

Carolina Power & Light Company

Brunswick Nuclear Project P. O. Box 10429 Southport, NC 28461-0429

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U.S. Nuclear Regulatory Commission ATTN: Document Control Desk Washington, DC 20555

> BRUNSWICK STEAM ELECTRIC PLANT UNITS 1 AND 2 DOCKET NOS. 50-325 AND 50-324 LICENSE NOS. DPR-71 AND DPR-62 RESPONSE TO INFRACTIONS OF NRC REQUIREMENTS

Gentlemen:

The Brunswick Steam Electric Plant (BSEP) has received I&E Inspection Report 50-325/89-18 and 50-324/89-18 and finds that it does not contain information of a proprietary nature.

This report identified one item that appeared to be in noncompliance with NRC requirements. Enclosed is Carolina Power & Light Company's response to this violation.

Very truly yours,

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J. L. Harness, General Manager Brunswick Nuclear Project

TMJ/mcg

Enclosure

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cc: Mr. S. D. Ebneter Mr. E. G. Tourigny BSEP NRC Resident Office

VIOLATION

10CFR50, Appendix B, Criteria V, and the licensee's accepted QA program (FSAR Section 17.2.5) collectively require that activities affecting quality shall be prescribed by documented instructions and shall be accomplished in accordance with these instructions. Engineer Procedure ENP-12, Engineering Evaluation Procedure, requires resolution of problem identified in Engineering Evaluatior Reports (EER) be repaired as directed by the EER, within the time prescribed c the EER.

10CFR50, Appendix B, Criterion III, as implemented by the CP&L accepted QA Program (FSAR Chapter 17.2.3) requires that design control measures provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by use of alternative or simplified calculation methods, or by performance of a suitable testing program.

Contrary to the above, pipe support 2 SGT-6VH30 was not repaired within time prescribed by EER 85-0364, and the licensee's design verification was inadequately implemented during reviews of EER 85-0364, in that, the structural steel beam supporting support 2 SGT-6VH30 was overstressed, it was not identified during the evaluation of the EER, and a similar nonconforming condition was not identified for Unit 1 support 1 SGT-6HV30.

This is a Severity Level IV violation.

RESPONSE

I. Admission or Denial of the Violation

Carolina Power & Light (CP&L) admits that pipe support 2-SGT-6VH30 was not repaired within the time prescribed by EER 85-0364 and the design verification was inadequately implemented during review of the EER in that the structural steel beam supporting the support 2-SGT-6VH30 was overstressed and was not identified during the evaluation of the EER nor was a similar nonconforming condition identified for the Unit 1 support, 1-SGT-6VH30.

II. Reason for the Violation

On October 15, 1985, while touring the Unit 2 Reactor Building, a system engineer noted that the "hydro" pins in a variable spring hanger (2SGT6VH30) supporting the 24" drywell purge exhaust pipe had not been removed. During the removal of the hydro pins and cold setting adjustments it was noted that the miscellaneous structural steel beam (W12x27) was bent along the lower flange where the hanger was attached. Engineering Evaluation Report (EER) 85-0364 was written which justified interim operability of the support. The evaluation determined that with the hanger pins installed the hanger had become a rigid support and thermal movement of the pipe had been transferred to the support steel resulting in flexure of the lower beam flange which, over time, resulted in cyclic stress fatigue in the support beam. The evaluation then considered the ability of the four adjacent hangers to carry the redistributed load if the hanger in question were to completely fail. The EER concluded that overall seismic integrity was not compromised and that operation could continue until the next Unit 2 refueling/maintenance outage. Work request 2-M-85-4074 was initiated for replacement of the damaged steel.

The cause of the failure to complete the replacement of the steel member, as required by the initial EER (85-0364), is the result of insufficient tracking of action items identified by EER's at that time. This EER was not required by the Engineering Evaluation Procedure in effect at that time (ENP-12, revision 10) to go to the Plant Nuclear Safety Committee (PNSC) for review. Thus, the only item tracking the replacement of the steel member was the WR&A which referenced the EER, but did not actually have a copy attached nor specifically say that the replacement was required to be completed prior to the end of the next refueling outage. The WR&A simply said "per EER 85-0364 this hanger must be replaced." It was placed on hold due to the fact that the same material was no longer available, and therefore was not completed.

The system engineer did not evaluate the load on the structural steel beam because he assumed that the original design was adequate for the load and nothing was being changed (i.e., the EEP called for the same size and type of beam that was already existing), therefore, in his judgment the beam did not appear to be overstressed, was still qualified, and did not require a design verification.

The nonconforming condition was not identified on Unit 1 because the cause of the failure on Unit 2 had resulted from the failure to remove bydro pins from the involved spring can support during its installation. This had transferred stress to the structural steel beam and resulted in the observed weakening. Unit 1 was inspected in 1985 and found not to have the hydro pins installed. Thus, the failure evaluated in EER 85-0364 was considered unique to Unit 2 and, given that Unit 2 was at the time considered acceptable, an evaluation on the Unit 1 support was not performed.

III. Corrective Steps Taken

ENP-12 now requires that action items generated by an EER be assigned via Form 4 of ENP-12, "EER Action Item Notification" and that piping and pipe supports qualified for short-term operation have a time limit for permanent resolution and an interim documented surveillance program as appropriate. These assigned action items and due dates are then tracked as per ENP-20.1, Technical Support Action Item Tracking Procedure. In this case EER 88-0544 has been written documenting the short-term repair on Unit 2 and establishing completion dates for the long-term fix. The long-term repairs were completed on Unit 1 on December 24, 1988.

A review of outstanding work requests on safety-related systems initiated Pprior to the inclusion of the surveillance action item form in ENP-12 was carried out by appropriate system engineering groups to determine if operability concerns existed due to each outstanding request. This review was completed in June 1989 and work requests identified as requiring further investigation for possible operability concerns are being tracked by the Facility Automated Computer Tracking System (FACTS) as per Regulatory Compliance Instruction (RCI) 05.2.

Current practice at CP&L is to implement a design verification on changes to an existing system when the change is to install something different from what is currently installed or, when the involved engineer determines that, in their judgment, an evaluation is required. In this instance the involved engineer did not feel that the structural steel beam was overstressed. At present CP&L believes this to be an isolated event and no changes have been initiated to this practice.

IV. Corrective Actions to be Taken

The cause of the line inoperability was that the steel beam would have been overloaded during a postulated seismic event. In addition, the calculated loading on the subject beam was increased due to attachment of field routed piping. This was apparently due to error(s) in the original calculations.

CP&L requested that United Engineers and Constructors (UE&C) conduct a file search to retrieve any documentation associated with the involved steel member and that they explain what the existing criteria had been for this type of member when it was designed. UE&C designated this type of beam as "supplementary steel" and has determined that the original calculations for this beam no longer exist. Supplementary stee. are utilized to provide supports for pipe, electrical raceway and HVAC duct systems wherever these systems can not be supported directly by building concrete or main steel members. Prior to 1979, a design criteria specifically for supplementary steel did not exist. In general, UE&C designed supplementary steel in accordance with the following criteria:

- 1. The American Institute of Steel Construction (AISC) Specification available at the time the frames were designed.
- Piping loads were generally treated as concentrated loads at midspan or as uniformly distributed loads when specific pipe support reactions were not available.

3. The allowable stresses for load combinations which included the Operating Basis Earthquake (OBE) load were limited to the normal allowable stresses as specified in the AISC manual. For load combinations which included the Design Basis Earthquake (DBE) load, allowable stresses were limited to 1.5 x AISC allowables.

Work performed since 1979 followed the UE&C procedures described in Procedure Number 062, Pipe Stress Reanalyis, dated May 2, 1979. This was subsequently modified and reissued as United Criteria Document 7865.007-S-M-021, Evaluation Criteria for Existing Pipe Supports Associated with NRC Bulletins (IEB) 79-02, 79-07, 79-14 dated March 31, 1987. Design criteria for supplementary steel was explicitly defined in the latter document. The allowable stress criteria in this document followed the same guidelines as described above. The UE&C procedures have been incorporated into various Site Design Guidelines (SDG) at CP&L (i.e.; SDG-07 is used for evaluations of existing conditions; SDG-02, 05 and 03 are used in the development of new modification designs; etc.)

Current criteria and design guidelines should prevent the overloading of steel beams in the future.

A budget request, B0060A, "As Built Verification of Steel," has been submitted to fund a project to review "supplementary steel" loading in the units.

V. Date of Full Compliance

The long-term repairs are expected to be complete on Unit 2 by the end of the 1989-1990 refuel/maintenance outage.

The ongoing operability reviews, initiated by the review of outstanding work requests, is expected to be complete by December 15, 1989.

Funding for the project to review supplementary steel is expected to be approved, with a schedule, by March 1990.