



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

October 26, 2001

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. 50-325/01-03 AND 50-324/01-03**

Dear Mr. Keenan:

On September 29, 2001, the Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick facility Units 1 and 2. The enclosed report documents the inspection findings which were discussed on October 18, 2001 with Mr. J. Lyash 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.

Based on the results of this inspection, the inspectors identified three issues of very low safety significance (Green). One of these issues was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it has been entered into your corrective action program, the NRC is treating this issue as a non-cited violation, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny this non-cited violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, 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 facility.

Since September 11, 2001, your staff has assumed a heightened level of security based on a series of threat advisories issued by the NRC. Although the NRC is not aware of any specific threat against nuclear facilities, the heightened level of security was recommended for all nuclear power plants and is being maintained due to the uncertainty about the possibility of additional terrorist attacks. The steps recommended by the NRC include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with local law enforcement and military authorities, and limited access of personnel and vehicles to the site.

The NRC continues to interact with the Intelligence Community and to communicate information to you and your staff. In addition, the NRC has monitored maintenance and other activities which could relate to the site's security posture.

In accordance with 10 CFR 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/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Brian R. Bonser, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

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

Enclosure: Inspection Report 50-325/01-03, 50-324/01-03

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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

Report Nos: 50-325/01-03, 50-324/01-03

Licensee: Carolina Power and Light Company

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: 8470 River Road SE  
Southport, NC 28461

Dates: July 1 to September 29, 2001

Inspectors: T. Easlick, Senior Resident Inspector  
E. Brown, Resident Inspector  
E. Guthrie, Resident Inspector  
Fred N. Wright, Senior Health Physicist (Section 2PS3)  
David Thompson, Physical Security Inspector (Sections 3PP1,  
3PP2, & 4OA1)

Approved by: B. Bonser, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000325-01-03, IR 05000324-001-03, on 7/1/01-9/29/2001, Carolina Power & Light Company, Brunswick Steam Electric Plant, Units 1 & 2. Maintenance rule implementation, operability evaluation.

The inspection was conducted by resident inspectors, a regional radiation specialist, and a regional security inspector. The inspection identified three Green findings, one of which was a non-cited violation. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

### A. Inspector Identified Findings

#### **Cornerstone: Mitigating Systems**

- Green. The licensee failed to identify that a deficient 1B-2 battery cell condition related to specific gravity had lead to exceeding the licensee's appropriate Maintenance Rule (MR) condition monitoring threshold criteria. As a result, this condition existed without pursuit of the expected MR activities such as recognition of the condition, determination of the cause, and goals to fix and restore optimum battery performance.

The finding was of very low safety significance because no actual loss of safety function occurred in that a loss of Direct Current (DC) supplied loads from the 1B-2 battery did not take place (Section 1R12).

- Green. The inoperability of the DGB motor control center (MCC) safety-related 480 volt feeder breaker overcurrent trip device was a degraded condition that was an unrecognized increase in risk while the plant was operating over the past three years. If a fault occurred on MCC DGB, the MCC DGB feeder breaker would not operate and therefore the E-6 bus supply breaker would trip open to isolate the fault. This would result in the loss of the entire E-6 substation and the loss of emergency diesel generator number 2.

The finding was of very low safety significance based on the small probability of a bus fault actually occurring (Section 1R15.2).

- Green. A Non-Cited violation for inadequate corrective actions was identified when the Unit 1, 125 VDC 1B-2 battery was found to be inoperable following a quarterly battery surveillance test. The inspectors determined that inadequate actions were taken by the licensee to maintain battery cells 3 and 57, located in the 1B-2 battery, within TS limits.

The finding was of very low safety significance because no actual loss of safety function occurred, in that a loss of DC supplied loads did not occur (Sections 1R15.3 and 4OA2).

B. Licensee Identified Violations

A violation of very low significance was identified by the licensee and has been reviewed by the inspectors. Corrective actions taken or planned by the licensee appear reasonable. This violation is listed in Section 4OA7 of this report.

## **Report Details**

Unit 1 began the report period operating at 100 percent rated thermal power (RTP). On August 18, power was reduced to 54 percent RTP for main condenser 1A-South circulating water debris filter cleaning and other maintenance activities. The unit was returned to 100 percent RTP on August 19. On August 20, reactor power was reduced to 73 percent RTP following the loss of the Weatherspoon electrical feeder line due to a lightning strike. The unit was returned to 100 percent RTP on August 21. The unit operated at or near full RTP for the remainder of the inspection period.

Unit 2 began the report period operating at 100 percent RTP. On July 21, reactor power was reduced to 80 percent RTP to support electrical transmission crew maintenance on the Whiteville electrical distribution feeder line. The unit was returned to 100 percent RTP the same day. On September 7, RTP was reduced to 24 percent for a drywell entry to add oil to a reactor recirculation pump motor. The unit was returned to 100 percent RTP on September 9. The unit operated at or near full RTP 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 circulating water system to verify that the system would remain functional when challenged by adverse weather; that the procedures required system readiness and adequate staffing; and that the operator actions required could be accomplished during severe weather. The inspectors reviewed system material condition and the adequacy of equipment protection to preclude weather induced initiating events. The system selected for this review was the Circulating Water System.

The following documents were reviewed:

- Figure 3 for Work Package 159788-01/02, Water Intrusion into MCC of Administrative Procedure 0AP-25, Revision (Rev. 13)
- Operating Instruction 0OI-50.9, 4160V Common A Electrical Load List, Rev. 10
- Operating Procedure 1OP-29, Circulating Water System, Rev. 66
- Abnormal Operating Procedure 0AOP-37, Low Condenser Vacuum, Rev. 13
- Maintenance Rule Scoping and Performance Criteria, System 4015 - Circulating Water

###### **b. Findings**

No findings of significance were identified.



1R04 Equipment Alignmenta. Inspection Scope

The inspectors reviewed plant documents to determine the correct system lineup, and observed equipment to verify that the systems were correctly aligned while the other train or system was inoperable or out of service. The inspectors reviewed licensee activities to verify that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact mitigating system availability. The inspectors reviewed the following system alignments and reviewed the associated documents:

- Unit 2 Reactor Core Isolation Cooling (RCIC)
  - Operating Procedure 2OP-16, Reactor Core Isolation Cooling System Operating Procedure, Rev. 83
- Unit 1 High Pressure Coolant Injection (HPCI) with Standby Liquid Control Outage
  - Operating Procedure 1OP-19, High Pressure Coolant Injection System Operating Procedure, Rev. 53.
- Emergency Diesel Generators (EDG) 1, 2, and 4
  - Operating Procedure, 0OP-39, Diesel Generator Operating Procedure, Rev. 88
- EDG 1
  - Operating Procedure, 0OP-39, Diesel Generator Operating Procedure, Rev. 88

In addition, the inspectors performed a detailed inspection of the Unit 1, 1B Core Spray System to verify that the system was correctly aligned and labeled. The power sources and support system were verified to be available. Outstanding design issues, maintenance work requests, and temporary modifications were also reviewed including the following documents:

- Operating Procedure 1OP-18, Core Spray System Operating Procedure, Rev. 36
- Technical Specifications (TS) 3.5.1, Emergency Core Cooling System (ECCS)
- Updated Final Safety Analysis Report, section 6.3.2.2.3, Core Spray System
- Reactor Building Piping Diagram Core Spray System Unit No. 1, D-25024

b. Findings

No findings of significance were identified.

1R05 Fire Protectiona. Inspection Scope

The inspectors reviewed current Action Requests (ARs), work orders (WOs), and impairments associated with the fire suppression system. The inspectors reviewed the status of on-going surveillance activities to determine whether they were current to support the operability of the fire protection system. In addition, the inspectors observed the fire protection 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 documents:

- Unit 1 Reactor Building, -17 foot elevation (four areas)
  - Prefire Plan 1PFP-RB, Reactor Building Prefire Plans, Rev. 2
- Emergency Diesel Generator Rooms (six areas)
  - Diesel Generator Building Prefire Plan 0PFP-DG, Rev. 5

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator performance during simulator training for cycle 2001-05 with one crew. This observation included emergency operating procedure and abnormal operating procedure scenarios. The inspectors reviewed the licensee's requalification program for licensed operators to verify that the program ensures safe power plant operation by adequately evaluating how well the individual operators and crews have mastered the training objectives, including training on high-risk operator actions. The scenarios tested the operators' ability to respond to a large break loss of coolant accident with emergency core cooling system logic failures, high pressure coolant injection and reactor core isolation cooling system operations. The inspectors reviewed licensee activities to verify consistent clarity and formality of communication, conservative decision-making by the crew, appropriate use of procedures, proper alarm response, and high-risk reactor turbine gauge board manipulations. Group dynamics and supervisory oversight, including the ability to properly identify and implement appropriate Technical Specification (TS) actions and regulatory reports and notifications, were observed. The following documents were reviewed:

- LOT-EOP-009, Large Break LOCA With ECCS Logic Failures, Rev. 01
- LOT-AOP-100, HPCI/RCIC System Operations, Rev. 02

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

For the equipment issues described in work orders and ARs listed below, the inspectors reviewed the licensee's implementation of the Maintenance Rule (MR) (10 CFR 50.65) with respect to the characterization of failures, the appropriateness of the associated a(1)

or a(2) classification, and the appropriateness of either the associated a(2) performance criteria or the associated a(1) goals and corrective actions:

- Unit 1 1-E41-LSL-N003, Unit 1 HPCI Condensate Storage Tank Low Level Switch

The following document was reviewed:

- AR 47029, Unit 1 CST Low Level HPCI Suction Swap to Torus is Broke

- Unit 1 1-B21-N015D, Out of Tolerance

The following documents were reviewed:

- AR 00046127, Trip Unit Setpoint Found Out of Tolerance
- AR 00046125, Transmitter Found Out of Tolerance

- Unit 2 2-C72-K9A, Turbine Trip Bypass Relay Failure

The following documents were reviewed:

- Limiting Condition for Operation T2-01-1270
- Maintenance Rule Scoping and Performance Criteria, System 1080 Reactor Protection

- Unit 1 and 2 Battery Cell Degradation Issues

The following documents were reviewed:

- AR 00046502, Performance Criteria For 125/250 VDC Systems Are Not IAW PSA
- AR 00031562, Definition For Batteries
- AR 00030368, Battery 2A-2 Fails Level B Criteria On Average SG
- AR 00045459, 1B-2 Battery Failure
- AR 00023097, Unit 1 Batteries 1-B2 Cell 54 Low SG and 1-A2 Cell Low Volts
- AR 00044684, 1B-2 Batteries Are A(1) Under New MR Criteria
- Maintenance Rule System 5245, Scoping and Performance Monitoring Criteria
- Maintenance Rule Expert Panel Meeting Minutes, July 11, System 5245 Scoping
- Maintenance Rule Functional Failure Definitions, System 5245 125 VDC Battery & Distribution
- IEEE Std 450-1980, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations, Revision of ANSI/IEEE Std 450-1975
- OMST-Batt11R, Batteries, 125 VDC, Service Capacity Test, Rev. 8
- Technical Specification 3.8.6, Battery Cell Parameters

b. Findings

One finding of very low safety significance (Green) was identified by the inspectors. The licensee failed to identify that a deficient 1B-2 battery cell condition related to specific gravity had lead to exceeding the licensee's appropriate MR condition monitoring threshold criteria. As a result, this condition existed without pursuit of the expected MR activities such as recognition of the condition, determination of the cause, and goals to fix and restore optimum battery performance.

The inspectors recognized longstanding battery cell performance issues associated with the Unit 1 battery system that were identified by the licensee. The inspectors reviewed the licensee's Maintenance Rule (MR) performance monitoring criteria for the battery system and found that the functional failure definition was stated as the inability of the battery to power DC loads or the failure of battery capability to supply DC loads. The performance monitoring criteria required greater than two functional failures to consider the system under 10 CFR 50.65 a(1). The inspectors questioned the Unit 1, B battery bank capability based on information reviewed in the MR Event Log associated with the 125 Volt DC Battery and Distribution system. The licensee had identified two functional failures on the 1B-2 battery. One functional failure was identified on November 6, 2000, and one was identified on April 26, 2001. The inspectors also found that multiple battery cells had specific gravity readings and individual cell voltages that were trending outside the normal values, and various cells were close to the TS limit. The inspectors subsequently requested the engineering basis for the functional capability of the battery since the performance monitoring criteria functional failure definition was directly related to battery capability and there were multiple cells that had degraded specific gravity and cell voltages. The inspectors also requested the engineering basis for concluding how many functional failures had occurred on the battery systems.

The licensee determined that no engineering basis or documentation existed. A subsequent evaluation determined that the battery was still functionally capable of performing its design safety function. The licensee's investigation of the inspectors questions revealed that the MR program for the battery system was not aligned with the probabilistic safety assessment (PSA). The licensee determined that the functional failure criteria should have been zero functional failures instead of greater than two functional failures. Based on that discrepancy the licensee revised the battery system performance monitoring criteria to zero functional failures. The functional failure definition was also revised. The original definition stated that a functional failure was the failure to provide DC power to loads or failure of battery capability to supply loads. The revision to the original definition added that the indication of a failed battery capability would be a failure of a battery discharge test or an average electrolyte temperature less than 60 degrees Fahrenheit.

Since the reliability criteria was changed to zero functional failures the licensee applied the industry guidance which established condition monitoring for Structures, Systems, or Components (SSCs) with zero functional failure reliability criteria. The licensee revised the performance monitoring criteria to include condition monitoring thresholds, also based on industry guidance. The licensee established condition monitoring criteria for specific gravity parameters, and both individual cell and average cell voltage parameters. Limits associated with the parameters were established and thresholds were specified to state when the system would be considered under 10 CFR 50.65 a(1). One of the new condition monitoring thresholds stated that when two battery cells needed to be replaced on the same battery, between battery discharge tests, then that battery would be considered under 10 CFR 50.65 a(1).

The inspectors concluded that the original MR 125 Volt DC Battery and Distribution performance monitoring criteria was inadequate and did not meet industry standards. Once the licensee established the revised performance monitoring criteria the licensee reviewed the previous battery system performance data for both Unit 1 and Unit 2. They determined that the Unit 1, 1B-2 battery exceeded the condition monitoring threshold of replacing more than two battery cells since the last battery discharge test was performed and identified the battery under 10 CFR 50.65 a(1). The last satisfactory battery discharge test on the Unit 1, 1B-2 battery was on May 5, 1998. The inspectors concluded that because the original battery system performance monitoring criteria was inadequate the MR program allowed a significantly degraded condition to exist on the battery for an extended period of time. This condition existed without the expected MR activities having been pursued such as recognition of the condition, determination of the cause, and goals to fix and restore optimum battery performance.

This issue was considered more than a minor finding because there was a credible impact on safety in that multiple battery cells had specific gravity readings as well as individual cell voltages that were trending outside the normal values. Various cells were close to the TS limit, and two cells exceeded the TS limit causing the battery to become inoperable. Additionally, no engineering basis for the functional capability of the battery existed so that the licensee did not actually know whether the battery was capable of fulfilling its intended function. This battery system MR issue effects the availability and reliability of the systems safety function. This system degradation impacted the mitigating system cornerstone and was reviewed using the Reactor Safety Significance Determination Process (SDP). A phase 1 screening assessment concluded that the finding was of very low safety significance (Green), on the basis that no actual loss of safety function occurred, in that a loss of DC supplied loads from the 1B-2 battery did not take place. No violation of NRC requirements occurred because no actual loss of safety function occurred.

#### 1R13 Maintenance Risk Assessments and Emergent Work Evaluation

##### a. Inspection Scope

For the following WP packages and/or procedures, the inspectors reviewed the effectiveness of risk assessments performed prior to changes in plant configuration for maintenance activities (planned and emergent), and verified that upon unforeseen situations the licensee had taken the necessary steps to plan and control the resultant emergent work activities:

- Unit 2 Standby Liquid Control and 0MST-APRM28Q maintenance

The following document was reviewed:

- BNP Risk Profile Week 27, July 11, 2001

- Work Week 30 - 2A Nuclear Service Water and EDG 4

The following document was reviewed:

- BNP Risk Profile Week 30, July 28, 2001

- Emergency Diesel Generator 3 outage

The following document was reviewed:

- BNP Risk Profile Week 33, August 18, 2001

- Unit 2 Battery Charger 2B-1 Repair

The following documents were reviewed:

- BNP Risk Profile Week 29, July 23, 2001
- Evaluation For Brunswick Unit 1 During Battery Charger Failure, July 24

- Unit 1 Multiple Battery Cell Charging

The following documents were reviewed:

- Preventive Maintenance, 0SPP-BAT010, 125VDC Batteries Cell Jumpering, Replacement, and Single Cell Charging
- Figure 3 for Work Package 172627-1, 1B-2 Battery Cell #22, Single Cell Charge per 0SPP-BAT010 of Administrative Procedure 0AP-25, BNP Integrated Scheduling, Rev.13
- Figure 3 for Work Package 1726660-1, 1B-2 Battery Cell #16, Single Cell Charge per 0SPP-BAT010 of Administrative Procedure 0AP-25, BNP Integrated Scheduling, Rev.13
- Figure 3 for Work Package 161358-1, 1B-2 Battery Cell #24, Single Cell Charge per 0SPP-BAT010 of Administrative Procedure 0AP-25, BNP Integrated Scheduling, Rev.13
- Figure 3 for Work Package 171281-1, 1B-2 Battery Cell #46, Single Cell Charger per 0SPP-BAT010 of Administrative Procedure 0AP-25, BNP Integrated Scheduling, Rev.13
- Unit 2 down power reduction for drywell entry and Work Week 35 activities

The following documents were reviewed:

- Administrative Procedure, 0AP-025, BNP Integrated Scheduling, Rev.12
- BNP Risk Profile Week 35, September 6, 2001

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

.1 Failure of Unit 2, 2B-1 Battery Charger

a. Inspection Scope

On July 19, the Unit 2 operators entered Abnormal Operating Procedure 39, Loss of DC Power, for a low battery bus voltage on the 2B-1 battery. The battery voltage was 120 volts DC. Licensee investigation of the cause found that the 2B-1 battery charger failed. The operators removed both the 2B-1 battery and battery charger from service and transferred DC control power for the associated emergency bus DC loads and emergency diesel generator DC loads in accordance with operational procedures. The inspectors observed licensee troubleshooting activities on the 2B-1 battery charger during the effort

to determine the cause of the low battery bus voltage. The inspectors reviewed licensee activities to verify appropriate response and conservative decision-making associated with the use of annunciator procedures, Abnormal Operating Procedures, and operational procedures related to the low battery bus voltage.

b. Findings

No findings of significance were identified.

.2 Unit 2 Downpower With Drywell Entry

a. Inspection Scope

On August 8, the inspectors observed portions of a Unit 2 downpower evolution in which the licensee entered the drywell to add oil to a reactor recirculation pump motor as well as implementation of the use of a single steamjet air ejector plant lineup. The licensee also changed the reactor control rod pattern to have two control rods inserted around a previously identified fuel rod leak, prior to this only one control rod had been inserted. The inspectors observed activities in the control room and the plant during the downpower for proper use and adherence to procedures as well as maintaining the plant in a safe condition.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

.1 Vacuum Breaker and Valve Operability Evaluations

a. Inspection Scope

The inspectors reviewed selected the operability evaluations affecting risk significant mitigating systems listed below to assess as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered as compensating measures; (4) where compensatory measures were involved, whether the compensatory measures were in place, would work as intended, and were appropriately controlled; (5) where continued operability was considered unjustified, the impact on TS limiting conditions for operations (LCOs) and the risk significance in accordance with the SDP. These reviews were performed for the following:

- Unit 1 2-CAC-X18C Vacuum Breaker Operability

The following document was reviewed:

- ESR 01-00277, 2-CAC-X18C Light Indication, Rev. 0

- Unit 2 Service Water Pump Discharge Strainer Blowdown Valve Local Test Operability Test, OPT-24.11.L

The following documents were reviewed:

- Piping Diagram, Service Water System, Dwg No. D-02041, Sht 2
- Plant Program OPLP-01.5, Alternative Shutdown Capability Controls, Rev. 11

- Unit 2 2A Core Spray minimum flow valve open during injection

The following documents were reviewed:

- AR 00046204, 2-E21-N006A, Would Not Change State During Calibration
- Core Spray Minimum Flow Valve, 2-E21-F031A - Operability Determination

b. Findings

No findings of significance were identified.

.2 Unit 1 K-Line Breaker Magnetic Latching Mechanism Failure

a. Inspection Scope

The inspectors reviewed the operability evaluation for a 480 volt breaker overcurrent trip device associated with the feeder breaker to the DGB motor control center (MCC).

The following documents were reviewed:

- AR 00045038, K-Line Breaker Functional Failure
- Technical Report, 01-095, Brunswick Nuclear Plant - Failure Analysis of an ABB Circuit Breaker Magnetic Latching Mechanism

b. Findings

The inspectors determined that an unrecognized increase in risk existed due to the inoperability of a safety-related 480 volt breaker overcurrent trip device over the past three years. This issue was of very low safety significance (Green) based on the small probability of a bus fault actually occurring. The basis for three years was that the maintenance periodicity for checking the overcurrent protective trip features on those types of plant breakers was six years. The breaker had not been checked for six years. The application of the industry standard to determine the length of time the trip feature was inoperable assumed the breaker protective feature had failed in half of the six year period, which was three years.

On July 17, the inspectors reviewed Action Request (AR) 00045038, K-Line Breaker Functional Failure, and questioned the past operability of the 480 volt breakers discussed in the AR. The feeder breaker that was installed in, and supplied power by, the Unit 1, 480 volt emergency bus substation E-6 failed an overcurrent trip test. The overcurrent trip device detected the overcurrent condition but the magnetic latch plunger did not actuate to trip and unlatch the breaker to the open position. The concern associated with the



overcurrent trip feature not working in the feeder breaker was that a fault on the bus fed by the breaker would not be isolated as close to the fault as possible and would therefore cause the E-6 bus supply breaker to trip open due to the fault overcurrent being propagated and sensed at that breaker. This would result in the loss of the entire E-6 substation and the loss of emergency diesel generator 2. The E-6 bus also supplies power to the DGB MCC, and the Unit 1, division II, train B accident mitigating safety-related equipment. The following systems could be effected: core spray, residual heat removal, standby liquid control, emergency diesel generator 2, 250 volt battery charger, and service water.

The inoperability of the overcurrent trip device is more than minor because the degraded condition had a credible impact on safety in that if a fault occurred on the DGB MCC a loss of the division II accident mitigating systems would have occurred. The systems effected were listed above. The degraded condition affected both the initiating event and mitigating system cornerstones and was reviewed using the Reactor Safety SDP. A phase 2 and phase 3 assessment was performed because the safety function of the breaker overcurrent trip protective features did not function resulting in the assumption that the E-6 emergency bus, and several division II mitigating systems were lost. The phase 2 and phase 3 SDP review concluded that this issue was of very low safety significance (Green) based on the small probability of a bus fault actually occurring. No violations of NRC requirements were identified because the licensee met regulatory requirements associated with maintenance and quality controls of the breaker components.

A concurrent failure existed on Units 1 and 2 during the same time frame. The inspectors had identified a green finding in Inspection Report 50-325(324)/00-06, section 1R15, Operability Evaluations, for two 480V breakers failing overcurrent trip tests on Unit 2. The breakers supplied power to 2XD and 2XM MCCs and would have resulted in the loss of the E-8 emergency bus substation had a fault occurred on either one of those busses. The E-8 substation supplied power to the Unit 2, division II, train B accident mitigating safety-related equipment. The following systems were effected: core spray, residual heat removal, standby liquid control, emergency diesel generator 2, 250 volt battery charger, and service water. During the phase 2 and phase 3 assessment that was performed for the E-6 bus the analysis included the Unit 2 breakers failing to trip because the units share loads for mitigating systems on the E-6 and E-8 bus loads. The phase 2 and phase 3 SDP review concluded that this issue was of very low safety significance (Green) based on the much smaller probability of a bus fault occurring on two separate busses at the same time.

.3 Unit 1, 1B-2 Battery Technical Specification Inoperability

a. Inspection Scope

The inspectors reviewed the operability evaluation for the 1B-2 battery after the battery was declared inoperable due to exceeding TS requirements.

The following documents were reviewed:

- 0MST-Batt11Q, Batteries, 125 VDC, Quarterly Operability Test, Rev. 4, dated Jan 29, 2001; April 26, 2001; April 27, 2001; July 20, 2001, and July 25, 2001.

- Engineering Service Request 01-00221, Analysis of 125 VDC Batteries With Single Cell Unavailable.

b. Findings

A non-cited violation for inadequate corrective actions occurred when the Unit 1, 125 VDC 1B-2 battery was found to be inoperable following a quarterly battery surveillance test. The inspectors determined that inadequate corrective actions were taken by the licensee to maintain battery cells 3 and 57 within TS limits. The finding was of very low safety significance because no actual loss of safety function occurred, in that a loss of DC supplied loads did not occur (Green).

The inspectors reviewed the status and condition of the 1B-2 battery after the battery was declared inoperable due to exceeding the TS 3.8.6.B, Battery Cell Parameters. The LCO for this TS stated that with one or more batteries with one or more battery cell parameters not within Category C limits to declare the battery inoperable immediately. The Category C specified limit that was exceeded was specific gravity, which could not be more than 0.020 units below the average of all battery cells in the battery bank.

The inspectors found that on July 20, battery cells number 3 and number 57 in the Unit 1, 1B-2 battery were found to be 0.024 and 0.025 units, respectively, below the average of all the cells in that battery bank. The licensee declared the battery inoperable as required by TSs. The inspectors had previously observed on April 26, that the quarterly battery surveillance test found cell number 1 to be 0.022 units below the average of all cells, which was outside the TS Category C limit. The inspectors also observed that the licensee promptly replaced the battery cell the next day on April 27. The inspectors determined that on April 27 a battery surveillance test found that battery cell 3 and cell 57 specific gravity readings were 0.017 and 0.019 units respectively below the over all average cell specific gravity. The inspectors found that the previous quarterly battery surveillance, performed on January 29, found cell 3 specific gravity to be 0.018 units and cell 57 to be 0.010 units below the overall average specific gravity. The previous two quarters of surveillance tests, prior to January 29, showed the same two cells had the same magnitude of lower than normal specific gravity readings as those described above.

The inspectors determined that inadequate actions were taken by the licensee to maintain battery cells 3 and 57 within TS limits. The inspectors were informed by the licensee in May of the multiple options that were available to maintain the battery cells within TS limits and therefore the battery operable. The licensee determined that a degraded condition existed with the two cells and ordered two replacement cells. The licensee had knowledge that the cells would not be available for several months. However, no action was taken prior to the battery cells exceeding the TS limits that occurred in July. The inspectors concluded that the licensee took inadequate corrective actions on the 1B-2 battery associated with cell 3 and cell 57 to preclude the repetitive reoccurrence of exceeding the TS 3.8.6.B Category C limit as occurred on April 26.

The inoperability of the 1B-2 battery due to exceeding TS 3.8.6.B Category C limit for specific gravity is more than minor because the degraded condition of the battery had a credible impact on safety in that the more battery cells that were degraded directly affected the capability of the battery to perform its function of supplying power to mitigating system equipment; additionally inoperability of the battery effects the mitigating systems supplied DC loads. The inoperability of the battery effected the mitigating system cornerstone and was reviewed using the Reactor Safety SDP. A Phase 1 screening assessment was performed which dispositioned this finding as very low safety significance (Green) on the basis that no actual loss of safety function occurred, in that a loss of DC supplied loads did not occur.

10 CFR 50 Appendix B, Criterion XVI, Corrective Action, states in part that in the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above on July 20, when the Unit 1,1B-2 battery was found to be inoperable due to exceeding TS 3.8.6 limits for specific gravity on cells 3 and 57, it was identified that the licensee had taken inadequate measures to preclude repetition of being outside TS limits and repetition of battery inoperability as occurred on April 26, for specific gravity on cell 1. This Severity Level IV violation is being treated as a non-cited violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. This NCV is identified as NCV 50-325/01-03-01, Failure to Correct Unit 1 Battery Deficiencies. This violation is identified in the licensee's corrective action program as AR 00044684, 1B-2 Batteries Are a(1) Under New MR Criteria.

#### 1R16 Operator Work-Arounds

##### a. Inspection Scope

The inspectors reviewed the cumulative effects of operator work-arounds. The inspectors reviewed the work-arounds on reliability, availability, and potential mis-operations of the systems involved. The inspectors reviewed whether the operator work-arounds on Unit 1 and Unit 2 could increase an initiating event frequency or could affect multiple mitigating systems. The inspectors also reviewed the cumulative effects of operator work-arounds on operator correct and timely response to plant transients and accidents. The following item was reviewed:

Operator Work-arounds, Matrix and Aggregate Assessment Factor, dated August 12.

##### b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testinga. Inspection Scope

For the post-maintenance tests and the associated documents listed below, the inspectors reviewed the test procedure and witnessed the testing and/or reviewed test records to determine whether the scope of testing adequately verified that the work performed was correctly completed; and whether the test demonstrated that the affected equipment was capable of performing its intended function and was operable in accordance with TS:

- Unit 1 125V DC station battery cell replacements

The following documents were reviewed:

- Maintenance Surveillance Test, OMST-BATT11Q, Batteries, 125 VDC, Quarterly Operability Test, Rev. 4, dated July 24.
- TS 3.8.6, Battery Cell Parameters
- UFSAR, Section 8.3.2.1, 125/250 Volt DC Power supply and Distribution System

- Unit 2, 2B-2 Motor Generator Set Lubricating Oil Pump Repair

The following document was reviewed:

- WO Packages 00031348-03, 08, and 10, Lube Oil Pump 2B-2

- Unit 1 125V DC station battery 1B-2 Cell 56 Replacement

The following documents were reviewed:

- Work Order 171701-04, [PMT/E] Cell 56 - OMST-BATT11Q
- UFSAR, Section 8.3.2.1, 125/250 Volt DC Power supply and Distribution System

- Unit 2, 2-FW-FS-175, Feedwater Flow Switch Failure

The following document was reviewed:

- Action Request 48261, 2 Additional Wire Found terminated From the 2-FW-FS-175

b. Findings

No findings of significance were identified.

1R22 Surveillance Testinga. Inspection Scope

The inspectors examined the procedures and/or witnessed testing, and reviewed test records against the Updated Final Safety Analysis Report and TS to determine whether the scope of testing adequately demonstrated that the affected equipment was capable of performing its intended function and was operable in accordance with TS. The following tests and associated documents were reviewed:

- Periodic Test OPT-9.2, HPCI System Operability Test
- Periodic Test OPT-10.1.1, RCIC Operability Test
- Periodic Test OPT-12.2.A, Diesel Generator Monthly Load Test
- Maintenance Surveillance Test, 1MST-PCIS22R, PCIS Low Main Steam Line Pressure Instrument Chan Cal, Rev. 7
- Maintenance Surveillance Test, 1MST-APRM26Q, APRM F Channel Calibration/Functional Test, Rev. 19
- Periodic Test, OPT-07.2.4b, Core Spray System Operability Test - Loop B, Rev. 47

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed an emergency response training drill conducted on August 21, to evaluate drill conduct and the licensee's post-drill critique. The drills were conducted using the plant simulator and emergency facilities. The inspectors evaluated licensee's self-assessment of classification, notification, and protective action recommendation development.

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

**Cornerstone: Public Radiation Safety (PS)**

2PS3 Radiological Environmental Monitoring Program (REMP)

.1 Environmental Monitoring

a. Inspection Scope

The inspectors reviewed environmental activities to evaluate compliance with the Offsite Dose Calculation Manual, REMP, TS, and 10 CFR Part 20 requirements. The inspectors accompanied environmental monitoring personnel taking environmental samples and observed material condition of thermoluminescent dosimeters (TLDs) and air sampling

equipment. Environmental air sampler calibration records were reviewed. The inspectors reviewed and discussed with licensee personnel the results published in the Brunswick Annual Radiological Environmental Operating report for calendar year 2000 and the land use census report for 2001.

The inspectors reviewed the operability of the meteorological monitoring equipment and operator access to real time meteorological conditions.

The following activities were reviewed by the inspectors at the Harris Energy and Environmental Center during the week of August 20 - 24. The inspectors evaluated analytical environmental procedures, self-assessment reports, daily instrument control charts, interviewed laboratory technicians and supervisors to evaluate compliance with the Offsite Dose Calculation Manual, REMP, Technical Specifications, and Title 10 CFR Part 20 requirements. Inter-laboratory comparison program cross-check results for laboratories were reviewed and discussed with licensee personnel. Quality control (QC) activities for radiation assessment instruments in the environmental laboratory were evaluated. The inspectors reviewed selected National Institute of Standards and Technology Certificates for radioactive sources used in calibrations of radioactivity monitoring instrumentation. Environmental laboratory staff qualifications were also reviewed. The results of the Environmental Cross Check Program for Carolina Power and Light for year 2000 and First Quarter 2001 were also reviewed and discussed with licensee personnel.

b. Findings

No findings of significance were identified.

.2 Unrestricted Release of Material From The Radiological Control Area (RCA)

a. Inspection Scope

The licensee's criteria for the survey and release of potentially contaminated material was reviewed. The inspectors also evaluated the licensee guidance for responding to an alarm of the small tool monitors. The inspectors reviewed operation, calibration, and response checks for the licensee's portable contamination, vault, and small tool monitors.

b. Findings

No findings of significance were identified

.3 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed the following audits and assessments and discussed their results with licensee personnel:

- Brunswick Nuclear Power Plant Assessment Report, RR-ERC-00-01, Round Robin Environmental and Radiation Control (E&RC) Functional Area Assessment, July 18, 2000

- Brunswick, Assessment number AR 27031, Radiological Environmental Assessment, June 4 - 6, 2001

- Various condition reports initiated by the environmental monitoring group and evaluated corrective actions taken

- Audit 99-19-SP-C, Material Dedication and Laboratory Services, dated December 15, 1999

- Self-assessment for environmental monitoring program AR 26312

- Radiochemistry condition reports and their corrective actions

b. Findings

No findings of significance were identified.

**3. SAFEGUARDS**

**Cornerstone: Physical Protection**

3PP1 Access Authorization

a. Inspection Scope

The inspector evaluated licensee procedures, Fitness For Duty (FFD) reports, and licensee audits. Additionally, the inspector interviewed five representatives concerning their understanding of the behavior observation portion of the personnel screening and FFD program. In interviewing these personnel, the inspector evaluated the effectiveness of their training and abilities to recognize aberrant behavioral traits, physiological indications of narcotic and alcohol use, and work call-out reporting procedures. Licensee compliance was evaluated against requirements in the Brunswick Nuclear Plant Physical Security Plan and associated procedures, and 10 CFR Part 26, Fitness For Duty Programs. The following procedures were reviewed:

- SEC-NGGC-2130, Continued Behavioral Program
- SEC-NGGC-2140, Fitness For Duty Program
- SEC-NGGC-2142, For Cause Chemical Testing
- SEC-NGGC-2147, Reporting of Safeguards and Fitness For Duty Events
- SEC-NGGC, 2141, Fitness For Duty Unscheduled Work Call Outs

b. Findings

No findings of significance were identified.

3PP2 Access Controla. Inspection Scope

The inspector observed access control activities on July 31, August 1 and 2, and observed search/access control equipment testing on August 1. In observing the access control activities, the inspector assessed whether officers could detect contraband prior to it being introduced into the protected area. The protective barriers for the Final Access Control facility were inspected to ensure compliance with protection standards in the Physical Security Plan. Additionally, the inspector assessed whether the officers were conducting access control equipment testing in accordance with regulatory requirements through observation, review of procedures, and log entries. Preventative and post maintenance procedures were evaluated and observed as performed. Lock, combination, and key control procedures were evaluated, as well as, aspects of the site Access Authorization Program. Licensee compliance was evaluated against requirements in the Brunswick Nuclear Plant Physical Security Plan and associated procedures, and 10 CFR Part 73.55, Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage, and Part 73.56, Personnel Access Authorization Requirements for Nuclear Power Plants. The following documents were reviewed:

- Training and Qualification Plan
- Safeguards Event Logs for first through fourth Quarter, 2000
- Brunswick Self Assessment , BNP AA-00, dated May 1-31, 2000
- Access Control-Personnel-Vehicles and Packages, Revision 84
- Security Instruction, OSI-18, Lock and Key Procedure
- Maintenance and Testing of Security Systems
- Post Order #6, Final Access Control  
Security Instruction, OSI-09, Access Control, Personnel Identification and Badging

b. Findings

No findings of significance were identified.



## 4 OTHER ACTIVITIES

### 4OA1 Performance Indicator Verification

#### .1 Mitigating Systems

##### a. Inspection Scope

The inspectors reviewed the PI data reported to the NRC since the last verification inspection was performed. A sample of the plant records and data was reviewed and compared to the reported data. The licensee's corrective action program records were also reviewed to determine if any problems with the collection of PI data had occurred. The inspectors reviewed the following PIs for the period from June 2000 to July 2001:

- Safety System Unavailability, Emergency AC Power
- Safety System Unavailability, High Pressure Injection System (HPCI)
- Safety System Unavailability, Heat Removal System (RCIC)

The following documents were reviewed:

- Control room operator logs
- NRC Inspection Reports issued during the review period
- Licensee's PI data bases for the PIs listed above
- REG-NGGC-0009, NRC Performance Indicators, Rev 0, Attachment 4, Safety System Unavailability
- NEI 99-02 Regulatory Assessment Performance Indicator Guideline, March 2000, Rev 0

##### b. Findings

No findings of significance were identified.

#### .2 Physical Protection

##### a. Inspection Scope

The inspector evaluated Brunswick Nuclear Plant programs for gathering and submitting data for the Fitness-For-Duty/Personnel Reliability Program, Personnel Screening Program, and Protected Area Equipment Performance Indicators. The evaluation included Brunswick's tracking and trending reports and security event reports for the Performance Indicator data submitted from the first quarter to the fourth quarter of 2000. Licensee performance was evaluated against requirements in NEI 99-02, Revision 0, Regulatory Assessment Performance Indicator Guideline.

##### b. Findings

No findings of significance were identified.

#### 4OA2 Identification and Resolution of Problems

A Non-Cited violation (NCV) for inadequate corrective actions occurred when the Unit 1, 125 VDC 1B-2 battery was found to be inoperable following a quarterly battery surveillance. The inspectors determined that inadequate actions were taken by the licensee to maintain battery cells 3 and 57 in 1B-2 battery, within TS limits. The inoperability of the 1B-2 battery, due to exceeding TS 3.8.6.B, Category C limit for specific gravity, is more than minor because the degraded condition of the battery had a credible impact on safety in that the more battery cells that were degraded directly affected the capability of the battery to perform its function of supplying power to mitigating system equipment; additionally inoperability of the battery effects the mitigating systems supplied DC loads.

#### 4OA3 Event Follow-up

(Closed) Licensee Event Report (LER) 50-324/99-008-00: Condenser Pressure Sensing Line Drain Activities Result in Engineered Safety Feature and Reactor Protection System Actuation. The inspectors reviewed the circumstances association with the event and documented the inspection findings, which included a non-cited violation for failure to implement operating procedures, in NRC Integrated Inspection Report Nos. 50-325/99-07 and 50-324/99-07 dated November 22, 1999. The corrective actions for this event, included an engineering review to evaluate the necessity for draining the condensate pressure transmitter sensing lines, and a revision to an operating procedure, were adequate.

#### 4OA5 Other

##### Review of Institute of Nuclear Power Operations (INPO) Interim Report

The inspectors reviewed the INPO interim report dated June 20, 2001. The INPO evaluation was conducted on April 23, through May 4, 2001. The licensee's response to the findings in this report were due to INPO within 6 months of the letter date. The inspectors found that the report contained no safety issues that required immediate NRC attention and that it was consistent with the NRC's current perception of licensee performance.

#### 4OA6 Meetings, including Exit

##### Exit Meeting Summary

The inspectors presented the inspection results to Mr. J. Lyash, Director of Site Operations, and other members of licensee management at the conclusion of the inspection on October 15, 2001. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

40A7 Licensee Identified Violations

The following finding of very low significance was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as a Non-cited Violation (NCV).

NCV Tracking NumberRequirement Licensee Failed to Meet

50-325/324/01-03-02

Brunswick operating license condition 2D requires the licensee to implement all provisions of the Brunswick Physical Security Plan including physical security implementing procedures. Procedures SEC-NGGC-2130, Revision 10 and Operating Security Instruction (OSI)-09, Revision 83 require that unescorted access be suspended for individuals who have had their access denied based on an ongoing investigation. From September 19, 2000 through October 4, 2000, an employee whose access had been denied based on an ongoing investigation, continued to maintain the capability of gaining unescorted access to the Brunswick Nuclear Plant. This item is described in licensee corrective action program AR 0002887 and AR 00024378 (Green).

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

A. Brittain, Manager Security  
 D. DiCello, Manager Regulatory Affairs  
 N. Gannon, Plant General Manager  
 J. Gawron, Training Manager  
 W. Dorman, Manager Nuclear Assessment  
 J. Keenan, Site Vice President  
 E. O'Neil, Manager Site Support Services  
 J. Lyash, Director of Site Operations  
 J. Franke, Manager Brunswick Engineering Support Section  
 W. Noll, Manager Operations  
 E. Quidley, Manager Maintenance  
 H. Wall, Manager Outage and Scheduling

#### NRC

B. Bonser, Chief, Reactor Projects Branch 4

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

None

#### Opened and Closed During This Inspection

50-325/01-03-01	NCV	Failure to Correct Unit 1 Battery Deficiencies (1R15.3)
50-325/324/01-03-02	NCV	Failure to Suspend Unescorted Access for an Employee Whose Access Had Been Denied Due to an Ongoing Investigation (4OA7)

#### Closed

50-324/99-008-00	LER	Condenser Pressure Sensing Line Drain Activities Result in Engineered Safety Feature and Reactor Protection System Actuation (4OA3)
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#### Discussed

None