CP&L

Carolina Power & Light Company

P. O. Box 1551 • Raleigh, N. C. 27602

February 14, 1992

SERIAL: NLS-92-031

R. A. WATSON
Senior Vice President
Nuclear Generation

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62
REPLY TO NOTICE OF VIOLATION (EA 91-158)

Gentlemen:

On January 3, 1992, the Nuclear Regulatory Commission issued a Notice of Violation (EA 91-045) for issues at the Brunswick Steam Electric Plant, Units 1 and 2. Details of the NRC inspections are provided in Inspection Report Nos. 50-325/91-26 and 50-324/91-26 dated November 22, 1991. Carolina Power & Light Company hereby responds to the Notice of Violation. The enclosure to this letter provides CP&L's reply to the Notice of Violation in accordance with the provisions of 10 CFR 2.201. Also enclosed is a check payable to the Treasurer of the United States in the amount of One Hundred Twenty-Five Thousand Dollars ($125,000.00).

Please refer any questions regarding this submittal to Mr. S. D. Floyd at (919) 546-6901.

Yours very truly,

R A Watson

R. A. Watson

WRM/ST/wrm (\wp\ea91158f.rev)

Enclosure

cc: Mr. S. D. Ebneter
Mr. N. B. Le
Mr. R. L. Prevatte

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)

SUSIE G. BUNN NOTARY PUBLIC JOHNSTON COUNTY, N.C.

My commission expires: 3/28/92

Check #553170 for $125,000.00

ENCLOSURE

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
REPLY TO NOTICE OF VIOLATION AND
PROPOSED IMPOSITION OF CIVIL PENALTY

VIOLATION I:

10 CFR Part 50, Appendix B, Criterion XVI, Corrective Actions, requires in part, that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.

Contrary to the above, effective measures were not established to promptly identify and correct deficiencies that resulted in the continuing breakdown of management control over work control activities similar to those previously identified in NRC enforcement action (EA) 91-045 which was issued on May 31, 1991, as evidenced by the following examples:

A. On October 3, 1991, at approximately 3:30 a.m., a reactor operator failed to correctly reposition Unit 1 B train Residual Heat Removal (RHR) heat exchanger bypass valve from the shut to open position as required by the RHR System Operating Procedure 1-OP-17, Revision 38, step 7.3(B)(5) to return the RHR Loop B from suppression pool cooling to the standby mode of operation. The second operator failed to independently verify that this valve was correctly aligned as required by the procedure. It remained in the incorrect position until identified by the NRC at approximately 6:30 a.m. on the same date.

B. On October 4, 1991, the mechanic assigned to perform the air inlet valves' lash adjustment on Diesel Generator No. 3 specified in step 7.3.4.2 of Maintenance Surveillance Test Procedure, Emergency Diesel Generators Inspection, 0MST-DG500, Revision 2, failed to obtain and use the required instructions contained in Maintenance Instruction, Diesel Engine: Exhaust Tappets and Inlet Hydraulic Lash Adjusters, MI-16-685C, Revision 000, in performing this task. In addition, the mechanic did not fill out nor place in work package MI-16-685C, the data sheet to document completion of this task. A lack of supervisory review of this task resulted in the diesel generator operating under a condition that could have resulted in equipment damage.

C. This example, identified by CP&L, was added with the NRC's concurrence. A description of this example is contained within the response to this example.

This is a Severity Level III violation (Supplement I).
Civil Penalty - $125,000

RESPONSE TO VIOLATION I:

Admission or Denial of Violation:

Carolina Power & Light Company admits to this violation.

Reason for the Violation:

Example A:

Plant analysis of the RHR F048B issue determined that the involved personnel failed to effectively use the procedural controls to align the B loop. The operating procedure utilized to restore the RHR system to the low pressure coolant injection standby mode from suppression pool cooling was written to be used for either loop. However, the wording implied the use of a single procedure for both loops was acceptable. This procedure required the operator to designate the applicable loop, A or B, but only provides sufficient sign-offs after each step for one loop. The involved operator secured the A loop of RHR successfully. By using the same procedure to secure the B loop as was used to secure the A loop, there were no blank signature blocks for the operators to sign as they completed each individual step (i.e., valve operation). Thus when one procedure was used, there existed no place-keeping mechanism to prevent skipping a step. Consequently the operators inadvertently missed the step which required opening the F048B valve. Past practice has been to use one procedure per loop; however, there was a space to denote either A or B loop and only A was marked.

Completed operational procedures are reviewed during each shift by the unit Senior Reactor Operator (SRO) to verify proper work practices and procedural compliance. Due to other important shift activities, the SRO was unable to review procedures until near the end of the shift. The SRO reviewed and approved the procedure for restoring A loop of RHR, but had no indication that the same procedure was used for both loops because the control operators did not indicate that the procedure was used for both loops.

In summary, the Company recognizes this deficiency in the procedural control process and the need to clarify the procedure format to eliminate ambiguity.

Example B:

Plant analysis has determined that the root cause of the Emergency Diesel Generator (EDG) No. 3 event is the failure of one individual to implement one step in the master procedure. The involved individual signed off a procedural step indicating that the diesel valves had been adjusted in accordance with a referenced procedure when in fact the referenced procedure was not used. Consequently, the valves were not adjusted correctly.

The involved mechanic had acquired a classification of first class mechanic and had approximately eight (8) years of experience on the maintenance of diesel generators at the Brunswick site. The

involved mechanic had received craft development training on diesel generator maintenance including the proper method for adjusting diesel valve timing. Additionally, the involved mechanic had successfully performed previous diesel valve timing adjustment activities. Consequently, the Company believes that the involved mechanic was provided the skills, tools, training and the procedures necessary to successfully complete the task with minimal supervisory oversight.

A thorough pre-job briefing was conducted by the Maintenance Supervisor prior to starting work on Diesel No. 3. Based on discussions with the mechanic and the mechanic's training, qualifications, and personal experience doing this task, the Maintenance Supervisor believed the mechanic had the ability to accomplish the task successfully. Furthermore, the Maintenance Supervisor performed a daily preliminary review of the procedures associated with the work accomplished during the diesel work effort. Based on verification that the step associated with the valve timing adjustment had been signed off as completed, the Mechanical Maintenance Supervisor believed that the valve timing adjustment activity had been performed in accordance with the master procedure requirements and subsequently authorized engine start.

A problem with engine operation was noted during a mid-maintenance run of the diesel generator. Plant Maintenance, Operations, and Engineering personnel observing the restart identified the diesel generator load fluctuations and aggressively pursued actions to resolve the problem.

Quality control oversight of work activities is ensured through Quality Control involvement as required by hold points contained in work procedures, Nuclear Assessment Department (NAD) observation of work activities, and self assessment which includes supervisory oversight. A review of the procedures used to support the Diesel No. 3 maintenance outage was completed on December 14, 1991. Results of this review indicate that the existing hold points met the requirements for Quality Control involvement for the overall maintenance activity. However, for the specific valve lash adjustment procedure, no Quality Control hold points were required.

The Nuclear Assessment Department was involved with the Diesel No. 3 outage pre-planning activities, the pre-staging of equipment, parts and procedures, and performance of some work activities. However, Nuclear Assessment Department was not present during the valve lash adjustment activity due to oversight being directed to other Unit 2 outage activities.

In summary, based on preliminary review of the master procedure, as well as reliance on the expertise and proven reliability of the involved mechanic, the Mechanical Maintenance Supervisor believed that conditions were acceptable for a diesel restart. Based on the attributes of the involved mechanic, the level of procedural controls for ensuring proper Quality Control involvement, and the verification through Nuclear Assessment Department surveillance that the initial diesel work efforts were adequate for ensuring successful performance of the diesel work effort, the Company believes that, at the time of the event, reasonable justification existed for the levels of oversight provided during the work activity. However, in retrospect the Company acknowledges the value of even greater supervisory presence on the job and quality control oversight, particularly for systems with high safety significance.

Example C:

The following information describes the failure of Emergency Diesel Generator No. 2 to auto start on January 6, 1992, the root cause of that event, and the corrective actions taken and corrective actions planned to prevent recurrence.

Event Discussion:

At 0045 hours on January 6, 1992, Unit 2 was at 26 percent reactor power and Unit 1 was at 100 percent reactor power. Both units' Emergency Core Cooling Systems were operable. Emergency Diesel Generator No. 2 had been prepared for repainting by cleaning the emergency diesel generator surfaces with a solvent (de-greaser) and rinsing with clean water. The cleaning activity had been researched and planned by the Plant Services organization prior to implementation.

The Unit 2 main generator was being separated from the grid to perform a backup acceleration amplifier test as a prerequisite for main turbine overspeed trip testing. At this time, a main turbine stop valve limit switch failure resulted in an inadvertent primary electrical lockout which initiated an automatic start signal to all four emergency diesel generators. Emergency Diesel Generator Nos. 1, 3 and 4 started as designed, but Emergency Diesel Generator No. 2 failed to start.

Immediately following the Emergency Diesel Generator No. 2 failure to successfully start, Technical Support organization personnel investigated and found that the emergency diesel generator properly received and correctly processed the electrical start signal. At 0618, as part of the continuing investigation, a restart of Emergency Diesel Generator No. 2 was initiated with observers stationed to monitor the starting sequence. The emergency diesel generator was observed to respond appropriately up to the engine being cranked by starting air and the Woodward governor sending the signal to inject fuel. A stationed observer noted that the governor appeared to be fully compressing the governor linkage assembly spring; however, the fuel racks were not extending. The manual fuel rack control lever was pushed and the fuel rack immediately positioned full open. Once this happened, the diesel engine started and Emergency Diesel Generator No. 2 operated normally.

The Emergency Diesel Generator No. 2 was placed under clearance to inspect the fuel racks and linkages for proper lubrication and all linkage components for binding. The linkages were found to move freely once they were disconnected from the fuel racks. The fuel racks were coated with what appeared to be a dry oil film of a thick consistency. Additionally, a white film was found on the fuel rack cylinders. Samples of the residue from the fuel racks, the grease from the roller bearings which support the fuel control racks, the cleaning agent (Planisol-M), and the new grease which would be used in the lubrication of the roller bearings were sent to the Company's Harris Energy and Environmental (HE&E) Center for analysis. Additionally, an examination of the fuel racks on the other three emergency diesel generators found that they were lubricated and moving freely.

The HE&E Center found that the white film residue was a sodium meta-silicate combined with a surfactant. The surfactant is a dispersant which is used to aid in cleaning similar in nature to dish washing detergent. The sodium meta-silicate is basically a glass. As the sodium silicate dries, a crystal adhesive bond forms. When broken, as with glass, the adhesive properties would no longer exist. In effect the silicate would shatter into very small particles which would no longer hinder movement of the components to which it once adhered. The HE&E Center concluded that Planisol-M is safe to use provided it is dissolved properly and residue is removed from surfaces.

Testing was conducted by the Technical Support organization on a spare fuel pump assembly that was washed with Planisol-M and left to dry for 2-1/2 days to approximate conditions experienced by Emergency Diesel Generator No. 2. The tension required to start movement was more than four times greater (greater than five pounds) than after it had broken free. After breaking free, no binding was noted.

Some additional information is also noteworthy, but was not found to be the cause of this failure. Late on Friday afternoon (January 3, 1992), when the cleaning of Emergency Diesel Generator No. 2 was completed, a request was made for the auxiliary crew to perform a lubrication check of the fuel racks. However, the lubrication was postponed until normal working hours on the following Monday (the day of the auto-starts). The auxiliary crew worker made the decision to postpone the lubrication check as he was not aware of any operability concerns related to this request. He was, however, aware of the need for a lube check after an emergency diesel generator cleaning because of his previous involvement with the lubrication of the fuel racks following the cleaning of Emergency Diesel Generator No. 1 performed in May 1991.

With the failure mechanism of Emergency Diesel Generator No. 2 discovered to be the Planisol-M crystalline bond on the fuel rack cylinders, a review of the other emergency diesel generators that had potentially been cleaned using Planisol-M was performed. The review determined that only Emergency Diesel Generator No. 1 had been cleaned by this method. The review concluded that insufficient evidence existed to conclude that cleaning Diesel No. 1 was a contributor to the slow start experienced on May 15, 1991.

Event Cause:

Plant analysis has determined that failure of Emergency Diesel Generator No. 2 to auto start was due to failure to recognize that cleaning the emergency diesel generators could lead to inoperability. Because this work was not recognized as a maintenance activity, it did not receive a higher level review and consideration of post maintenance testing.

Corrective Steps Which Have Been Taken and Results Achieved:

Example A - Unit 1 RHR F048B:

1. Formal identification of the root cause of the event was completed on November 21, 1991. The root cause determination provided the basis for the corrective actions taken and planned to prevent occurrence of a similar event.

2. Counselling and discipline of involved personnel was performed on October 11, 1991 to ensure individual awareness of the significance of the event.

3. Shift supervision discussed this event with Operations personnel and re-emphasized management expectations of rigorous compliance with procedures and independent verification.

4. Communication of the event with appropriate plant personnel by those directly involved, including a briefing on the event and personnel errors involved with the event, was completed on October 15, 1991.

5. A procedure revision was completed on November 27, 1991, to eliminate the potential use of the same procedure copy for multiple loops.

6. A review of Operating Procedures and Operations Periodic Tests for similar instances of potentially ambiguous direction to repeat steps was completed on December 30, 1991. Thirty-nine (39) procedures were identified where additional clarification could aid in avoidance of similar situations. The appropriate procedure revisions will be performed by April 1, 1992. In the interim, a standing order has been issued alerting shift operations personnel to the ambiguous condition of some procedures.

Example B - Setting of Diesel No. 3 Valve Lash Adjustment:

1. Identification of the root cause of the event was completed on October 17, 1991. The root cause determination provided the basis for the corrective actions taken and planned to prevent occurrence of a similar event.

2. The maintenance mechanic who incorrectly performed the diesel work activity was terminated on November 11, 1991.

3. Counselling of other involved personnel to ensure individual awareness of the significance of the event and the importance of procedural compliance has been completed.

4. Certain management changes and rotations of personnel have occurred.

5. A revision of 0MST-DG500, Emergency Diesel Generator Inspection, to support inclusion of a specific reference to supporting procedure, 0CM-ENG513, required to complete diesel valve timing adjustments, was completed on November 11, 1991.

6. Based on the Diesel No. 3 lessons learned, the following improvements to diesel work procedures and supervisory oversight were implemented in support of the Emergency Diesel Generator No. 4 outage which occurred November 20 through November 27, 1991:

   - 0MST-DG500, Emergency Diesel Generator Inspection, has been revised to include expanded Quality Control hold points and to invoke the requirements of PLP-17, Identification, Development, Review, And Conduct Of Infrequently Performed Tests Or Evolutions, such that sensitivity to supplemental procedures and the level of management involvement is increased.

   - 0CM-ENG513, Maintenance Instructions For Nordberg Diesel Engine Exhaust Tappets and Inlet Lash Adjustors, procedure has been revised to include expanded Quality Control hold points.

   - Two Maintenance supervisors were dedicated to the Diesel No. 4 outage to provide oversight of day shift and night shift activities.

   - A project manager was assigned overall management responsibility to ensure scheduling and clearance coordination.

   - Increased Quality Control oversight was implemented.

   - Increased vendor presence was implemented.

   The aforementioned improvements to the Diesel No. 4 outage resulted in the accomplishment of an intensive work scope within schedule and without incident. This fact was acknowledged by the following quote taken from the Resident Inspector's December 31, 1991 Monthly Report: "The EDG No. 4 outage demonstrated the licensee's ability to implement a well planned and executed outage when proper attention is directed at that effort".

7. Quality Control presence and support has been enhanced by performing assessments of maintenance activities on a daily scheduled basis. Quality Control works with the Site Work Force Control Group (SWFCG) chairman to determine priorities and to identify which maintenance activities receive assessment. The emphasis of this approach is on doing the job right the first time by coaching maintenance personnel on possible improvements and thereby preventing rework.

Example C - Diesel No. 2 Fuel Rack Cleaning:

1. Plant Services organization work has been brought under the formal control of the Site Work Force Control Group Process Procedure (BSP-43). Site Work Force Control Group review of work activities provides a multi-disciplined review with emphasis applied to specific plant conditions, impact to equipment and system operability, and the compensatory actions required to support the activity.

2. Communication of the event with other CP&L nuclear sites and the industry through a Nuclear Network entry was completed January 21, 1992.

Corrective Actions That Will Be Taken To Avoid Further Violations:

Example A - Unit 1 RHR F048B:

A revision to support removal of ambiguities associated with repeated steps within Operating Procedures and Periodic Tests will be completed by April 1, 1992.

Example B - Setting Of Diesel No. 3 Valve Lash Adjustment:

1. A review of the event with Maintenance personnel during 1992 first quarter Continuing Training will be completed by April 17, 1992.

2. The Brunswick diesel maintenance team and its supervisor are participating with Duke Power's McGuire Plant Maintenance Department in the conduct of a complete overhaul of their Nordberg diesel engine.

Example C - Diesel No. 2 Fuel Rack Cleaning:

1. A review during 1992 first quarter Continuing Training of the event with appropriate personnel in the Operations, Maintenance, Technical Support, and Plant Services organizations to reinforce the importance of self-checking will be completed by April 30, 1992. This review will also stress the importance of pre-job briefings involving the appropriate organizations needed to assess operability risks to safety related equipment.

2. The review and planning of site work activities for housekeeping, cleaning, insulation removal, painting, etc. will include checks to ensure approved procedures are established to control activities which have a impact on safety and quality.

Generic To Examples A, B, and C:

1. Prior to the sequence of events cited as examples to Violations I and II herein, Brunswick Plant management recognized the need for improvement in the areas of work control and self assessment. Plant management and the Nuclear Assessment Department have assessed work control and plant management is currently implementing corrective actions as identified in that assessment. Additionally, Work Control and Corrective Action Program assist visits by INPO are scheduled for February 10, 1992 and March 2, 1992, respectively.

2. A special team is being assembled from the Nuclear Plant Support Group and other organizations such as the Nuclear Assessment Department to identify and review those factors which contributed to areas of successful performance, (e.g., ALARA dose reduction, personnel contamination reduction, and the Maintenance I&C 2,000,000 man-hour safety record). This team will also be identifying the key factors and methods which contributed to areas of successful performance at the Company's other nuclear sites to recommend improvements to methods and processes at the Brunswick Plant. The team will be assembled and a schedule for implementation of team goals will be completed by June 30, 1992.

Date When Full Compliance Will Be Achieved:

July 31, 1992.

VIOLATION II:

Technical Specification 6.8.1.a requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Quality Assurance Program Requirements (Operation), November 1972. Appendix A requires that procedures be established for Performing Maintenance; Equipment Control (e.g., locking and tagging); and Correcting Abnormal, Offnormal, or Alarm Conditions.

Contrary to the above, procedures were not properly established or implemented as indicated by the following examples:

A. On September 27, 1991, the Scram Discharge Volume (SDV) high level trip bypass switch was positioned from BYPASS to NORMAL by a Senior Reactor Operator prior to the SDV High-High Level Reactor Protection System (RPS) Trip Annunciator clearing as directed in Annunciator Panel Procedure APP-A-05, revision 21, for window 1-5, Scram Discharge Volume High-High Water Level Trip Bypass. This caused an unnecessary RPS System actuation.

B. On October 2, 1991, Special Procedure SP-91-042, Reactor Vessel Water Level Control for Chemical Decontamination, was not properly established in that the necessity for pulling Emergency Core Cooling System (ECCS) analog trip unit cards in a specified sequence was not clearly stated in prerequisite step 5.1. This led to an unnecessary Unit 2 ECCS actuation.

C. On October 14, 1991, Unit 2 Reactor Core Isolation Cooling Valve 2-E51-F012, Reactor Core isolation Cooling (RCIC) Pump Discharge Valve, was discovered open instead of being closed as required by Local Clearances 2-91-1090, Master Drain Clearance for B Feed Water Local Leak Rate Test (LLRT), established on October 3 and 4, 1991, and 2-91-0850B, RCIC Master LLRT Clearance Boundary Change, established on October 6, 1991.

D. On October 29, 1991, Unit 2 Service Water Valve 2-SW-V294, Outboard isolation to Chlorination, was left open instead of being placed in the closed position as required by Local Clearance 2-91-1587, Secondary Containment Integrity, established on that date.

This is a Severity Level IV violation (Supplement I).

RESPONSE TO VIOLATION II:

Admission or Denial of Violation:

Carolina Power & Light Company admits to this violation.

Reason for the Violation:

Examples A and C - SDV Bypass Switch and RCIC F012:

The cause of the RCIC F012 and RPS events identified by examples A and C of Violation II is attributed to the failure of personnel to properly implement established procedures.

Example B - ECCS Trip Card:

The ECCS trip card event identified by example B of Violation II occurred as a result of improperly established procedures. The special procedure lacked a caution stating that removal of the analog trip units must occur in the order specified within the attachment to the special procedure to prevent safety system actuation. Additionally, the Automated Clearance Management System contributed to the event by automatically arranging the order of clearance alpha-numerically. This resulted in the clearance having a sequence for pulling the trip unit cards different from that specified by the special procedure.

Example D - SW-V294:

Plant analysis has determined that the SW-V294 valve was stuck in the open position at the time of this event. The personnel implementing the valve clearance acted according to the guidance provided within established procedures and operator training intended to protect the valve from excessive force. Consequently, with the valve having been electrically disabled prior to the hanging of the clearance, the operators relied on the physical resistance of the valve to support their determination of valve position.

Corrective Steps Which Have Been Taken and Results Achieved:

Example A - SDV Bypass Switch:

1. Identification of the root cause of the event was completed and reported within Licensee Event Report 2-91-014 on October 27, 1991. The root cause determination provided the basis for the corrective actions taken and planned to prevent occurrence of a similar event.

2. Counselling and admonishment of the Senior Reactor Operator involved with the event has been completed.

3. Dissemination of information to Operations shift personnel by discussing the significance of the event was completed on October 11, 1991. This information

stressed the importance of increased attention to detail, improved communications, and self check practices.

Example B - ECCS Trip Card:

1. Identification of the root cause of the event was completed and reported within Licensee Event Report 2-91-015 on November 1, 1991. The root cause determination provided the basis for the corrective actions taken and planned to prevent occurrence of a similar event.

2. A revision of the ECCS analog trip card special procedure to establish a caution statement for ensuring proper execution of the disabling of analog trip cards was completed on October 15, 1991.

Example C - RCIC F012:

An exhaustive investigation was completed on November 18, 1991 which proved unsuccessful in determining the factors contributing to the RCIC F012 valve mispositioning event. Consequently, specific corrective actions designed to resolve contributing factors could not be developed. However, a memorandum generated by the site Vice President on December 2, 1991 was distributed to site personnel to elevate site awareness to the need for strict compliance to the clearance process.

Example D - SW V294:

1. Identification of the root cause of the event was completed on November 12, 1991. The root cause determination provided the basis for the corrective actions taken and planned to prevent occurrence of a similar event.

2. Repair of the 2-SW-V294 binding condition was completed on November 19, 1991.

3. Review of the event with the appropriate personnel was completed on January 17, 1992.

Corrective Steps Which Will Be Taken to Avoid Further Violations:

Example B - ECCS Trip Card:

1. Review of the ECCS trip card special procedure to ensure appropriate application of prerequisite steps will be performed by February 28, 1992.

2. Review of the generic implications associated with clearance/procedure interface and procedure prerequisite concerns to ensure that actions requiring a specific performance sequence are procedurally controlled in such a manner as to prevent a system actuation or trip will be performed by April 30, 1992.

3. Additional review of the event will be performed during the formal training cycle and will be completed by April 2, 1992.

Example C - RCIC F012:

Review of the event with the appropriate plant personnel will be performed by February 20, 1992.

Date When Full Compliance Will Be Achieved:

April 30, 1992.