



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO STATION BLACKOUT ANALYSIS

CONSUMERS POWER COMPANY

PALISADES PLANT

DOCKET NO. 50-255

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 May 20, 1991. The staff found the licensee's proposed method of coping with an SBO to be acceptable, subject to the satisfactory resolution of six recommendations which were itemized in the staff's SE. The licensee responded to the staff's SE and, specifically, to the recommendations by letter from G. B. Slade, Consumers Power Company (CPC) to the Document Control Desk, U.S. Nuclear Regulatory Commission, August 1, 1991. Also, there was a teleconference between representatives of the licensee and the NRC staff on July 2, 1991.

2.0 EVALUATION

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

2.1 Class 1E Battery Capacity (SE Section 2.2.2)

SE Recommendation

The licensee should not consider load stripping to occur until 30 minutes into the event, verify that the battery load profile envelopes the resulting load requirements, and confirm the battery adequacy for the 4 hour coping duration and recovery thereafter. Also, the licensee needs to verify that the correct aging and temperature factors recommended in IEEE Std-485 have been applied. The revised results should be reflected in the appropriate plant procedures and included in the SBO submittal supporting documents.

Licensee Response

The licensee stated that the Palisades Battery Analysis does not assume that manual load stripping occurs until 30 minutes into the event. The battery load reduction which occurs between 1 and 10 minutes on the battery load profile is due to the dropping out of short duration loads (e.g., relays which remain energized until a valve strokes to its final position, emergency sirens, etc.). The licensee also stated that these short duration loads are conservatively assumed to be energized for the first 10 minutes of the event. The manual load shedding is shown on the battery load profile at 30 minutes

into the event. The licensee concludes that plant procedures for the station blackout event list battery loads to be shed which are consistent with this battery analysis. Further, the battery analysis for Palisades does use the correct aging and temperature factors recommended in IEEE-STD-485.

Staff Evaluation

Based on its review and the licensee's response, the staff accepts the licensee's Class 1E battery capacity analysis.

2.2 Effects of Loss of Ventilation (SE Section 2.2.4)

2.2.1 Control Room

SE Recommendations

The licensee should reevaluate the effects of a loss of ventilation for the areas identified in this Section, specifically in the control room where the licensee used a nonconservative initial temperature and used two different values for the thermal conductivity of concrete in the heat up calculations.

Licensee Response

Regarding the control room HVAC, the licensee committed to reevaluate the effects of a loss of ventilation assuming an initial temperature of 90°F to be consistent with a Technical Specification (TS) limit on control room temperature which is currently being developed. This reevaluation will also correct the value of thermal conductivity utilized in the analysis. This reevaluation is expected to show that the control room will remain below 120°F during an SBO event of four hours duration.

Staff Evaluation

Based on its review and the licensee's commitment, and providing that the revised peak calculated temperature for this control room during an SBO event will not exceed 120°F (temperature limit described in NUMARC 87-00), the staff finds the licensee's response acceptable and considers its concerns of the effects of loss of ventilation in the control room resolved. The reevaluation should be included as part of the documentation supporting the SBO response.

Note: Subsequent to issuing the SE for the Palisades plant, the NRC staff has clarified its position with respect to the assumed initial temperatures used in the heat up evaluations during an SBO. The staff position is that 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 the initial temperatures consistent with those used in the heat up analyses. While the use of TS is one method of control, it was not the staff's intent that TS should be developed to provide the controls. The basis and justification should be included in the documentation that is to be maintained by the licensee in support of the SBO submittals.

2.2.2 Cable Spreading and Battery Rooms

SE Recommendation

The licensee should ensure that, in the cable spreading and battery rooms, at least one DC powered fan will be available to each area after the load shedding process is complete or perform heat up calculations of these rooms representative of expected room conditions and associated operating equipment during an SBO event.

Licensee Response

With regard to the battery rooms and in response to the staff's concern described in the SE, the licensee stated that no detailed evaluation of the effects of the loss of ventilation has been performed for these rooms. The licensee also states that the battery rooms are located adjacent to the cable spreading room which has been shown to remain below its design temperature of 104°F for a loss of ventilation of up to 6 hours duration. The licensee further states that the only heat source available in the battery rooms is the heating due to internal battery resistance which is considered to be insignificant. The licensee concludes that the battery rooms' temperature is thus expected to follow closely the cable spreading room's temperature and to remain below 104°F for the duration of an SBO event. With regard to the cable spreading room, the licensee indicated that a test was conducted to demonstrate the effects of loss of ventilation. Consequently, it was determined that certain cabinets required forced cooling to maintain cabinet internal temperatures below their design limits. Subsequent to this testing, fans were installed internal to these cabinets to provide this forced cooling capability. These fans are powered from DC backed sources and will be available to cool the required cabinets and internal equipment during an SBO event.

Staff Evaluations

With respect to the battery rooms, the staff finds the licensee's response acceptable and considers its concern of the effects of loss of ventilation in the battery rooms resolved.

With respect to the cable spreading room, the staff finds the action taken by the licensee to provide forced cooling to the required cabinets and internal equipment, acceptable and considers its concern of the effects of loss of ventilation in the cable spreading room resolved.

2.2.3 Heat Tracing

SE Recommendation

The licensee needs to verify that the loss of heat tracing during an SBO event would not degrade the operation of safe shutdown system.

Licensee Response

The licensee indicated that an evaluation with regard to the effects of the loss of heat tracing during an SBO of four hours duration has been performed. The only area of concern is the concentrated boric acid tanks and associated piping. This heat tracing system would be lost during an SBO event. A calculation has been performed which indicated that the temperature of the fluid in these components will remain above the precipitation temperature of the boric acid for the duration of a four hour SBO event.

Staff Evaluation

Based on its review, the staff finds the licensee's response acceptable and considers its concern of the loss of heat tracing during an SBO event resolved.

2.3 Containment Isolation (SE Section 2.2.5)

SE Recommendation

The licensee should list in an appropriate procedure all containment isolation valves that cannot be excluded by the exclusion criteria outlined in Regulatory Guide (RG) 1.155 (i.e., valves that are either normally closed or open and fail "as is" upon loss of AC power). The procedure should identify the actions necessary to ensure that these valves are fully closed, if needed. The staff's position is that the valve closure needs to be confirmed by position indication (local, mechanical, remote, process information, etc.). This information should also be included with the other documentation that is to be maintained by the licensee in support of the SBO submittals.

Licensee Response

In its response to the staff's concern, the licensee states that it has reviewed the plant list of containment isolation valves and verified that these valves either meet the exclusion criteria of RG 1.155 or are capable of being closed from the control room under SBO conditions. The containment isolation valves which are required to be confirmed closed are addressed in appropriate emergency operating procedures. These valves are confirmed to be in the closed position by procedure if containment pressure begins to increase. The licensee also states that the two valves identified by Science Applications International Corporation (SAIC) as not meeting the exclusion criteria of RG 1.155 are normally closed and fail closed during an SBO event. The licensee further states that these valves are air operated (with a back-up N₂ accumulator) with DC solenoids and also have DC powered position indication. The licensee concludes that these valves are further backed up by a check valve or locked closed manual valve which do meet the exclusion criteria of RG 1.155.

Staff Evaluation

Based on its review, the staff finds that the licensee's rationale meets the intent of the guidance described in RG 1.155 and is, therefore, acceptable. The staff considers its concern of containment isolation resolved.

2.4 Proposed Modification (SE Section 2.4)

In the SE, the staff noted that the licensee will add back-up compressed air supplies to support the atmospheric dump valves (ADV) during an SBO.

SE Recommendation

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

Licensee Response

The licensee stated that the descriptions of the modifications described above will be available as part of the documentation maintained in support of the SBO submittals. The licensee also stated that the modification to add back-up compressed air supplies to the atmospheric dump valves will be completed by the end of the second refueling outage after January 1, 1992. The licensee concludes that this refueling outage is currently scheduled to begin in May 1993.

Staff Evaluation

Based on its review and the licensee's commitment, the staff finds the licensee's response acceptable and considers the above cited issue resolved.

2.5 Quality Assurance and Technical Specifications (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. This evaluation should be documented as part of the documentation supporting the SBO rule response.

Licensee Response

The licensee states that with the exception of the back-up air supply to the ADV being installed as part of a future modification, no non-safety related equipment is used to meet the station blackout requirements of 10 CFR 50.63. The licensee concludes that the design and installation of the ADV back-up air supply modification will be available as part of the documentation supporting the SBO rule response.

Staff Evaluation

The licensee should commit to a QA program for the ADV back-up air supply. Verification that such a program is in place should be included as part of the documentation supporting the SBO file for future audit/verification.

2.6 EDG Reliability Program (SE Section 2.6)

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, 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

The licensee currently has implemented programs which track and maintain EDG reliability. The licensee states that these programs incorporate the elements identified in RG 1.155, Section 1.2. The licensee concludes that details of the EDG Reliability Program are subject to change following resolution of Generic Issue B-56, "Diesel Generator Reliability."

Staff Evaluation

The staff accepts the licensee's assurance that all elements required by RG 1.155 for an EDG reliability program are implemented at Palisades. Adjustments to the EDG reliability program, if required, may be made to conform to changing requirements subject to the resolution of Generic Issue B-56 "Diesel Generator Reliability."

3.0 SUMMARY AND CONCLUSION

The staff has reviewed the licensee's response to the staff's SE pertaining to the SBO Rule (10 CFR 50.63) in their transmittal letter dated August 1, 1991. Also there was a teleconference between representatives of the licensee and the NRC staff on July 2, 1991. The licensee's confirmation and commitments to the staff's SE are acceptable. Also, a Quality Assurance Program for the back-up compressed air supplies to the atmospheric dump valves must be implemented in accordance with RG 1.155, Appendix A. The licensee has committed to complete the modification during the May 1993 refueling outage. It is the staff's position, that the licensee must be in full compliance with

the SBO Rule within two years after receipt by the licensee of this SSE in accordance with 10 CFR 50.63(c)(4). Therefore, the above items should be expeditiously implemented to bring the licensee into full compliance with the SBO Rule. Also, the licensee should retain all supporting documentation in the SBO file.

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