UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

October 16, 2003

Carolina Power and Light Company
ATTN: Mr. J. S. Keenan
Vice President
Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION REPORT NOS. 05000325/2003005 AND 05000324/2003005

Dear Mr. Keenan:

On September 20, 2003, the Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick Units 1 and 2 facilities. The enclosed integrated inspection report documents the inspection findings, which were discussed on September 17, 2003, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

The report documents one NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it is entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the non-cited violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Brunswick Steam Electric Plant.

In accordance with 10CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Paul E. Fredrickson, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos.: 50-325, 50-324
License Nos: DPR-71, DPR-62

Enclosure: Inspection Report 05000325, 324/2003005
w/Attachment: Supplemental Information

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REGION II

Docket Nos:	50-325, 50-324
License Nos:	DPR-71, DPR-62
Report Nos:	05000325/2003005 and 05000324/2003005
Licensee:	Carolina Power and Light
Facility:	Brunswick Steam Electric Plant, Units 1 & 2
Location:	8470 River Road SE Southport, NC 28461
Dates:	June 22, 2003 - September 20, 2003
Inspectors:	E. DiPaolo, Senior Resident Inspector J. Canady, Acting Senior Resident Inspector J. Austin, Resident Inspector
Approved by:	Paul Fredrickson, Chief, Reactor Projects Branch 4 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000325/2003-005, 05000324/2003-005; 06/22/2003 - 09/20/2003; Brunswick Steam Electric Plant, Units 1 and 2; Problem Identification and Resolution.

The report covered a three-month period of inspection by resident inspectors. One Green non-cited violation (NCV) was identified. The significance of most findings is indicated by its color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Initiating Events and Mitigating Systems

Green. The inspectors identified a non-cited violation for the licensee's failure to comply with 10 CFR 50, Appendix B, Criterion XVI. This violation is related to inadequate corrective actions to prevent recurring nuclear and conventional service water pump functional failures caused by clogging of the associated pump's strainer due to marine growth in the service water intake bays. This resulted in six failures in twelve months.

This finding is greater than minor because it resulted in an increase in the likelihood of loss of nuclear and conventional service water initiating events. In addition, the finding affected the operability, availability, and reliability of the nuclear and conventional service water pumps. The finding is of very low safety significance because redundancy existed in the nuclear and conventional service water systems and the relatively short duration of unavailability of the pumps. (Section 4OA2)

B. Licensee Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the report period operating at full power. On July 1, 2003, the unit was shutdown for a forced outage due to drywell unidentified leakage exceeding Technical Specification (TS) requirements. The Unit was returned to full power on July 6, following drywell leakage repairs. On July 11, reactor power was reduced to 70% power to facilitate repairs of a steam leak on the B feedwater heater string. Full power was reached the following day, and the Unit remained at approximately full power for the remainder of the inspection period.

Unit 2 began the report period operating at full power. Power was reduced to approximately 50% on August 22 for a rod sequence exchange, various planned corrective and preventive maintenance activities, and surveillance testing. Power was returned to full power on August 25, and the Unit remained at approximately full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed the licensee's preparations for severe weather conditions during hurricane season. The inspectors toured protected area and exterior plant grounds for loose debris which could pose hazards to plant equipment during high winds, and reviewed preparations for increased accumulation of rain water. The inspectors selected risk-significant and susceptible systems and areas for review. These included the electrical switch yard, the hydrogen tank storage area, the radioactive waste building, the emergency diesel generator building and the service water structure.

During the approach of Hurricane Isabel to the Cape Fear Region of North Carolina, the inspectors attended hurricane preparation status meetings and reviewed provisions for relief of plant operators, security guards, and emergency response organization personnel. Licensee preparations for plant damage assessment were also reviewed. On September 17 and 18, 2003, the inspectors observed the licensee's emergency response facility staff's monitoring of storm conditions, damage assessment and corrective actions.

During these inspections, the following procedures were reviewed to verify that the licensee's actions were consistent with severe weather program requirements:

- Plant Emergency Procedure 0PEP-02.6, Severe Weather
- Administrative Instruction 0AI-68, Brunswick Nuclear Plant Response to Severe Weather Warning
- Abnormal Operating Procedure 0AOP-13.0, Operation During Hurricane, Flood Conditions, Tornado, or Earthquake

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

The inspectors performed three partial walkdowns of the below listed systems to verify that the systems were correctly aligned while the redundant train or system was inoperable or out-of-service (OOS) or, for single train risk significant systems, while the system was available in a standby condition. The inspectors assessed conditions such as equipment alignment (i.e., valve positions, damper positions, and breaker alignment) and system operational readiness (i.e., control power and permissive status) that could affect operability. The inspectors verified that the licensee identified and resolved equipment alignment problems that could cause initiating events or impact mitigating system availability. Administrative procedure ADM-NGGC-0106, Configuration Management Program Implementation, was reviewed by the inspectors to verify that available structure, system or components (SSCs) met the requirements of the licensee's configuration control program.

- Units 1 and 2 offsite circuit breaker alignment (emergency diesel generator number 3 OOS due to maintenance)
- Unit 2 core spray train A (B train OOS due to maintenance)
- Unit 1 reactor core isolation cooling (RCIC)

In determining correct system lineup, the inspectors reviewed Procedure OPT-12.8.1, Breaker Alignment Operability Test, 2OP-18, Core Spray System Operating Procedure, and 1OP-16, Reactor Core Isolation Cooling (RCIC) System Operating Procedure.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

1. Fire Area Walkdowns

a. Inspection Scope

The inspectors reviewed current action requests (ARs) and work orders (WOs) associated with the fire suppression system to confirm that their disposition was in accordance with OAP-033, Fire Protection Program Manual. The inspectors reviewed the status of ongoing surveillance activities to verify that they were current to support the operability of the fire protection system. In addition, the inspectors observed the fire suppression and detection equipment to determine whether any conditions or deficiencies existed which would impair the operability of that equipment. The inspectors toured the following areas important to reactor safety and reviewed the

associated Prefire Plans to verify that the requirements for fire protection design features, fire area boundaries, and combustible loading were met:

- Unit 1 reactor building, -17-foot elevation, high pressure coolant injection room and the north and south residual heat removal (RHR) rooms, Prefire Plan 1PFP-RB, Reactor Building Prefire Plans (three areas)
- Unit 1 reactor building, nine and 20 foot elevations, north and south RHR heat exchanger rooms, Prefire Plan 1PFP-RB, Reactor Building Prefire Plans (2 areas)
- Diesel generator building number two cell, 23-foot elevation. Prefire plan OPFP-DG Diesel Generator Building Prefire Plans
- Units 1 and 2 reactor building, 23-foot elevation, battery rooms 1A, 1B, 2A, and 2B, Prefire Plan 0PFP-CB, Control Building Prefire Plans (four areas)

To assess the licensee's ability to identify and correct adverse conditions, the inspectors reviewed the licensee's actions in response to AR 102494 which identified incorrect test requirements for the station emergency lighting unit batteries.

b. Findings

No findings of significance were identified.

2. Fire Drill

a. Inspection Scope

On September 5, 2003, the inspectors observed an unannounced plant fire drill in the Unit 2 reactor building, to assess the fire brigade performance and to verify that proper firefighting techniques for the type of fire encountered were utilized. The inspectors monitored the fire brigade's use of protective equipment and firefighting equipment to verify that preplanned firefighting procedures and appropriate firefighting techniques were used, and to verify that the directions of the fire brigade leader were thorough, clear, and effective. The inspectors attended the critique to confirm that appropriate feedback on performance was provided to brigade members and to ensure that areas for improvement were properly identified for licensee follow-up. In preparing for and evaluating the drill the inspectors reviewed the preplanned drill scenario, Drill Number 99-F-RB-02 (Fire in Motor Control Center 2XDA), and the fire plan for the area as documented in 2PFP-RB, Reactor Building Prefire Plans.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

b. Inspection Scope

The inspectors observed licensed operator performance and reviewed the associated training documents during simulator training sessions for cycle 2003-04. This simulator

observation and review included an evaluation of emergency operating procedure and abnormal operating procedure utilization. The inspectors reviewed Procedure OTPP-200, Licensed Operator Continuing Training (LOCT) Program, to verify that the program ensures safe power plant operation. The scenarios tested the operators' ability to respond to a hydraulic control unit low pressure, a conventional service water leak, failure of an electro-hydraulic control pressure regulator, failure of the reactor protection system to scram, loss of 4 kilovolt buses 2D and 3E, and a large break loss of coolant accident. The inspectors reviewed the operators' activities to verify consistent clarity and formality of communication, conservative decision-making by the crew, appropriate use of procedures, and proper alarm response. Group dynamics and supervisory oversight, including the ability to properly identify and implement appropriate TS actions, regulatory reports, and notifications, were observed. The inspectors reviewed simulator scenario LORX-12 which documented the associated observed simulator training scenario.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the equipment issues described in work documents listed below, the inspectors reviewed the licensee's implementation of the Maintenance Rule (10 CFR 50.65) with respect to the characterization of failures, the appropriateness of the associated Maintenance Rule a(1) or a(2) classification, and the appropriateness of the associated a(1) goals and corrective actions. The inspectors also reviewed operations logs and licensee event reports to verify unavailability times of components and systems, if applicable. Licensee performance was evaluated against the requirements of Procedure ADM-NGG-0101, Maintenance Rule Program. The inspectors also reviewed deficiencies related to the work activities listed below to verify that the licensee had identified and resolved deficiencies in accordance with Procedure CAP-NGGC-0200, Corrective Action.

- WOs 440591 and 440593 - Containment atmosphere control (CAC) flow control valves 2717 and 2720 failures to stoke fully
- Work Request 107490 - Radioactive waste effluent monitor failure during effluent release

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's implementation of 10 CFR 50.65 (a)(4) requirements during scheduled and emergent maintenance activities using Procedure OAP-025, BNP Integrated Scheduling and Technical Requirements Manual (TRM) 5.5.13, Configuration Risk Management Program. The inspectors reviewed the effectiveness of risk assessments performed prior to changes in plant configuration for maintenance activities (planned and emergent). The review was conducted to verify that, upon unforseen situations, the licensee had taken the necessary steps to plan and control the resultant emergent work activities. The inspectors reviewed the applicable plant risk profiles, work week schedules, and maintenance work orders for the following OOS equipment:

• AR 98294	Failure of torus purge exhaust valve (1-CAC-V7) to meet in-service test stroke time requirements results in a yellow risk window due to the unavailability of the large suppression pool vent and hardened wetwell vent paths
• AR 98771	Tripping of the 1A-2 battery charger output breaker results in a yellow risk window
• 0MST-DG501R3	Preplanned 72-month inspection of emergency diesel generator (EDG) #3 results in a yellow risk window, BNP Risk Profile Week 29
• AR 102967	Vital battery 1A-1 cell #53 inoperable resulting in deferral of EDG #4 planned outage during work week 34
• AR 103914	Unit 2 A 250-volt battery positive bus ground and subsequent troubleshooting activities occurring on September 7, 2003
• 1 HPCI 37	Unit 1 high pressure coolant injection system outage work scope reduction due to the approach of Hurricane Isabel during Work Week 37
• AR 104887	Vital battery 1A-2 declared inoperable due to cell #42 not meeting TS 3.8.6 Category C limits

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Non-Routine Plant Evolutions and Events

a. Inspection Scope

The inspectors observed and monitored Unit 1 control room personnel actions during the power decrease and ascension associated with the forced outage on July 1, 2003, due to drywell leakage in excess of that allowed by TS. Operator actions were observed prior to the forced outage during drywell valve back seating efforts to mitigate the leakage. The purpose of the review was to verify the following: (1) the power changes were performed in accordance with Procedure 0GP-12, Power Changes, (2) the

appropriate TS was entered during the back seating activities, and (3) control room operations personnel were provided with guidance on the control of plant equipment and system status in accordance with Operating Instruction 0OI-01.08, Control of Equipment and System Status.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the operability evaluations associated with six issues, listed below, which affected risk significant systems or components to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) the justification of continued system operability; (3) any existing degraded conditions used as compensatory measures; (4) the adequacy of any compensatory measures in place, including their intended use and control; and (5) where continued operability was considered unjustified, the impact on TS limiting conditions for operations (LCOs) and the risk significance. In addition to the reviews, discussions were conducted with the applicable system engineer regarding the ability of the system to perform its intended safety function.

- AR 102456 High pressure coolant injection system operability determination to address potential vortexing and air entrainment while aligned to the condensate storage tank as a suction source
- AR 99205 Coolant leak from motor-driven fire pump heat exchanger
- AR 98654 Vital battery 1A-2 battery charger main supply breaker tripped
- AR 104326 Vital battery 1A-1 cell #53 cracked with small leak
- AR 98448 2A conventional service water pump blowdown strainer clogged
- EER 940217 Engineering evaluation report to downgrade the 24/48 volt DC system to Quality Class B

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds (OWAs)

a. Inspection Scope

The inspectors reviewed the status of OWAs for Units 1 and 2 to determine if the functional capability of the system or operator reliability in responding to an initiating event was affected. The review was to evaluate the effect of the OWA on the operator's ability to implement abnormal or emergency operating procedures during transient or event conditions. The inspectors compared licensee actions to the requirements of Procedure 0OI-01.08, Control of Equipment and System Status and held discussions with operations personnel related to the OWA's reviewed.

The two OWAs reviewed were:

- OWA-403, Auxiliary Operator or Instrumentation and Control Technician Isolate Three High Pressure Oil Switches Prior to Resetting a Reactor Feedwater Pump Turbine or Starting a Reactor Feedwater Pump Turbine Oil Pump. A modification on Unit 2 has replaced switches and the Unit 1 Modification will be performed in the 2004 outage (See Integrated Inspection Report Numbers 50-325/03-03 and 50-324/03-03)
- OWA-375, Leak By Valves Upstream of Feedwater Stop Valve Causes Rapid Injection of Cold Water when Opening per GP-02

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed a permanent plant modification (WO 326591) that removed pneumatic controls located in the E3 switchgear room and replaced them with a temperature switch. The inspectors reviewed the design adequacy of the modification for material compatibility which included functional properties, environmental qualification, and seismic evaluation. One purpose of the review was to verify that the replacement switch performance characteristics met the design bases and the design assumptions. Another purpose was to verify that modification preparation, staging, and implementation did not impair emergency/abnormal operating procedure actions and key safety functions. The inspectors also reviewed the modification to verify that the post-modification testing would establish operability and that unintended system interactions would not occur, and that testing demonstrated that the modification acceptance criteria were met.

1R19 Post Maintenance Testing

a. Inspection Scope

For the post maintenance tests and maintenance activities listed below, the inspectors reviewed the test procedure and witnessed the testing and/or reviewed test records to confirm that the scope of testing adequately verified that the work performed was correctly completed, and that the test demonstrated that the affected equipment was capable of performing its intended function and was operable in accordance with TS requirements. The inspectors reviewed the licensee's actions against the requirements in Procedure 0PLP-20, Post Maintenance Testing Program.

- 0PT-07.1.8, Core Spray System Component Test following preventive maintenance on Unit 2 B core spray system
- 0PT-10.1.8, RCIC System Valve Operability Test following channel calibrations on Unit 2 RCIC

- 0PT-15.7, Standby Gas Treatment System Operability Test following maintenance on system damper 1-VA-1D-BFV-RB-MO per WO 71178
- 0PT-14.2.1, Single Rod Scram Insertion Times Test following diaphragm replacement on scram solenoid pilot valves 2-C12-SV-117/118 (Unit 2 control rod 42-43) per WO 434466
- WO 440591, post-maintenance test of CAC system flow controller 2-CAC-FCU-2717 following circuit board replacement
- AR 98654, post-maintenance test of the battery charger amplifier board replacement

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities

a. Inspection Scope

The inspectors monitored portions of the Unit 1 TS required shutdown that commenced on June 30, 2003, due to high drywell unidentified leakage. The inspectors verified that the requirements of General Plant Operating Procedure 0GP-05, Unit Shutdown, were met. Additionally the inspectors reviewed the data package of Procedure 1PT-01.7, Heatup/cooldown Monitoring, to verify that vessel cooldown rates were not exceeded.

The inspectors monitored the heatup and startup activities following the Unit 1 forced outage. The inspectors reviewed Procedures 0GP-01, Pre-startup Checklist, and 0GP-02, Approach to Criticality and Pressurization of the Reactor to ensure that control room operators satisfied procedural requirements. In addition, the inspectors reviewed TS, license conditions, commitments, and administrative procedural prerequisites for mode changes to verify that the requirements for changing the plant configurations were met. The changing plant configurations observed by the inspectors included the reactor startup, the approach to criticality, and portions of the power ascension.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

1. Routine Surveillance Testing

a. Inspection Scope

The inspectors either observed surveillance tests or reviewed test data for the risk significant SSC surveillance listed below to verify the tests met TS surveillance requirements, UFSAR commitments, in-service testing (IST), and licensee procedural requirements. The inspectors assessed the effectiveness of the tests in demonstrating that the SSCs were operationally capable of performing their intended safety functions.

- Periodic Test 0PT-10.1.1, RCIC System Operability Test, performed on Unit 2
- Periodic Test 1PT-01.7, Heatup/cooldown Monitoring
- Periodic Test 0PT-14.2.1, Single Rod Scram Insertion Times Test, performed on Unit 2
- Periodic Test OPT-12.2B, EDG #2 monthly load test

b. Findings

No findings of significance were identified.

2. Inservice Surveillance Testing

a. Inspection Scope

The inspectors observed the performance of Periodic Test 0PT-08.2b, Low Pressure Coolant Injection (LPCI)/Residual Heat Removal (RHR) Operability Test-Loop B, performed on Unit 2. The inspectors evaluated the effectiveness of the licensee's American Society of Mechanical Engineers (ASME) Section XI testing program to determine equipment availability and reliability. The inspectors evaluated selected portions of the following areas: (1) testing procedures; (2) acceptance criteria; (3) testing methods; (4) compliance with the licensee's in-service testing program, TS, selected licensee commitments, and code requirements; (5) range and accuracy of test instruments; and (6) required corrective actions. The inspectors also assessed any applicable corrective actions taken.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed Plant Operating Manual 0PLP-22, Temporary Changes, to assess implementation of the below listed temporary modifications. The inspectors reviewed these temporary modifications to verify that the modifications were properly installed and whether they had any effect on system operability. The inspectors also assessed drawings and procedures for appropriate updating and post-modification testing.

- PCHG-DESG Engineering Change (EC) 52293, temporary cover installation on phase B isophase bus duct
- PCHG-DESG EC 57185, EDG # 4 stator high temperature alarm disabled

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed two site emergency preparedness training evolutions conducted on July 15, 2003, and September 2, 2003. The inspectors reviewed the drill scenario's narrative to identify the timing and location of classification, notification, and protective action recommendation (PAR) development activities. The inspectors evaluated each drill's conduct from the control room simulator, technical support center, and the emergency operations facility. During the drills, the inspectors assessed the adequacy of event classification and notification activities. The inspectors observed the licensee's post-drill critiques and evaluated the licensee's self assessments of classification, notification, and protective action recommendation development. The inspectors assessed the licensee's evaluation of each drill's performance with respect to performance indicators. To assess the ability of the licensee to identify and correct problems the inspectors reviewed ARs 105705 and 105706 which documented drill performance deficiencies and improvement items from the observed drill.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors reviewed the performance indicator (PI) data submitted in July 2003 to the NRC since the last verification inspection was performed. A sample of plant records and data was reviewed and compared to the reported data to verify the accuracy of the performance indicators. The licensee's corrective action program records were also reviewed to determine if any problems with the collection of PI data had occurred. PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 2 were utilized.

The inspectors reviewed the following Units 1 and 2 PIs for the period July 2002 to June 2003:

- Safety System Unavailability, Reactor Core Isolation Cooling
- Safety System Unavailability, Residual Heat Removal System
- Safety System Functional Failures

The following documents were reviewed:

- Control room operating logs
- NRC inspection reports issued during the review period

- Licensee's data bases for the PIs listed above
- Nuclear Generating Group Standard Procedure REG-NGGC-0009, NRC Performance Indicator
- NEI 99-02 Regulatory Assessment Performance Indicator Guideline
- Licensee Event Reports

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution

a. Inspection Scope

The inspectors performed an in-depth annual sample review of selected ARs to determine whether conditions adverse to quality were addressed in a manner that was commensurate with the safety significance of the issue. The inspectors reviewed the actions taken to verify that the licensee had adequately addressed the following attributes:

- Complete, accurate, and timely identification of the problem
- Evaluation and disposition of operability and reportability issues
- Consideration of previous failures, extent of condition, generic or common cause implications
- Prioritization and resolution of the issue commensurate with the safety significance
- Identification of the root cause and contributing causes of the problem
- Identification and implementation of corrective actions commensurate with the safety significance of the issue

The following issues and associated corrective actions were reviewed:

- AR 74020 Service water pump strainer functional failures due to high strainer differential pressure
- AR 88634 Unit 2 main steam line drain isolation valve local leak rate test failures

c. Findings and Observations

Introduction: A Green NCV was identified for inadequate corrective actions to prevent the recurrence of service water pump discharge strainer blowdown lines from clogging.

Description: On July 8, 1999, the licensee identified a significant adverse condition (AR 07149). The licensee noted several instances when the blowdown lines of the service water (nuclear and conventional) pump discharge strainers became clogged with oyster shells, rendering the pump impaired and/or inoperable. The service water pumps are deep-well pumps and take suction on the service water intake structure bays. The pumps provide cooling water to various safety-related (i.e. EDGs and RHR systems) and non-safety-related loads. The licensee determined that the root cause was due to

inadequate cleaning of the service water pump bays, and implemented a yearly preventive maintenance cleaning of the bays. The AR was closed on August 24, 2000.

On October 10, 2002, the licensee identified another significant adverse condition (AR 74020), again identifying several instances of service water pump inoperabilities due to the pump strainer blowdown line becoming clogged with oyster shells. In both of the above mentioned issues, the licensee identified a contributing cause as the formation/existence of oyster shells in the vicinity of the service water pump suction.

In May 2003, the inspectors questioned the status of the root cause analysis and corrective actions of AR 74020. At that time, corrective actions had not been fully implemented. The inspectors noted that the root cause was determined to be inadequate cleaning of the service water pump bays. The inspectors questioned the promptness and adequacy of the licensee's corrective action plan given the fact that three functional failures had occurred during the first three months of 2003. The licensee subsequently reevaluated the root cause evaluation and corrective actions of AR 74020, and identified oyster growth on the pump casings as an additional root cause. Past cleanings of the pump bays did not include cleaning of the deep-well pump exterior casings. The licensee implemented increased monitoring of strainer differential pressure to detect possible blowdown line clogging at an early stage, thus reducing pump functional failures. Additional corrective actions were planned to clean the pump casings concurrent with bay cleanings. Other corrective actions and enhancements were planned to improve system reliability.

Analysis: This finding is greater than minor because it resulted in an increase in the likelihood of loss of nuclear and conventional service water initiating events. In addition, the mitigating systems cornerstone objective to ensure reliability, availability, and capability of systems that respond to initiating events was affected by equipment performance. The deficiency was evaluated using the out-of-service times for the nuclear and conventional services water pumps for the past year. A Significance Determination Process analysis determined the finding to be of very low safety significance (Green) due to the relatively short duration of unavailability of the pumps.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. In the case for significant conditions adverse to quality, the measures shall assure the cause of the condition is determined and corrective actions taken to preclude repetition. The corrective actions of AR's 07149 and 74020 failed to preclude repetitive functional failures of nuclear and conventional service water pumps due to discharge strainer blowdown line clogging. This resulted in six pump failures in a twelve month time-frame, between October 2002 and September 2003. Because the failure of the corrective actions to prevent repetition is of very low safety significance and has been entered into the corrective action program (revision to AR 74020), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-324,325/2003-05-01, Inadequate Corrective Actions for Service Water Strainer Blowdown Line Clogging.

4OA3 Event Follow-up

1. Unusual Event Due to Hurricane Warning

a. Inspection Scope

At 10:40 p.m. on September 16, 2003, the site declared an Unusual Event due to the issuance of a hurricane warning for the Cape Fear Region of North Carolina. The inspectors reviewed Plant Emergency Procedure 0PEP-02.1, Initial Emergency Actions, to verify the licensee's actions to classify and make timely notification were consistent with site emergency plan requirements. The inspectors reviewed plant status including the availability of mitigating systems and the effect of storm conditions on the plant. The inspectors assessed licensee performance with respect to the licensee's staffing of the emergency response organization, provisions for the relief of plant operators, and plant damage assessment. During the approach of the storm the inspectors communicated plant status to the Region II Incident Response Center. At 5:40 p.m. on September 18, 2003, the licensee exited the Unusual Event due to the lifting of the hurricane warning for the Cape Fear Region. See Section 1R01 for additional inspector activities associated with adverse weather preparations.

b. Findings

No findings of significance were identified.

2. (Closed) Licensee Event Report (LER) 50-324/2003-01: Main Steam Line Drain Isolation Valve Local Leak Rate Test Failures. During the Spring 2003 Unit 2 refueling outage, the results of local leak rate testing of the main stream line drain inboard and outboard isolation valves (2-B21-F016 and 2-B21-F019) determined that the valves would not pressurize. Due to the inability to pressurize the containment penetration, the ability to quantify the leak rate of the penetration was beyond the ability of the licensee's test method. Therefore, the licensee conservatively assumed a direct path of a 3-inch nominal pipe size for containment leak rate determination. This method of quantifying the leak rate, administratively required by the licensee's Appendix J program, resulted in a calculated leak rate that exceeded the TS primary containment leak rate limit.

The outboard isolation valve was refurbished by replacing the valve steam and disc assemblies. Only small defects of the valve disc were observed. The inboard isolation valve, a limit-seated valve, needed only a minor limit switch adjustment to achieve satisfactory leak rate results. Although the valves were not leak tight, the valves were capable of closing and reducing the release of radioactive gases. Based on this information and the demonstrated ability of the valves to close, the inspector concluded that the method for calculating the penetration leak rate, was conservative. The valves were classified as a(1) in the licensee's Maintenance Rule Program. The licensee planned to replace the valves with a design that will provide better isolation capability. The licensee also planned to install an additional block valve and a test connection in the system that will facilitate local leak rate testing. This event did not constitute a violation of NRC requirements due to the uncertainty on when the containment penetration leakage problems occurred, with respect to the allowed out-of-service time.

The licensee documented the issue in the corrective action program as AR 88364. This LER is closed.

3. (Closed) LER 50-324/2003-02: Reactor Protection System Instrumentation Out of Calibration Results in Operation Prohibited by Technical Specifications. During the Spring 2003 Unit 2 refueling outage, maintenance technicians recorded as-found calibration setpoints on four-of-eight inboard and outboard main steam isolation valve-closure reactor protection system position limit switches exceeding the TS allowable value. The data was collected using a new licensee calibration method which was more repeatable and removed human factors associated with the previously used method. The previous method, which was used to set the limit switches during previous outages, relied on visual observations and coordination between personnel in different locations to measure the limit switch setpoint. The inspector noted that the previous method used by the licensee was consistent with industry practice.

   The main steam isolation valve-closure reactor trip function is intended to initiate a scram prior to a significant reduction in steam flow thus reducing the severity of the subsequent pressure transient and its effect on fuel thermal limits. The licensee's evaluation of the as-found condition determined that the condition did not appreciable decrease the fuel thermal margin nor did it significantly impact peak transient system pressurization. The main steam isolation valve-closure reactor trip function is not credited in the plant's over-pressure analysis.

   Because the new calibration method was not available during the previous Unit 1 outage, the inspector reviewed the licensee's assessment of test data. The inspector concluded that there was a reasonable assurance of operability for the Unit 1 limit switches due to the existence of more margin between the as-left measured setpoint and the TS allowable value. This event did not constitute a violation of NRC requirements due to the uncertainty as to what effect the more conservative nature of the revised calibration methodology had on actual as-found instrument calibration setpoints. The licensee documented the event in the corrective action program as AR 89077. This LER is closed.

4. (Closed) LER 50-324/2003-03: Unit 2 Scram During Startup Due to Electro Hydraulic Control (EHC) System Malfunction. The cause of the event was determined to be an intermittent error signal from an EHC card that was improperly engaged in its hardware slot in the EHC pressure control circuitry. The licensee found the steam line resonance compensator (SLRC) card for the B EHC pressure regulator was not fully seated. Although the card was not removed for maintenance during the Spring 2003 refueling outage, other cards in the cabinet had been removed and reinstalled. Prior to operation, all cards were checked for proper engagement. The licensee's practice for verifying proper engagement was to apply manual pressure to cards that had been removed and perform visual inspection of all other cards. Due to the design and arrangement of the SLRC cards, the licensee determined that manual seating and verification of proper seating was less than optimal. The licensee planned a procedure revision to add detail to the restoration steps for EHC cards to assure proper engagement for all cards following maintenance activities. The LER was reviewed by the inspectors and no findings of significance were identified. This event did not constitute a violation of NRC

requirements. The licensee documented the event in the corrective action program as AR 89705. This LER is closed.

4OA5 Other

Review of World Association of Nuclear Operators (WANO) Interim Report

The inspectors reviewed a WANO Interim Report for the Brunswick Steam Electric Plant, dated August 14, 2003. The review determined that the results of the WANO report were generally consistent with the results of similar evaluations conducted by the NRC. The inspectors determine that no additional Regional follow-up concerning the results of the WANO report was warranted.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On September 17, 2003, the resident inspectors presented the inspection results to Mr. J. Keenan and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:

A. Brittain, Manager Security
E. Conway, Senior Nuclear Security Specialist
W. Dorman, Manager Nuclear Assessment
C. Elberfeld, Lead Engineer, Technical Support
N. Gannon, Director of Site Operations
J. Gawron, Training Manager
D. Hinds, Manager Brunswick Engineering Support Section
J. Keenan, Site Vice President
D. Makosky, Lead Nuclear Security Specialist
W. Noll, Plant General Manager
E. O'Neil, Manager Site Support Services
H. Wall, Manager Maintenance
E. Quidley, Manager Outage and Scheduling
M. Williams, Manager Operations

NRC Personnel:

P. Fredrickson, Branch Chief, Division of Reactor Projects (DRP), Region II (RII)

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

50-324,325/2003-05-01	NCV	Inadequate Corrective Actions for Service Water Strainer Blowdown Line Clogging (Section 4OA2)

Closed

50-324/2003-01	LER	Main Steam Line Drain Isolation Valve Local Leak Rate Test Failures (Section 4OA3.2)
50-324/2003-02	LER	Reactor Protection System Instrumentation Out of Calibration Results in Operation Prohibited by Technical Specifications (Section 4OA3.3)
50-324/2003-03	LER	Unit 2 Scram During Startup Due to Electro Hydraulic Control System Malfunction (Section 4OA3.4)

Discussed

None