 INTRODUCTION

The NRC staff's Safety Evaluation (SE) 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 December 11, 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 the staff's SE, and specifically to the recommendations, by letter dated January 16, 1992. Additional information regarding the extremely severe weather grouping was provided by letter dated March 20, 1992.

2.0 EVALUATION

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

2.1 Station Blackout Duration (SE Section 2.1)

SE Recommendation: The licensee should have an analysis showing emergency diesel generator (EDG) reliability statistics for the last 20, 50, and 100 demands in the documentation supporting the SBO submittal. The licensee should select an EDG target reliability of 0.975 or re-submit its SBO analysis based on a required SBO coping duration of 8 hours rather than 4 hours.

Licensee Response: In the response to the staff concern, the licensee indicated that they have performed an analysis showing EDG reliability statistics for the last 20, 50, and 100 demands. Based upon the review of the data, the licensee had the option of selecting a target reliability of either 0.95 or 0.975, since Shearon Harris Nuclear Power Plant, Unit 1 (Harris), meets all three of the criteria specified in NUMARC 87-00. The analysis is maintained in the documentation supporting the SBO submittal.

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The licensee maintains that the appropriate classification for the off-site power design characteristics is P2*. The licensee stated that three issues of contention in this determination involve the extremely severe weather (ESW) classification, the applicability of pre-hurricane shutdown requirements, and the independence of off-site power (I) classification.

Regarding ESW classification of Group 3, the licensee stated that this determination is based on site specific data consistent with Final Safety Analysis Report (FSAR) values. The licensee stated that the maximum wind speeds expected and rate of recurrence indicated by Table 3-2 of NUMARC 87-00 are not consistent with the National Bureau of Standards (NBS) Guideline noted or the site-specific data. The licensee further stated that the topography of the region will have a significant affect on expected winds speeds primarily due to the distance from the coast. This will reduce the values of maximum wind speeds that would be expected from extremely severe weather and increase the recurrence intervals. A storm would lose wind strength and intensity due to the considerable distance traveled over land and the loss of the oceanic heat source.

Regarding pre-hurricane shutdown requirements, the licensee differs with the Science Applications International Corporation (SAIC) Technical Evaluation Report (TER) discussion. The licensee stated that the utilization of the hurricane readiness procedure is related to the plant being subject to the risk of a hurricane induced loss of off-site power (LOOP). The fact that the plant has not recorded hurricane force winds does not preclude the possibility of one occurring, or imply that the plant is not designed to withstand one.

Regarding the I classification, the licensee maintains that the site meets the requirement of I 1/2 classification, per Regulatory Guide (RG) 1.155, Table 5. The licensee stated that the normal source of power is from the main generator and there is an automatic fast bus transfer of both trains to their respective start-up transformers (SUTs), the preferred off-site power source. The licensee finds that this transfer is consistent with or actually superior to the description given under the I 2 category in RG 1.155, Table 5.

Based on the above discussion, the licensee maintains that Harris is a 4-hour coping duration plant with an EDG reliability of 0.95.

Staff Evaluation: Based on its review, the staff agrees with the licensee in the independence of offsite power classification of Group I 1/2. This determination is based on the review of NUREG-1032 Tables A.2 and A.3. The staff, also, agrees with the licensee as to the ESW classification of Group 3, which is based on site specific data consistent with FSAR values. This determination is based on adequate justification provided by the licensee to show how the wind speed of a hurricane diminished between the coast line and Harris site. The staff concludes that the ESW Group 5 for Harris per NUMARC 87-00, Table 3-2 was apparently based on the coastal wind speed. The staff also accepts the licensee's statement regarding the utilization of the hurricane readiness procedures.

Based on the above, the staff agrees with the licensee that Harris is a 4-hour coping duration plant with an EDG reliability of 0.95.

2.2 Class 1E Battery Capacity (SE Section 2.2.2)

SE Recommendation: The licensee should verify that the battery calculations consider a design margin of 10 to 15 percent as recommended in IEEE-Std. 485 and that the battery room temperature would not be lower than 70°F prior to an SBO event.

Licensee Response: In response to the above staff concern, the licensee stated that for a mature plant battery load profile, design margin does not have to be considered when evaluating the adequacy of an existing system since the loads are known and the batteries are in a controlled environment. The licensee further stated that the actual battery design margin available will be addressed in the plant design calculations and may vary from the 10 to 15 percent that is recommended based on that analysis. Also, the licensee committed to modify the existing plant procedure to verify that the battery room temperature is not less than 70°F or more than 85°F.

Staff Evaluation: The staff finds that a 10% design margin is required to compensate for less than optimum operating conditions, recent discharge, accuracy in identifying all small dc loads (indicating lights, relays, solenoids, etc.) and inaccuracy in reading the discharge curve. The licensee needs to verify that a 10% margin is available.

2.3 Compressed Air (SE Section 2.2.3)

In the SE, the staff reported that the steam generator power-operated relief valves (PORVs), which can be manually operated, are required for steam relief to the atmosphere during an SBO event.

SE Recommendation: The licensee should provide assurance that the area enclosing the PORVs is habitable.

Licensee Response: In the response to the above staff concern, the licensee indicated that it does not anticipate habitability concerns for operation of the PORVs. In the unlikely event that existing plant procedures prohibit entry into the steam tunnel due to habitability considerations, an alternate means (the use of main steam safety relief valves) of removing decay heat will be implemented for the remaining portion of the SBO four-hour coping period.

Staff Evaluation: Based on its review, the staff finds the licensee's response acceptable and considers its concern related to compressed air design and operation during an SBO event resolved.

2.4 Effects of Loss of Ventilation (SE Section 2.2.4)

2.4.1 Control Room (SE Section 2.2.4.1)

SE Recommendation: The licensee should reevaluate the control room temperature rise utilizing an initial temperature no lower than the maximum allowed by the Technical Specification (TS) or the administrative procedures, and use conservative values for personnel heat load as described in the SAIC TER for the heat-up calculation. The licensee should provide a step in the SBO procedure to open the control room cabinet doors within 30 minutes of the onset of an SBO.

Licensee Response: In response to the above staff concern, the licensee indicated that the control room calculation for loss of heating, ventilation, and air conditioning (HVAC) was revised with the TS value of 85°F as initial temperature, ten individuals in the control room, and the sensible heat load of 400 BTU/Hr per person. The calculation indicates that the temperature will remain less than 120°F. In addition, the licensee stated that a step in the SBO procedure regarding the opening of the control room cabinet doors within 30 minutes of the onset of an SBO will be provided.

Staff Evaluation: Based on its review, the staff finds the licensee's response acceptable and considers its concerns related to the effects of loss of ventilation in the control room during an SBO event resolved.

2.4.2 Inverter Room (SE Section 2.2.4.2)

SE Recommendation: The licensee should perform a heat-up analysis using a conservative value for the inverter heat load to ensure that the calculated peak temperature in the inverter room is within the limits as described in NUMARC 87-00 for equipment operability and personnel habitability.

Licensee Response: In the response to the above staff concern, the licensee indicated that the inverter room temperature was calculated as described in the March 30, 1990, submittal to document its engineering judgement that the room was not a dominant area of concern. The results of the calculation for the inverter room indicate the expected temperature rise is low due to (1) the lack of other equipment located within that room that would be powered during the SBO event, and (2) the size of the room. In addition, a sensitivity analysis was performed on the original calculation and it was determined that even when the inverter heat load was increased by a factor of four (from 1600 watts to 6400 watts); the inverter room temperature would not exceed 120°F.

Staff Evaluation: Based on its review, the staff finds the licensee's response acceptable and considers its concern related to the effects of loss of ventilation in the inverter room during an SBO event resolved.

2.5 Containment Isolation (SE Section 2.2.5)

SE Recommendation: The licensee should implement a procedural change or design modification for the isolation valves of the penetration X-74, list these valves in the appropriate procedure, and identify the actions necessary to ensure that they are fully closed during an SBO event. The valve closure should be confirmed by position indication (local, mechanical, remote, process information, etc.).

Licensee Response: Penetration X-74 is the 3" diameter containment sump pump discharge line. In the response to the above staff concern, the licensee indicated that only the outboard isolation valve 2MD-V77SB-1 will be utilized for containment isolation, if needed during an SBO event. Through the appropriate procedure, this valve will be manually closed or confirmed closed as required during an SBO event.

Staff Evaluation: Based on its review, the staff finds that the licensee's response has met the intent of the guidance described in RG 1.155 and is acceptable. Therefore, the staff considers its concern related to containment integrity during an SBO event resolved.

2.6 Procedures and Training (SE Section 2.3)

SE Concern: Although personnel training requirements for an SBO response were not specifically addressed by the licensee, the staff expects the licensee to implement appropriate training to ensure an effective response to an SBO.

Licensee Response: In the response to the above, the licensee committed to provide appropriate SBO procedure training to ensure an effective response to an SBO event.

Staff Evaluation: Based on its review and the licensee's commitment to provide appropriate SBO procedure training, the staff finds this acceptable.

2.7 Proposed Modifications (SE Section 2.4)

SE Recommendation: The licensee should include a full description of the proposed modifications in the documentation that is to be maintained by the licensee in support of the SBO submittals.

Licensee Response: In response to the above staff concern, the licensee stated that a description of plant modifications to satisfy the 4-hour coping duration and enhance operator ability to perform required actions associated with an SBO event, will be maintained with the applicable modification package.



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Staff Evaluation: The staff accepts the licensee's statement and finds it acceptable.

2.8 Quality Assurance and Technical Specification (SE Section 2.5)

SE Recommendation: The licensee should verify that the SBO equipment is covered by an appropriate QA program consistent with the guidance of RG 1.155 and to maintain this evaluation as part of the documentation supporting the SBO Rule response.

Licensee Response: In response to the above staff concern, the licensee stated that all SBO equipment will be included in an appropriate QA program consistent with the guidance of RG 1.155 and the evaluation will be included in the documentation supporting the SBO Rule response.

Staff Evaluation: The staff finds this to be acceptable based on the licensee's statement.

2.9 EDG Reliability Program (SE Section 2.6)

SE Recommendation: It is the staff's position that an EDG reliability program should be developed in accordance with the guidance of RG 1.155, Section 1.2. If an EDG reliability program currently exists, the program should be evaluated and adjusted in accordance with RG 1.155. Confirmation that such a program is in place or will be implemented should be included in the documentation that is to be maintained by the licensee in support of the SBO submittals.

Licensee Response: In response to the above staff concern, the licensee referenced RG 1.155 and Appendix D of NUMARC 87-00 and stated that it will ensure that an EDG reliability program is implemented utilizing the guidance of Appendix D of NUMARC 87-00. The licensee further stated that the information related to that program will be maintained with the documentation supporting the SBO submittals.

Staff Evaluation: The staff finds this to be acceptable based on the licensee's statement. Note: RG 1.155 accepted the November 1987 version of NUMARC 87-00. The licensee is required to implement an EDG reliability program consistent with that guidance until Generic Issue B-56 has been resolved.

3.0 SUMMARY AND CONCLUSION

The NRC staff's SE pertaining to the licensee's initial response to the SBO Rule, 10 CFR 50.63, was transmitted to the licensee by letter dated December 11, 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's

response to each of the staff's recommendations have been evaluated in this Supplemental Safety Evaluation (SSE) and found to be acceptable contingent upon verification of Class 1E battery margin.

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 two-year clock for implementation of the SBO Rule in accordance with 10 CFR 50.63(c)(4) to begin upon receipt of this SSE by the licensee. Therefore, the licensee should take the necessary actions to assure complete compliance with the SBO Rule as indicated in the staff's SE and SSE. The analyses and description of actions required to resolve these concerns should be included with the other documentation to be maintained by the licensee in support of SBO Rule implementation, which may be the subject of a future NRC audit.

Principal Contributors: Amar Pal and Dave Shum

Dated: June 16, 1992



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