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

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
REPLY TO A NOTICE OF VIOLATION
NRC INSPECTION REPORT NOS. 50-325/95-13 AND 50-325/95-14

Gentlemen:

On September 8, 1995, the Nuclear Regulatory Commission (NRC) issued a Notice of Violation for the Brunswick Steam Electric Plant, Units 1 and 2. The basis for the violation is provided in NRC Inspection Report 50-325/95-13 and 50-325/95-14. Carolina Power & Light Company (CP&L) has determined that the inspection report does not contain information of a proprietary nature. Enclosure 1 provides a synopsis of the actions CP&L is taking to address the generic engineering issues identified in this Notice of Violation. Enclosure 2 provides CP&L's response to the individual Notices of Violation in accordance with the provisions of 10 CFR 2.201.

Please refer any questions regarding this submittal to Mr. G. D. Hicks at (910) 457-2163.

Sincerely,

William R. Campbell

William R. Campbell
Brunswick Nuclear Plant

SFT/

Enclosures
1. Synopsis
2. Reply to Notice of Violation
3. List of Commitments

cc: Mr. S. D. Ebneter, Regional Administrator, Region II
Mr. D. C. Trimble, Jr., NRR Project Manager - Brunswick Units 1 and 2
Mr. C. A. Patterson, Brunswick NRC Senior Resident Inspector
The Honorable H. Wells, Chairman - North Carolina Utilities Commission

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ENCLOSURE 1

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 VIOLATIONS

SYNOPSIS

On August 28, 1995, CP&L staff met with your staff to discuss the circumstances surrounding the violations. As discussed at that meeting, CP&L recognizes the need to further improve the quality of engineering products and continues to implement actions designed to affect the cultural and programmatic improvements necessary to raise Brunswick Engineering Support Section performance to desired standards. These improvements are intended to address the management oversight, process deficiencies, and communication issues which contributed to these events and include the following actions:

The design and system engineering components of the Brunswick Engineering Support Section have been integrated nto a single organization. This integration is intended to improve communication and interface, provide consistent management oversight, and improve the quality of engineering products.

CP&L also recognized the need and has taken actions to instill design engineering ownership of the complete modification process. These actions include establishing a single individual with accountability for the quality of design, planning, installation, and retest associated with each modification. To formally effect this change, the Project Management Manual will be proceduralized and the Engineering Support Request process re-designed.

CP&L management recognizes the need to continue enhancing engineering personnel skills with the Engineering Support Personnel training program, augmented system training (including the Management Operations System Training and Senior Reactor Operator Certification programs), job rotation, and individual development plans.

Brunswick Engineering Support Section management has implemented tools to assist them in ensuring the quality and consistency of engineering products. Among these tools was the establishment of a Design Review Team in early 1995. This team supports engineering management in their responsibility to oversee the quality of engineering products and the adequacy of associated safety reviews by reviewing modifications that have the potential to impact safety significant systems.

In addition to the Design Review Team, a group of knowledgeable individuals representing appropriate site organizations including Engineering management, Operations, and Maintenance was established. This group, referred to as the Product Review Team, was formed to ensure that significant engineering products are developed and implemented in a manner which includes a comprehensive plant perspective. Additionally, the Product Review Team's scope of review includes a review of the plant modification implementation package and acceptance testing methodology. These teams will continue this function

until such time that the quality of engineering products is consistent with engineering management's expectations.

The Brunswick Engineering Support Section management conducted a meeting on September 19, 1995, with engineering personnel to review recent events, including the events addressed by this violation, and to discuss the recently developed Brunswick Engineering Support Section Plant Engineering Expectations.

On September 26, 1995, a stop work directive was issued halting the implementation of all engineering products which physically modify the configuration of plant systems or structures. This action was taken so that additional reviews or assessments of engineering products could be performed to ensure the quality of near term modifications scheduled for implementation. This review will incorporate accountabilities for a responsible engineer and supervisor to certify the adequacy of the engineering products reviewed.

Additionally, the Brunswick Engineering Support Section conducted a two day stand-down meeting on September 27 and 28, 1995. These meetings provided positive reinforcement by senior management of engineering section expectations. Training on diverse engineering and problem solving skills was provided. Emphasis was placed on risk significant systems in order to heighten the sensitivity of plant engineers to systems which could significantly impact core damage frequency. Additionally, engineering personnel provided input into identification of areas within the organization needing improvement and specific recommendations for resolution of these deficiencies. A product of this stand-down was the Engineering Product Quality Affirmation. This affirmation will ensure that engineering products are reviewed to the established guidelines of this document, and that the signatures of the responsible engineer and supervisor on this document confirm that the quality of each engineering product meets appropriate engineering standards.

CP&L believes that the corrective actions discussed above will result in the improvements necessary to improve the quality of modifications implemented at Brunswick.

ENCLOSURE 2

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 VIOLATIONS

During NRC inspections conducted between April 29 and August 10, 1995, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," (60 FR 34381; June 30, 1995/NUREG-1600), the violations are listed below:

A. 10 CFR 50, Appendix B, Criterion III, Design Control, requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications and instructions. Criterion III also requires, in part, that design control measures shall provide for verifying or checking the adequacy of design such as by design reviews or by the performance of a suitable testing program.

Contrary to the above, measures were not established to assure that applicable regulatory requirements and the design basis were correctly translated into specifications and instructions for Plant Modification 92-79, High Pressure Coolant Injection/Reactor Core Isolation Cooling Inverter and Flow Controller Replacement, in that:

1. The design review for plant modification 92-79 did not adequately isolate DC power supplying the flow control loop from direct current grounds as evidenced from June 8-10, 1995, when high pressure coolant injection was declared inoperable due to a direct current ground causing erroneous speed and flow indications during a routine operability test.

2 Post-modification testing for plant modification 92-79 did not assure that the flow controller was adjusted for high pressure coolant injection to the vessel. Specifically, on May 18, 1995 tuning of the flow controller was conducted under recirculation conditions and did not account for the different hydrodynamic conditions of vessel injection.

B. Technical Specification 6.8.1 states, in part, that written procedures shall be established, implemented, and maintained covering the activities referenced in Appendix A of Regulatory Guide 1.33, November 1972. Regulatory Guide 1.33, November 1992, Appendix A, requires, in part, specific procedures for testing of the Reactor Core Isolation Cooling (RCIC) system.

Modification Administrative Procedure, 0-MAP-005, Implementation of Major Modifications, implements Technical Specification 6.8.1 requirements. 0-MAP-005, Revision 4, Section 5.5.3.4.a.1, requires that Post-modification Testing shall ensure that modified systems, structures, and components are functional and operate as designed under analyzed conditions.

Contrary to the above, the post-modification testing of Plant Modification 92-79, High Pressure Coolant Injection/Reactor Core Isolation Cooling Inverter and Flow Controller Replacement, which was implemented under Work Request/Job Orders 94-ALXT7 and 94-ALXTF did not ensure that the modified systems, structures, and components were functional and would operate as designed under analyzed plant conditions, as demonstrated by the failure of the RCIC system flow controller to control flow when actuated in the automatic mode of operation on May 19, 1995, following a Unit 1 reactor trip. Flow controller adjustments for RCIC did not account for the different hydrodynamic conditions of vessel injection.

These violations represent a Severity Level III problem (Supplement I). This violation is applicable to Unit 1 only.

RESPONSE TO VIOLATION A:

Admission or Denial of Violation

Carolina Power & Light admits this violation.

Reason for Violation

Example 1:

The design review for plant modification 92-79 did not identify isolation of the inputs and outputs on the High Pressure Coolant Injection (HPCI) flow controller as a critical design characteristic. This lack of isolation failed to protect the control circuit from DC power system grounds. The failure to identify this critical design characteristic of the HPCI controller occurred as a result of the following programmatic and human performance problems encountered during the design review process:

During the comparison of design features between the original and replacement flow controllers, a review of technical information for the two controllers did not identify any specific reference to input and output isolation.

Determination of the critical design characteristics of the flow controllers included a review of available design basis information and did not include a detailed review of the electrical schematics of the individual controllers. A detailed review of the electrical schematics would have revealed this design feature.

The applicable Design Basis Documents did not address the significant effects that grounds can have upon DC control circuits.

During acceptance testing for this modification, it was discovered that the flow controller did not possess isolated inputs and outputs. The responsible engineers did not fully evaluate the significance of this condition.

Example 2:

The post-modification testing for plant modification 92-79 did not assure that the HPCI system flow controller was properly adjusted for vessel injection. The post-modification testing failed to adequately control the tuning of the flow controller. As a result, the tuning was performed without establishing predetermined limits for the controller settings to ensure that the controllers would remain within acceptable tolerances after tuning was completed. The failure to properly tune the controller was due to the following communication and programmatic deficiencies:

Communication between the modification design engineer and the system engineer who prepared the post modification test was inadequate. The differences in system dynamics and post modification testing methodology was not thoroughly communicated between the design and system engineers. Additionally, the parameters defining the limits of permissible controller tuning were not communicated between the two engineers. This breakdown in communication resulted in the development of a post modification test that specified recirculation to the condensate storage tank instead of injection to the reactor vessel during controller tuning.

Neither the approved post modification test procedure nor the completed post modification test results required review and concurrence by the design engineer. The modification implementation process lacked a single point of accountability resulting in frequent responsibility shifts from modification designer to project manager to system engineer. These process hand-offs were significant contributors to this event.

Corrective Actions Which Have Been Taken and Results Achieved

Example 1:

Evaluation of the HPCI control loop was performed and concluded that the ground fault did not damage HPCI components.

A temporary modification was installed to electrically isolate the HPCI flow controller inputs and outputs to protect the control loop from ground faults.

A permanent modification has been installed to provide an isolated power supply to the RCIC flow controller. The isolated power supply provides protection of the RCIC control loop from ground faults.

A review was performed to identify systems susceptible to DC ground faults. The results of this review determined that the HPCI, RCIC, and Emergency Diesel Generator (EDG) systems are susceptible to DC grounds. The Design Basis Documents for the HPCI, Emergency Diesel Generator, and 125VDC systems will be revised to address the significant effect that grounds can have on DC control circuits.

Electrical and I&C engineers were briefed on the susceptibility of DC powered control systems to this phenomenon to heighten the awareness of engineering personnel to this issue until the required Design Basis Documents can be revised.

Engineering management has reinforced the need for engineering personnel to fully evaluate off normal indications/observations.

Example 2:

The HPCI flow controller setpoints were reset to their pre-modification settings.

The HPCI system was evaluated for past operability. This evaluation determined that the flow controller tuning performed during the acceptance testing of plant modification 92-79 would not have prevented HPCI from performing its safety function. The as-tuned controller settings were bounded by previous full flow vessel injection data.

Procedure 0PLP-30, Engineering Service Requests, was revised to require the design engineer to review post modification acceptance test procedures.

Corrective Steps Which Will Be Taken to Avoid Further Violations

Example 1:

A permanent modification will be installed to provide an isolated power supply to the HPCI flow controller by December 31, 1995. The necessary parts to install this modification are on order and expected to be received by November 1, 1995.

Design Basis Documents for the HPCI, Emergency Diesel Generator, and 125VDC systems will be revised to address the significant effect that grounds can have on DC control circuits by December 31, 1995.

Plant Modification 92-080, (Unit 2) High Pressure Coolant Injection/Reactor Core Isolation Cooling Inverter and Flow Controller Replacement, will be revised to incorporate lessons learned regarding flow controller ground isolation by December 31, 1995.

Example 2:

Procedures 0PLP-022, Implementation of Minor Modifications, and 0MAP-005, Implementation of Major Modifications, will be revised by October 31, 1995, to require the design engineer to review and accept post modification acceptance test results prior to declaring modification operability.

Plant Modification 92-080, (Unit 2) High Pressure Coolant Injection/Reactor Core Isolation Cooling Inverter and Flow Controller Replacement, will be revised to incorporate lessons learned regarding flow controller tuning by December 31, 1995.

Date When Full Compliance Will Be Achieved

Carolina Power and Light believes that it is in full compliance with 10 CFR 50, Appendix B, Criterion III, as it applies to the issues identified in Violation A.

RESPONSE TO VIOLATION B:

Admission or Denial of Violation

Carolina Power & Light admits this violation.

Reason for Violation

The post-modification testing for plant modification 92-79 did not assure that the RCIC system flow controller was properly adjusted for vessel injection. The cause of this event is similar to the cause of the event described in Violation A, example 2 above. The post-modification testing failed to adequately control the tuning of the flow controller. The tuning was performed without establishing predetermined limits for the controller settings to ensure that the controllers would remain within acceptable tolerances after tuning was completed. The failure to properly tune the controller is due to the following programmatic and communication deficiencies:

Communication between the modification design engineer and the system engineer who prepared the post modification test was inadequate. The differences in system dynamics and post modification testing methodology was not thoroughly communicated between the design and system engineers. Additionally, the parameters defining the limits of permissible controller tuning were not communicated between the two engineers. This breakdown in communication resulted in the development of a post modification test that specified recirculation to the condensate storage tank instead of injection to the reactor vessel during controller tuning.

Neither the approved post modification test procedure nor the completed post modification test results required review and concurrence by the design engineer. The modification implementation process lacked a single point of accountability resulting in frequent responsibility shifts from modification designer to project manager to system engineer. These process hand-offs were significant contributors to this event.

Corrective Actions Which Have Been Taken and Results Achieved

The RCIC flow controller setpoints were reset to their pre-modification settings.

Procedure 0PLP-30, Engineering Service Requests, was revised to require the design engineer to review post modification acceptance test procedures.

Corrective Steps Which Will Be Taken to Avoid Further Violations

Procedures 0PLP-022, Implementation of Minor Modifications, and 0MAP-005, Implementation of Major Modifications, will be revised by October 31, 1995 to require the design engineer to review and accept post modification acceptance test results prior to declaring modification operability.

Plant Modification 92-080, (Unit 2) High Pressure Coolant Injection/Reactor Core Isolation Cooling Inverter and Flow Controller Replacement, will be revised to incorporate lessons learned regarding flow controller tuning by December 31, 1995.

Date When Full Compliance Will Be Achieved

Carolina Power and Light believes that it is in full compliance with Technical Specification 6.8.1, as it applies to the issues stated in Violation B.

ENCLOSURE 3
LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Carolina Power & Light Company in this document. Any other actions discussed in the submittal represent intended or planned actions by Carolina Power & Light Company. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Manager-Regulatory Affairs at the Brunswick Nuclear Plant of any questions regarding this document or any associated regulatory commitments.

	Commitment	Committed date or outage
1.	A permanent modification will be installed to provide an isolated power supply to the HPCI flow controller.	12/31/95
2.	Design Basis Documents for the HPCI, Emergency Diesel Generator, and 125VDC systems will be revised to address the significant effect that grounds can have on DC control circuits.	12/31/95
3.	The Project Management Manual will be proceduralized to further instill engineering ownership of the complete modification process, including the quality of design, planning, installation, and retest.	12/31/95
4.	Procedures 0PLP-022, Implementation of Minor Modifications, and 0MAP-005, Implementation of Major Modifications, will be revised to require the design engineer to review and accept post modification acceptance test results prior to declaring modification operability.	10/31/95
5.	The Engineering Service Request process will be redesigned to further instill engineering ownership of the complete modification process, including the quality of design, planning, installation, and retest.	7/1/96
6.	Plant Modification 92-080, (Unit 2) High Pressure Coolant Injection/Reactor Core Isolation Cooling Inverter and Flow Controller Replacement, will be revised to incorporate lessons learned regarding flow controller tuning.	12/31/95