



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 119 TO FACILITY OPERATING LICENSE NO. DPR-71
AND AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. DPR-62
CAROLINA POWER & LIGHT COMPANY, et al.
BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated March 13, 1987, as supplemented January 6, 1988, March 10, 1988, April 6, 1988 and July 12, 1988, Carolina Power & Light Company (CP&L) requested a revision to the Technical Specifications (TS) for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. The proposed amendments relate to TS Section 3/4.4.1.2, which specifies the surveillance requirements to demonstrate the operability of the jet pumps.

A loss of jet pump integrity can degrade the capability to maintain the water level needed for adequate core cooling in the event of a design basis loss-of-coolant accident (LOCA), thus resulting in a violation of the allowable peak clad temperature. Hence, plant TS require that all jet pumps be operable during power operation (Operational Conditions 1 and 2).

2.0 EVALUATION

The existing TS for BSEP Units 1 and 2 provide for surveillance of jet pump operability. The express purpose of the proposed revisions is to improve the reliability of the surveillance. The staff evaluation follows.

2.1 Background

On April 4, 1980, IE Bulletin No. 80-07 cited a generic problem involving failure of jet pump hold-down beam assemblies in boiling water reactors (BWRs). Licensees of BWR/3 and BWR/4 operating facilities were required to perform inspections to assess the jet pump integrity and to implement a daily surveillance program to confirm continued integrity during power operation. The surveillance consisted of monitoring of established flow relationships which can provide indication of hold-down beam failures which result in loose or displaced jet pump mixers. Diagnosis of jet pump problems based on change in operating characteristics is further addressed in General Electric Service Information Letter No. 330, Supplement 1 (SIL 330).

NUREG/CR-3052, November 1984, assessed the closeout status of IE Bulletin 80-07 at 20 operating facilities, including BSEP Units 1 and 2. For the BSEP units, it was concluded that utility personnel had responded acceptably to the bulletin on April 24, 1980, indicating that there were no cracked beams or unusually worn components and that required surveillance had been implemented. The utility response is verified per NRC Region II Inspection Report 81-10 of June 22, 1981. Although the bulletin was closed out for these facilities, follow-up was suggested to verify that the improved operability surveillance described in bulletin item B.2 or SIL 330 continues to be implemented daily until either the surveillance is incorporated into the technical specifications or improved BWR/4-6 hold-down beams, with new heat treatment and 25 kips preload, are installed.

Daily jet pump surveillance requirements are now incorporated in the plant technical specifications for both BSEP units. However, they do not conform to the recommendations of SIL 330, Supplement 1, which discusses modified surveillance requirements to provide more reliable indications of jet pump performance associated with failure of BWR/4 jet pump beam designs.

In the March 13, 1987 submittal, the licensee proposed TS changes designed to improve the surveillance requirements consistent with the SIL 330 recommendations. By letter dated December 3, 1987, the NRC staff requested clarification with regard to several concerns relating to the March 13 submittal. By letter dated January 6, 1988, the licensee responded to the staff concerns. The response included a commitment to provide an additional supplement to the TS changes requested in order to incorporate additional surveillance requirements which will verify jet pump operability during low flow in Operational Condition 2. This supplement was provided in an additional submittal dated March 10, 1988. The submittals made on April 6, 1988 and July 12, 1988 contained only clarification with respect to the Basis pages.

2.2 Proposed Technical Specification Revisions

The proposed changes to TS 3/4.4.1.2, "Jet Pumps" and justification cited by the licensee follow:

- (1) It is proposed that the surveillance requirement for monitoring of jet pump speed versus flow relationships be eliminated for Operational Condition 2 (less than 15 percent of rated thermal power) because the scatter in the data for the corresponding low flow operating conditions obscures the recognition of a change in flow resistance characteristics. This surveillance will be replaced by a simple verification of diffuser-to-lower plenum differential pressure (D/P) flow indication for each jet pump prior to entering Operational Condition 2 and periodically thereafter.
- (2) The existing TS 3/4.4.1.2 requires that a jet pump be declared inoperable if all three specified criteria relating to established pump speed versus flow relationships are exceeded simultaneously. Thus, the operability test is passed by demonstrating that any one of

the criteria are satisfied. The proposed change provides that two of the three criteria must be satisfied to meet the surveillance requirement. The intent of the change is to improve the effectiveness of the surveillance program.

- (3) In accordance with recommendations of SIL 330, acceptance criteria for Surveillance Requirement 4.4.1.2.1a (recirculation pump flow/speed ratio) are changed to reduce the acceptance tolerance on deviation from established characteristics from 10 percent to 5 percent. This is a more restrictive limit on the operability determination.
- (4) The licensee proposes replacing the current Surveillance Requirement 4.4.1.2.1b (which is based on established power versus core flow relationships) with another criterion recommended in SIL 330, which is based on monitoring of the jet pump loop flow/speed ratio. The allowable deviation from normal range is 5 percent. This is reported to be a more effective indicator of jet pump performance.
- (5) The licensee proposes to modify the existing Surveillance Requirement 4.4.1.2.1c which requires that the diffuser-to-lower plenum differential pressure reading on any individual jet pump be within 10 percent of the mean of all jet pump differential pressures in the loop. The proposed change is in response to SIL 330 guidance to overcome large measurement uncertainties in the existing method at low recirculation pump speeds. The proposed criterion permits more accurate indication of jet pump operability through all ranges of recirculation pump speed associated with Operational Condition 1 and greater than 15 percent of rated thermal power.
- (6) The licensee has also proposed a revision to the Bases 3/4.4.1, providing additional information describing the methods required to establish acceptance criteria in the proposed surveillance. The established relationships which provide the basis for operability acceptance criteria will be updated if necessary because of alteration or replacement of the system piping or major components of the recirculation system.

The staff has reviewed the proposed TS changes to evaluate consistency with the SIL 330 surveillance recommendations, which have been approved as acceptable surveillance methods (see NUREG/CR-3052, "Closeout of IE Bulletin 80-07: BWR Jet Pump Assembly Failure"). We have determined that these changes are consistent with the SIL 330 recommendations. However, the Individual Jet Pump D/P versus Recirculation Pump Speed relationship (Item 5) is not a preferred method of the GE SIL since it was anticipated that a large volume of data for individual jet pumps would need to be updated after each reload and during the fuel cycle because it is sensitive to changes in core flow resistance. However, this relationship is recognized as a sensitive indicator of jet pump performance problems. Therefore, the staff finds the proposed TS changes to be acceptable, with

the understanding that procedures will be implemented to assure that significant changes in core flow resistance will be recognized and baseline data on the Jet Pumps D/P will be updated when appropriate, as described in Bases section 3/4.4.1 of the TS.

3.0 ENVIRONMENTAL CONSIDERATIONS

These amendments change a requirement with respect to to the surveillance requirements. The staff has determined that these amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site; and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that these amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSION

The Commission made a proposed determination that this amendment involves no significant hazards consideration which was published in the Federal Register on July 13, 1988 (53 FR 26519), and consulted with the State of North Carolina. No public comments or requests for hearing were received, and the State of North Carolina did not have any comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: October 6, 1988