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RECIP.NAME RECIPIENT AFFILIATION
Ofc of Enforcement (Post 870413)

SUBJECT: Responds to notice of violation & proposed imposition of civil penalty in amount of $37,500 noted in Insp Rept 50-261/91-20.Corrective actions:individual assigned to function as reactor protection sys engineer.

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Carolina Power & Light Company

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JAN 30 1992

R. A. WATSON
Senior Vice President
Nuclear Generation

SERIAL: NLS-92-038

Director, Office of Enforcement
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
NRC INSPECTION REPORT NO. 50-261/91-20 REPLY TO A NOTICE OF VIOLATION

Gentlemen:

Carolina Power & Light Company (CP&L) hereby provides this reply to the Notice of Violation associated with Inspection Report 50-261/91-20. This violation represents a grouping of four examples, each shown to be of minimal safety significance, into a Severity Level III violation with the attendant civil penalty. The Company acknowledges that these examples indicate weakness in the control of design interfaces and does not deny the violation. Further discussion is contained below in the reply. Also, a check in the amount of $37,500 is enclosed in payment of the civil penalty.

In the letter issuing the notice of violation, you asked that we address any instances where we may have assumed the availability of non-Technical Specification equipment to mitigate the consequences of accidents addressed in Chapter 15 of the Updated Final Safety Analysis Report. To address this issue, an existing list of plant parameters that affect the safety analysis was reviewed. This list indicates that the only non-Technical Specification equipment assumed available to mitigate the consequences of accidents addressed in Chapter 15 of the UFSAR are the Main Steam PORVs during a steam generator tube rupture.

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IE14 1/1

Severity Level III Violation (RII-91-20-06)

10CFR50 Appendix B, Criterion III, requires, in part, that measures be established for the identification and control of design interfaces and for coordination among participating design organizations. Criterion III also requires that design control measures provide for verifying or checking the adequacy of design, such as by performance of design reviews, by the use of alternate or simplified or calculational methods, or by the performance of a suitable testing program.

Contrary to the above, inadequate control of design interfaces and coordination among participating design organizations resulted in the failure to adequately verify or check the adequacy of design of the Safety Injection (SI) system and the Reactor Protection System (RPS), as evidenced by the following examples:

1. From June 20, 1988 until January 5, 1989, a design basis analysis was not developed for single SI Pump operation during the time interval for Emergency Core Cooling (ECCS) transfer from the injection phase to the recirculation phase (switchover) during a Large Break Loss of Coolant Accident (LOCA).

2. From January 5, 1989 until May 16, 1991, a design activity analysis (Nuclear Fuels Section Design Activity 89-0001) to support single SI pump operation during a large break LOCA was inadequate in that losses of Reactor Coolant System inventory due to entrainment were not properly considered.

3. From June 20, 1988 until August 3, 1991, a design basis analysis was not developed for single SI pump operation during the time interval for ECCS switchover during a small break LOCA.

4. The Resistance Temperature Detector Bypass Removal Modification, M-959, was inadequately developed, verified, and performed in that from February 25, 1989 until August 17, 1991, the Overtemperature Delta Temperature reactor trip time response exceeded the time used in the accident analysis.

REPLY

Admission or Denial of the Alleged Violation

CP&L acknowledges the violation.

Reason for the Violation

The control of design interfaces and coordination among participating design organizations has been weak in the past as indicated by the examples cited. These weaknesses result from training and technical expertise issues, and adequate follow-up documentation when engineering judgment was used. The reason for each of the examples cited in the Notice of Violation is addressed below.

1) During the period January 28, 1988, until June 20, 1988, considerable engineering and analytical effort was expended to address single failure concerns in the automatic starting features of the SI Pumps. This effort included large break and small break LOCA analyses assuming only one SI Pump was available. The analytical work included twenty SBLOCA cases which indicated that one SI Pump was adequate for decay heat removal. This knowledge, combined with the perception that credit could be taken for the manual starting of an additional SI Pump, and a lack of information about the entrainment issue raised by Westinghouse (see 2 below) created an environment where the engineers responsible for the analysis did not recognize that a separate analysis to address switchover with only one pump available was needed. During this time frame, the management controls on the engineering and analytical activities were largely left to the technical expertise and engineering judgement of the individuals involved.

2) At the time the large break LOCA analysis was done during 1988, one of the three SI Pumps was considered a "Manual Start" pump available to support the ECCS and was being maintained as such. Subsequently, a decision was made to evaluate an option of converting the third SI Pump from a "Manual Start" pump to a "Maintenance" pump which may not be available to support the ECCS. In considering this option, it was recognized that without the "Manual Start" pump available, an analysis was required to address only one pump available during switchover. Nuclear Fuel Section Design Activity 89-001 was initiated to perform this analysis and was considered to be a formality to document previous engineering judgement.

   To perform the analysis, the amount of coolant leaving the reactor vessel during a LOCA must be evaluated, one component of which is water "entrained" in the steam boiling off the core. In May and June of 1987 Westinghouse sent two letters to CP&L addressing this phenomena, however the terminology "Natural circulation" was used to describe it; in July 1987 Westinghouse sent a third letter which more fully explained what was meant by the May and June letters. The engineers performing Design Activity 89-001 had only located the May and June letters and therefore discounted the phenomena, knowing that "Natural circulation" was not applicable to the analysis. Document control and distribution weaknesses contributed to the fact that the NFS engineers were not cognizant of the July 1987 Westinghouse letter.

3) This example differs from example 1) only in that it addresses small break LOCA versus large break LOCA. As discussed in 1) above, during January to June 1988 considerable engineering and analytical effort was expended to evaluate both large and small break LOCAs. The reasons why a switchover analysis was not performed for a small break LOCA are the same as for a large break LOCA. An additional factor which reduces the significance of this example is the fact that during a small break LOCA, switchover occurs farther out in time when core decay heat is reduced. Note also that at the time, industry practice considered large break LOCA to be bounding and small break LOCA analysis to be unnecessary in this time frame.

4) The omission of the design basis requirement for removal of the lag circuits was not identified by CP&L during review and installation of the modification package, or during the subsequent calibration and operation of the OTΔT circuitry. Weakness in the technical overview of the OTΔT design and associated setpoints is primarily attributed to the lack of an adequate technical basis for design information associated with the complex OTΔT process electronics and associated setpoints. Instrument scaling calculations would have provided a correlation between the response time characteristics assumed in the design and safety analysis of the system, and the instrument setpoints provided in the plant calibration procedures. However, the vendor did not supply the OTΔT instrument scaling calculations for the design. Further, CP&L did not establish a contractual requirement for the vendor to supply the technical basis for the OTΔT electronics design.

The following factors also contributed to this example:

- A weakness was identified in the coordination of technical information by the plant individual responsible for MOD-959. This is attributed to the individual's limited knowledge of the OTΔT electronics design.

- A weakness was identified in that personnel turnover within the Reactor Protection System (RPS) System Engineer position occurred during the development and implementation of MOD-959. This discontinuity in assignment resulted in a lack of technical involvement by the plant system engineering group.

- The primary responsibility for development and design of MOD-959 was assigned to the Nuclear Steam Supply System (NSSS) vendor under contract to Carolina Power & Light Company. The vendor supplied the safety analysis and licensing report defining the design basis requirements, and also supplied the design, installation, and testing of the new system, including associated safety evaluations and independent review of the design. During the course of their activities, however, the vendor failed to incorporate the design basis requirement for removal of the lag circuits into the design, installation and testing of the modification.

The Corrective Steps That Have Been Taken and the Results Achieved

As documented in the individual examples, the errors which ultimately resulted in this violation occurred between 1987 and early 1989; however they were not detected until Mid-1991. During the ensuing time and independent of these specific examples, CP&L has endeavored to continually improve and enhance engineering design and analysis capabilities. Many of the corrective actions which can reasonably be expected to preclude these types of errors had already been taken. Irrespective of the evolutionary improvements already being taken, CP&L recognizes the need to carefully examine the specific examples cited in this violation, determine the root cause, and take additional specific corrective actions to preclude reoccurrence. The actions discussed for each example below include both actions taken specifically in response to this violation and actions taken independent of it.

The specific action taken as a result of examples 1, 2 and 3 was to counsel Nuclear Fuel Section engineers on the specific errors which contributed to these examples. This counseling included emphasis on conducting adequate document searches, caution on taking credit for equipment functioning when it may not be appropriate to do so, use of the correct decay heat curves in Appendix K analysis, and reemphasis that technical analyses will be within the limits of Technical Specifications and applicable regulations unless NRC approval is obtained to do otherwise. In addition, other actions taken prior to identification of the error but which help to preclude their occurrence include: changes to the document control and distribution process such that NFS now receives copies of technical/analysis related correspondence from vendors; procedures now require consulting Design Basis Documentation as part of performing a design activity; a list of plant parameters that affect safety analysis has been developed and is reviewed in conjunction with plant modifications; the NFS is now represented on the WOG Analysis Subcommittee; access has been made available to electronic data bases; and several members of NFS have become qualified safety reviewers.

For example 4), the following corrective actions had already been taken in conjunction with enhancements to engineering practices:

1. A modification design basis document is now required for modifications to the RPS. Further, design basis information supporting modifications will be compatible with the existing Design Basis Document for affected systems. In 1989, the Nuclear Engineering Department (NED) was designated as the Central Design Organization (CDO) and "Engineer of Record" responsible for control of plant design. The requirement for a technical basis of design for plant modifications is provided within NED Procedure 3.1, "Design Control Procedure."

2. Supervisory practices and management policy will reinforce the assignment of personnel to projects commensurate with their job function and job skill. This will be an on-going process and dialogue involving working level engineers and the appropriate levels of engineering management. These practices and policies, resulting from prior management initiatives directed to improvements to the engineering function, are periodically reinforced by policy statement, memorandum, or procedure change, as deemed appropriate.

3. An individual has been assigned and is functioning as the RPS System Engineer. This individual is the same person who initially identified the problem.

4. The importance of complete, in-depth and rigorous technical reviews of procedures and modifications has been reemphasized to personnel who perform technical review activities. NED reviews are governed by NED Procedure 3.3, "Design Verification/Technical Review," which delineates the requirements for technical reviews and design verification of modifications. For plant Technical Support personnel, guidance regarding the requirements for technical, system/component, environmental qualification, and in-service inspection reviews is provided by Technical Support Guidelines TSG-200, TSG-202, TSG-204, and TSG-205.

The Corrective Steps That Will Be Taken To Avoid Further Violations

For examples 1, 2 and 3 the corrective actions discussed above are complete and are considered adequate to avoid further violations. For example 4, in addition to the completed corrective actions discussed above, OTΔT instrument scaling calculations will be developed and appropriate plant personnel will be trained on their use. This will provide further sources of technical knowledge relative to the OTΔT feature.

Date When Full Compliance Will be Achieved

Full compliance with examples 1,2 and 3 cited in the notice of violation was achieved with the completion of additional analysis on May 16, 1991. Full compliance was achieved for example 4 prior to start-up on August 18, 1991 with the removal of the capacitors that introduced the additional time delay. The corrective actions identified above which are not already complete are scheduled to be completed by June 30, 1992.

Should you have any questions regarding this matter, please contact Mr. R. W. Prunty at (919) 546-7318.

Yours very truly,

R. A. Watson

R. A. Watson

JSK/jbw

Enclosure

cc: Mr. S. D. Ebneter
Mr. L. Garner
Mr. R. Lo
INPO

R. A. Watson, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Susie G. Bunn
Notary (Seal)

My commission expires: 3/28/92