UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-325/94-02 and 50-324/94-02

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

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

Facility Name: Brunswick 1 and 2

Inspection Conducted: January 5 - February 4, 1994

Lead Inspector: R E Carroll for 2/17/94
R. L. Prevatte, Senior Resident Inspector Date Signed

Other Inspectors: P. M. Byron, Resident Inspector
M. T. Janus, Resident Inspector
R. E. Carroll, Project Engineer
C. Hughey, Resident Inspector - Grand Gulf
R. Bernhard, Senior Resident Inspector - Grand Gulf
R. Musser, Resident Inspector - Browns Ferry

Approved By: 2/18/94
H. O. Christensen, Chief Date Signed
Reactor Projects Section 1A
Division of Reactor Projects

SUMMARY

Scope:

This routine safety inspection by the resident inspector involved the areas of operations, maintenance, surveillance, engineering support, plant support, and other areas. Inspecticns were conducted during normal working hours, on back shift, deep back shift, holidays, and weekends.

Results:

In the areas inspected, a violation was identified involving an inadequate procedure for residual heat removal shutdown cooling reactor pressure instrumentation channel calibration. This resulted in an eight minute loss of shutdown cooling on Unit 1, paragraph 3.b.

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An unresolved item was identified involving the adequacy of testing of a containment atmosphere valve, paragraph 3.b.

The line management affirmation process (PN-31) has had a positive affect on plant personnel by establishing good communications and enforcing new and improved standards, paragraph 2.c.

A weakness was identified in the area of preventive maintenance on the control building air dryers, paragraph 4.

A weakness involving configuration control on ba'ance of plant equipment was also identified, paragraph 2.a.

Unit 2 operated at essentially 100% power for the reporting period.
Unit 1 was restarted on February 1, 1994.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

K. Ahern, Manager, Operations Support and Work Control
R. Anderson, Vice President, Brunswick Nuclear Project
G. Barnes, Manager, Operations, Unit 1
*M. Bradley, Manager, Brunswick Project Assessment
*J. Cowan, Plant Manager, Unit 1
R. Grazio, Manager, Brunswick Engineering Support Section
*J. Heffley, Manager Maintenance, Unit 2
*G. Hicks, Manager, Training
C. Hinnant, Director of Site Operations
G. Honma, Manager, Regulatory Compliance
*P. Leslie, Manager, Security
W. Levis, Manager, Regulatory Affairs
*R. Lopriore, Manager, Maintenance, Unit 1
G. Miller, Manager, Technical Support
C. Robertson, Manager, Environmental & Radiological Control
*J. Titrington, Manager, Operations, Unit 2
*C. Warren, Plant Manager, Unit 2
G. Warriner, Manager, Control and Administration
*E. Willett, Manager, Project Management

Other licensee employees contacted included construction craftsmen, engineers, technicians, plant operators, office personnel and security force members.

*Attended the exit interview.

Acronyms and initialisms used in the report are listed in the last paragraph.

2. Operations

a. Operational Safety Verification (71707)

The inspectors verified that Unit 1 and Unit 2 were operated in compliance with Technical Specifications and other regulatory requirements by direct observations of activities, facility tours, discussions with personnel, reviewing of records and independent verification of safety system status.

The inspectors verified that control room manning requirements of 10 CFR 50.54 and the Technical Specifications were met. Control operator, shift supervisor, clearance, STA, jumper/bypass, and daily/standing instruction logs were reviewed to obtain information concerning operating trends and out of service safety systems to ensure that there were no conflicts with Technical Specification LCOs. Direct observations of control room panels, instrumentation and recorded traces important to safety were

conducted to verify operability and that operating parameters were within Technical Specification limits. The inspectors observed shift turnovers to verify that system status continuity was maintained. The inspectors also verified the status of selected control room annunciators.

Operability of a selected Engineered Safety Feature division was verified weekly by ensuring that: each accessible valve in the flow path was in its correct position; each power supply and breaker was closed for components that must activate upon initiation signal; the RHR subsystem cross-tie valve for each unit was closed with the power removed from the valve operator; there was not leakage of major components; there was proper lubrication and cooling water available; and conditions did not exist which could prevent fulfillment of the system's functional requirements. Instrumentation essential to system actuation or performance was verified operable by observing on-scale indication and proper instrument valve lineup, if accessible.

Configuration Control

There were four configuration control events during the inspection period:

- On January 2, instrument drain valve 2-FO-IV-127 on the DG fuel oil system was found open when it was required to be closed. An operator identified the discrepancy by observing fuel oil seeping around the pipe cap on this instrumentation drain line. This valve was placed in the correct position and ACR 94-016 was written to document the event.

- On January 5, two AOs observed condensation on the suction piping of the 1A reactor feedwater pump (RFP). Pursuing this observation, they found the 1A RFP suction valve (COD-V49) open. This valve was under clearance 1-93-2672 (boundary extension H) which required the valve to be shut. This event was documented by ACR 94-009.

- On January 31, an auxiliary operator discovered in RFP Room 2A that the outlet inboard drain valve (2-FW-V48) on Feedwater Flow Valve 2-FW-FV-V47 was open. System Operating Procedure 2-OP 32, Condensate and Feedwater System Operating Procedure, requires the valve to be shut. The operator placed the valve in the proper position. The licensee is still investigating this event.

- On February 2, an auxiliary operator discovered that valves 1-B32-F019 and F020, Recirculation Sample Line Isolation Valves, were shut. The normal lineup is in the open position. Clearance 1-94-430 was hung on 1B32-F020 and canceled on January 29, 1994. The restored position for this valve should have been open as required by Operating

Procedure 1OP-02, Reactor Recirculation System Operating Procedure.

These four events were all identified by auxiliary operators and the valves were placed in the proper position under the direction of a licensed operator. None of the events resulted in equipment malfunctions. The licensee continues their investigation of these events.

The licensee is concerned about the increased number of configuration events. On January 28, the Operations Managers for both units assembled a coaching paper containing a description of recent events. The shift supervisors then briefed their shifts on these configuration events to heighten crew awareness.

On January 28, clearance 2-94-00562 was written to remove the lube oil storage tank conditioner from service to allow for filter replacement. The clearance was developed for the breaker for the lube oil storage tank transfer pump, 2-2TE-CT5-52, rather than the lube oil storage tank condition breaker, 2-2TE-CV9-52. This discrepancy was identified before the clearance was accepted and the proper tag was then hung. This is an example of the operators identifying a potential clearance problem.

The inspector discussed his concerns with the licensee. In addition to the crew briefings, they are reviewing the clearance process in an attempt to simplify it. They have organized a task force to study the process and revise procedure AI-58, Equipment Clearance Procedure. The licensee has concluded that simplification of the process should reduce the configuration errors. The licensee's difficulty in correcting this configuration control issue is considered a weakness.

b. Unit 1 Core Reload Verification (60710)

On January 13, the licensee performed a core reload verification. This was performed by three individuals, a QC inspector, a nuclear engineer, and an SRO, who observed the video taping of the location of each fuel element on a TV monitor. They independently recorded the fuel element serial number for each physical location. At the end of each row, two of the observers read their recorded data for that row to the third. This data was reviewed against the core load sheets. Any discrepancies were immediately resolved. The inspector observed this evolution and did not identify any problems. He also reviewed the procedural steps of procedure OENP 24.13, Rev. 2, Core Verification and found them to be adequate.

The above video tapes were also independently reviewed by an SRO and a nuclear engineer who compared their observations with the core reload sheets for an additional verification. The inspector reviewed the above tapes, including the tapes which verified core

height. The inspection for core height ensures that all fuel elements are fully inserted. The inspector independently verified that selected fuel elements were in their proper location. He also concluded that the licensee's process has sufficient depth to ensure that fuel is loaded into its proper location.

c. Unit 1 Restart Activities

In preparation for the Unit 1 startup following refueling, the licensee performed Periodic Test OPT-8.1, Reactor Pressure Vessel Hydrostatic Test, on January 21. The purpose of this periodic test is to provide for system pressure testing of the Class 1 Reactor Coolant Pressure Boundary piping and components in accordance with the ASME Boiler and Pressure Vessel Code. The inspector observed the start of the testing, the establishment of the test conditions, and performed portions of the drywell walkdown with the QC inspectors to identify any leaks following the four hour soak time at test pressure.

During his observation of the control room during this evolution, the inspector observed good control of the test evolution, proper use of procedures, and good communications and coordination of the different phases of this test. The inspector noted that a control operator had been dedicated to monitor and maintain test pressure conditions. This operator used the new plant process computer system to monitor the various test parameters in one location allowing him to identify and avert any adverse trends or degradations in condition. The licensee also assigned a second senior control operator on Unit 1 to assist and control the testing and startup evolutions, thereby eliminating some of the burden on the Unit 1 SCO. The inspector considered the use of the two additional dedicated operators to be a conservative approach to ensure the safe conduct of this test.

The inspector observed portions of the drywell walkdown following the four hour soak at test pressure to identify leaking piping and components. The walkdown was performed by QC personnel who had previously performed and were knowledgeable in this task. The QC inspector performed the walkdowns in accordance with OPT-80.1, and identified and quantified the existing leaks. The inspector discussed the inspection with the QC inspector. He did not identify any major deficiencies or adverse conditions during this inspection. The results of the inspection were reported to the control room and work tickets were processed for repairs. These repairs are scheduled to be re-inspected during a low power entry during the unit start up.

In accordance with CP&L's Plant Notice, PN-31, Systems Turnover to Operations and Line Management Self-Assessment of Readiness for Restart of Unit 1, each manager was required to assess and confirm his organization's readiness to support the safe and reliable restart and operation of Unit 1. These assessments, in

conjunction with the completion of the pre-startup work scope, were established to assure CP&L management that Unit 1 was ready to restart. The final step in this process required each section and selected unit managers to formally meet with the site Vice President and affirm that their area was ready for Unit 1 restart.

An inspector attended the following meetings to observe and evaluate this process: Training, Outage Management, Regulatory Affairs, Project Management, Nuclear Engineering, Maintenance, Environmental and Radiation Control, Operations, and Technical Support. The meetings lasted about one and a half hours, and were conducted in a very positive atmosphere. Numerous questions were asked by the site Vice President. If clear positive answers were not provided, that manager was sent back to research and/or provide actions to address the issue. The inspector noted that the Vice President's standards and expectations were clearly defined and communicated to his managers. This process appears to be establishing good communications and enforcing new and improved standards for the plant. It also appears to be having a positive affect on plant personnel and improving the plant's readiness for restart and successful power operations. This process and its implementation is considered a strength.

General Plant Operating Procedures (GP) were reviewed with respect to changes made since the restart of Unit 2 and associated operator training. The GPs reviewed were:

- GP-01, Prestartup Checklist, Revision 126
- GP-02, Approach to Criticality and Pressurization of the Reactor, Revision 47
- GP-03, Unit Startup and Synchronization, Revision 32
- GP-04, Increasing Turbine Load to Rated Power, Revision 28
- GP-05, Unit Shutdown, Revision 63
- GP-10, Rod Sequence Checkoff Sheets, Revision 20

Commensurate with the scope and significance of the GP changes made, associated operator training was considered by the inspector to be appropriate. The inspector also reviewed GP-09, Initial Criticality After Core Alterations, and verified that it was also included in the Unit 1 Startup/Power Ascension Plan. Accordingly, the inspector confirmed that the Power Ascension Plan was included in the startup training provided to the operators.

As specified in the Unit 1 Startup and Power Ascension Performance Objectives and Management Plan, normal shift makeup has been augmented with a shift test coordinator and designated test teams. The purpose of this restart shift augmentation is to assure testing is adequately controlled and conducted in accordance with the detailed Startup/Power Ascension Test Plan/Schedule developed by the Power Ascension Test Manager. The inspector reviewed the current Test Plan/Schedule (Revision 3) and 1SP-93-058, Unit 1 Startup and Power Ascension Guidelines and Checklists, Revision 1.

Based on this review, and the similarity to controls employed during the restart of Unit 2, the inspector considers the established Unit 1 controls to be appropriate for the conduct of startup/power ascension testing.

In addition, the licensee's staffing plans and watch bills were reviewed for the restart of Unit 1, including the areas of: operations shift manning, the shift test coordinators, nuclear engineers, startup duty managers, system engineering support, maintenance support, and engineering support. The personnel assigned to these tasks were knowledgeable in their respective areas and the staffing levels appear adequate to support Unit 1 restart.

On January 27, the inspector accompanied licensee personnel on a final walkdown of the Unit 1 drywell prior to closure. The purpose of the inspection was to complete or verify completion of previously identified items, and to ensure all areas of the drywell were clear of trash, debris, cables, hoses, etc. Prior to entry, the inspector attended a pre-job brief for personnel entering the drywell and reviewed a list of discrepancies previously identified by the licensee for disposition prior to final drywell closure and reactor startup. In addition, the inspector reviewed Administrative Procedure AI-127, Drywell Inspection and Closeout, Revision 1, dated June 12, 1993, which gives general guidance for drywell inspections.

During the walkdown, the inspector noted several minor housekeeping items, radiological control signs, ropes and sampling equipment, and temporary power cables. These observations were passed on to licensee personnel in the drywell to insure that these items were removed or secured prior to drywell closure. Licensee QC inspectors noted several additional housekeeping discrepancies. No temporary filters on or around the drywell coolers were observed, and no trash or debris was observed in any of the downcomers. In conclusion, housekeeping in the drywell was satisfactory and no significant equipment discrepancies were observed by the inspector. The inspector also verified that the licensee corrected all identified deficiencies prior to final drywell closeout.

The inspector walked down accessible portions of the following areas for equipment condition, general area cleanliness, combustible material control, and proper radiological controls. The following was observed:

(1) Intake structure (including circulating water motors/pumps)

- housekeeping was good
- some temporary heaters were in place for cold weather protection

- a large number of mussel/clam shells were observed on the sides of the inlet water boxes under the traveling screens
- the circulating water pump motor bearing oil cooler radiators were extremely corroded and rubber hose connections on outlet of cyclone separators for lube water to the circulating water pumps were spraying water
- heavy corrosion was noted around the traveling screens

(2) Turbine building (including feedwater heater rooms, turbine/generator general area, main steam stop and control valves and main steam lines general area, steam jet air ejector rooms, feedwater pump rooms, condensate booster pump rooms, heater drain pumps area, lower condenser bay area, condensate pumps area, turbine building sample room)

- SJAE rooms - excellent condition
- FWP rooms - excellent condition, associated instrument racks in good condition
- condensate booster pump room - good condition although not painted
- heater drain pump area - excellent condition
- lower condensate bay area - good condition - some performance monitoring instrumentation cables were in disarray in some areas
- condensate pump area - contaminated area but housekeeping was good - minor oil leaks observed on a couple of valve actuators
- turbine building sample room in very good condition
- MS stop/control valve, main steam line areas in good condition
- observed several remote cameras located for use during operations to reduce personnel radiation exposure - good practice
- use of tags on temporary power cables is a good practice. Tag denotes use, person responsible, and supervisor's name.

(3) Radwaste building

- large double doors (trouble tag dated 10/24/91) not fully closed (partially open - not able to be closed) and door from outside into Unit 1 CFD were (elevation 23') wide open (trouble tag dated 7/1/92) with sign saying contact SRO prior to propping open - per TS 3.11.2.1 - concern was that these areas were unmonitored released paths. Subsequent conversations with E&RC management indicated that they were aware of these pathways and potential releases from these areas had been evaluated per ENP-54

- Unit 1 precoat tank mixer motor held on with a rope
- In general, housekeeping in radwaste was very good

(4) Service water building

- lots of components identified by trouble ticket as corroded
- bottom two floors painted and in very good shape
- top floor prepped for painting
- work ongoing in the area, pump replacement in process
- no significant discrepancies observed on any Unit 1 or Unit 2 nuclear service water pumps

(5) Containment Atmospheric Dilution and Containment Atmospheric Control Building, Augmented Off Gas Building, Transformer Yard, Switchyard and Battery Rooms - no discrepancies were identified

In summary, housekeeping in the areas toured was very good. Efforts to provide high quality painting of floors and walls was very noticeable. Discrepancies observed were provided to licensee management for resolution.

The inspector performed a walkdown of all of the elevations of the Unit 1 Reactor Building. This walkdown was performed to identify any potential problems which needed to be addressed prior to restart and to verify that all previously identified discrepancies were corrected.

The major systems, components and areas inspected during this tour included: core spray pump rooms, CRD pumps, RHR rooms, HPCI room, RCIC system, RHR heat exchangers, HCUs, RHR service water booster pumps, RBCCW, SBGT trains, SLC, reactor building ventilation room, the refueling floor, and the spent fuel pool.

During the walkdown, the inspector looked for indications of material degradations, component malfunctions, and valve and breaker mispositionings, removal of temporary power supplies and work equipment, and general housekeeping problems. The inspector identified a grease leak on a valve operator located on the D loop of the RHR system. This leak was reported to the system engineer who initiated a trouble ticket for its repair. The inspector also identified a minor leak on a flange on the discharge of the D RHR Service Water Booster Pump. This leakage was reported to the unit senior control operator.

The general appearance of the Unit 1 reactor building has greatly improved, with new paint on many systems, floors and walls, and a general clean up and decontamination effort to maintain contaminated areas at a minimum. The painting and cleaning effort will continue during and after the unit startup. The inspector also noted during the tour that there were a number of light bulbs

in need of replacement. These were captured by the licensee's own identification program. Other than the two minor discrepancies noted above, no major problems or issues which would prevent the successful startup of the unit were identified.

The inspector also reviewed the control of components and equipment associated with safety systems. The inspector conducted tours of the control room and performed walkdowns of the Reactor Turbine Gage Boards and verified that all the safety systems were properly aligned. The inspector reviewed the established controls for valve manipulations, position changes, and the valve lineup process and found them acceptable. He also reviewed the control room logs and the daily work tickets to verify that identified discrepancies and deficiencies were tracked and captured by the system for evaluation and repair.

Additionally, the inspector followed the scheduled and emergent work activities in the areas of maintenance, plant modification, startup testing, and system turnovers. Each of these activities progressed well and all work needed to support Unit 1 restart was satisfactorily completed. All startup preparations were completed on January 31, and Unit 1 restarted on February 1, 1994. Startup and power ascension testing commenced on February 2. The following problems have occurred since startup.

- Air trapped in the reactor water level reference legs resulted in declaring several instruments inoperable until the instrument lines were purged.

- A temperature monitor on the drywell was not working and was replaced.

- An air leak in the valve actuator for a recirculation pump seal staging return line developed a leak in the actuator. This was rebuilt.

- A small steam leak on SRV J was identified by increasing tail pipe temperature. The valve will be cycled and monitored to see if leak stops as pressure and temperature increases.

- A phase to phase short in the bus bars for 480 MCC 1TA resulted in an electrical fire that extinguished itself when de-energized.

All of the above items were effectively responded to and repaired in a timely manner except the leaking SRV and MCC problem which were still being worked at the conclusion of the inspection period. The inspector noted that on-shift communications were excellent. Thorough and detailed pre-job briefings were being conducted prior to the start of important tasks or evolutions. Maintenance and other support organizations provided timely

assistance when needed. Unit and site management have been very visible in the plant during Unit 1 restart. Other than the above minor problems, no significant deficiencies have been identified.

Violations and deviations were not identified.

3. Maintenance

a. Maintenance Observation (62703)

The inspectors observed maintenance activities, interviewed personnel, and reviewed records to verify that work was conducted in accordance with approved procedures, Technical Specifications, and applicable industry codes and standards. The inspectors also verified that: redundant components were operable; administrative controls were followed; tagouts were adequate; personnel were qualified; correct replacement parts were used; radiological controls were proper; fire protection was adequate; quality control hold points were adequate and observed; adequate post-maintenance testing was performed; and independent verification requirements were implemented. The inspectors independently verified that selected equipment was properly returned to service.

On January 17, the licensee identified a body to bonnet leak of approximately 1 gpm on the Unit 1 No. 2 stop valve, 1-MS-SV-2. WR/JO 94-ABBT1 was written to replace the body to bonnet gasket. The inspector observed preparations to remove the bonnet. It appeared that efforts were performed sequentially rather than in parallel. Examples of this are as follows: the floor plugs were removed, then tools assembled at the job site, the Herculite was placed on the grating under the shop valve, and finally the craft commenced loosening the bonnet bolts. The inspector observed the work activity for approximately 2 1/2 hours and during that time, the Herculite was spread out under the stop valves and three nuts were loosened. The mechanics had difficulty in loosening the nuts with the "hi-torque" device. The inspector noted that three supervisors observed the work effort and a maintenance foreman made several appearances. This effort was later satisfactorily completed.

The inspector reviewed the work associated with WR/JO 94-ABBT1 and found it adequate. There was adequate engineering and HP support. The inspector found the work practices to be acceptable. The work effort took two days and was field completed on January 19.

b. Surveillance Observation (61726)

The inspectors witnessed/reviewed portions of the following test activities:

OPT 4.1.1, Reactor Building Vent Exhaust Monitoring System Functional Test

On January 31, during the performance of OPT 4.1.1, the STA found that the Hardened Wetwell Vent Valve, 1-CAC-V216, was not on the list of valves being tested. The STA reviewed RCI 2.6, Cross Reference to Technical Specifications, and Technical Specification 3.6.3, and concluded that CAC-V216 should have been tested during the performance of OPT 4.1.1. Subsequently, the licensee performed a partial OPT 4.1.1 which includes CAC-V216. ACR 94-052 was written to document this issue.

Plant Modifications PM 91-001 and 92-073 installed the Hardened Wet Well Vents for Units 1 and 2, respectively. The CAC V-216 valve is wired such that it can be operated manually from the RTGB with an override switch or closed automatically by a Group 6 isolation signal. The licensee's initial investigation determined that the post modification testing did not test the valve's operation from an isolation signal. The inspector reviewed procedure RCI 02.6, Cross Reference to Technical Specifications, Revision 12, Appendices A and B, dated November 4, 1993. Appendix A lists 1-CAC-V216, Hardened Wetwell Vent Outboard Isolation Valve and Appendix B lists 2-CAC-V216, Outboard Suppression Pool Vent Valve as primary containment isolation valves. However, OPT 04.1.1, Revision 41, dated December 14, 1993, does not test these valves. The licensee, as part of the resolution to the ACR, is conducting an investigation to determine if these valves are mis-classified. This issue is considered an Unresolved Item (URI 94-02-01), Inadequate Surveillance Procedure, pending the inspector's review of the licensee's resolution of ACR 94-52.

OPT 12.8.C, Diesel Generator Operability Test

The inspector observed the performance of an operability performance test on DG No. 3 in preparation for a maintenance outage on DG No. 1. The inspector observed that the operators used the procedure, and the test was well supported by maintenance, QC, and the shift supervisor. The inspector did not identify any deficiencies and considered the crew's performance to be acceptable.

Loss of RPS Bus A Power

During the restoration of 1MST-DG11R, DG-1 Loading Test, Unit 1 experienced a loss of power to the A Reactor Protection System. The loss of power resulted in the following ESF actuations: closure of the Main Steam Line Drain Inboard Isolation Valve 1-B21-F016; closure of the Reactor Water Cleanup Isolation Valve 1-G31-F001; and isolation of the Reactor Building HVAC system. Other systems which would have actuated were already running or

isolated in support of the test. The licensee made a four hour report in accordance with 10 CFR 50.72 (b)(2)ii.

This event occurred while preparations were being made to parallel DG No. 1 with offsite power to restore the normal electrical alignment following the completion of the test. Emergency Bus 1 was powered from DG No. 1 during the test. During this process, the control operator improperly adjusted the DG frequency which resulted in the trip of EPA breaker 2 and the loss of power to RPS bus A. Following this event, the licensee aligned RPS bus A to the alternate power source and commenced restoration of the systems to their normal alignments. All systems functioned as designed. No further problems were experienced or noted.

Diesel Generator Load Tests

In preparation for restart of Unit 1, the licensee also performed the required refueling outage DG load test. These tests are conducted to determine the operability of the DG Emergency Power System. The tests provide a loss of power signal to the E Bus being tested, in conjunction with a start signal for the decisional ECCS loads. The following tests were performed: 1MST-DG11R, DG No. 1 Loading Test; 1MST-DG12R, DG No. 2 Loading Test; 2MST-DG11R, DG No. 1 Loading Test; and 2MST-DG12R, DG No. 2 Loading Test.

The inspector attended the pre-job brief prior to the performance of 1MST-DG11R on January 26, and noted that it was comprehensive with an emphasis on potential problems and safety. Following the brief, one inspector witnessed the performance of this test from the control room while a second inspector was present in the DG No. 1 control cell. This test provided a loss of power to Emergency Bus E1 in conjunction with a start signal for the Unit 1 Division 1 ECCS loads. All four diesels started and DG No. 1 picked up its required loads. During the performance of this test, the strip chart recorder used to record response time data indicated the 1X LOCA Jet Assist Solenoids remained open for approximately 27 seconds during this test. It was later determined that this was a problem with the recorder. As a result, special procedure O-SPP-LOG005 was performed on January 29 and satisfactorily retested the Jet Assist logic portion of this test. The special procedure verified that the 1X LOCA Jet Assist solenoid only remained open for 4.3 seconds which is within the required range of 3.6 to 4.4 seconds.

While parallelling DG No. 1 with offsite power, an operator error resulted in the loss of power to the A RPS and several ESF actuations previously described in this report. The inspector verified that the licensee made the required four hour notification.

An additional problem with a chart recorder also resulted in having to reperform 2MST-DG11R on DG No. 1. The inspector verified that the test was satisfactorily reperformed on January 27. No other problems were identified during the performance of this test.

On January 27, the inspector witnessed the successful performance of 1MST-DG12R. This test provided a loss of power to Emergency Bus E2 in conjunction with a start signal for Unit 1, Division II, ECCS loads. The inspector was present in the DG control cell for the performance of this test and verified that all DGs started and ran as required, and that DG No. 2 loaded as required. During the performance of this test, a minor exhaust leak was identified on the number 2L cylinder which is scheduled to be repaired during the next maintenance window. Test results indicated that the 1X LOCA logic jet assist timing relay (JATR) timed out (i.e., jet assist solenoids remained open) approximately 6.37 seconds, which is longer than the required 3.6 to 4.4 second time period. The licensee identified and evaluated this issue in EWR 13167 and determined that it was not an operability concern, as the 6.37 second jet assist was bounded by an analyzed nominal 9 second combined 1X and 2X LOCA logic jet assist to the EDG's turbocharger. As the 1X LOCA JATR was energized for 2.37 seconds longer than its nominal 4 second value, the inspector felt that the EWR should have analyzed the 11.37 seconds of potential 1X and 2X combined LOCA logic jet assist (i.e., 9 seconds + 2.37 seconds). This concern was discussed with the system engineer. Subsequently, the licensee re-evaluated the operability concern (11.37 seconds of combined jet assist) in EWR 13169. This new EWR (based on the findings of EER 91-0151, which had previously determined that jet assist could be applied for 12.16 seconds without affecting the control air loads for the associated EDG) found the 11.37 seconds of combined jet assist not be an operability concern. The inspector reviewed EWR 13169 and found no discrepancies or problems with this new evaluation.

The final required diesel loading test, 2MST-DG12R, was performed satisfactorily on January 27, and observed by the inspector. This test provided a loss of power to Emergency Bus E2 in conjunction with a start signal for the Unit 2, Division II, ECCS loads. No problems or issues were identified during the performance of this test.

During observation of the performance of these tests, the inspector noted that all the tests were performed in a controlled manner in accordance with the procedures and requirements covered in the pre-job brief. The inspector noted a continued good use of the procedure and that verified copies were present and in use by the various test personnel at all testing locations. The inspector also noted that the requirement of the pre-job brief of strict adherence to proper communications between the control room

and the test personnel in the field was followed. The above tests were well coordinated efforts with good performance by the test crews.

Loss of Shutdown Cooling

On January 11, following the performance of Maintenance Surveillance Test (MST) 1-MST-RHR27M, RHR Shutdown Cooling Reactor Pressure Instrument Channel Calibration, the licensee experienced a loss of shutdown cooling. The loss of shutdown cooling resulted from the closure of the inboard shutdown cooling isolation valve (1E11-F009) following the removal of the testing clearance and the restoration of power. The closure of the 1E11-F009 valve caused the 1A RHR pump to trip, resulting in the loss of shutdown cooling to the Unit 1 reactor. Shutdown cooling was lost for approximately eight minutes.

At the time of the event, Unit 1 was in the process of reloading fuel, with approximately 421 out of 560 fuel bundles reloaded into the vessel. During the eight minutes that shutdown cooling was lost, no changes in vessel clarity or fuel pool temperature were noted. Little or no decay heat was present, since the unit had been in shutdown conditions since April 1992.

The loss of shutdown cooling was the result of procedural inadequacies. The procedure allows the performance of the testing with shutdown cooling in service. As a prerequisite, 1MST-RHR27M directs the placement of clearances on both 1E11-F008 and 1E11-F009 (the outboard and inboard shutdown cooling isolation valves, respectively) to maintain shutdown cooling . These clearances de-energized the breakers for the valves, preventing their closure during the testing. These steps had been added to the procedure to allow testing with shutdown cooling in service during the last procedure revision on April 25, 1991. The procedure has been performed 20 times since then; however, shutdown cooling was not in service during the performance of these tests.

Problems of this nature have not been previously identified during the performance of this test. Prior to Revision 8, dated June 1, 1990, the test was performed using jumpers to prevent the isolation relays from de-energizing. Revision 8 deleted the steps to install the jumpers in accordance with the philosophy change to not use jumpers during testing. Revision 9, dated April 25, 1991, added the steps to de-energize the F008 and F009 valves if shutdown cooling was in service. Neither Revision 8 nor 9 added steps to reset the logic prior to re-energizing the valves.

The procedural inadequacy involved the failure to reset the group isolation logic following the completion of the trip testing of each logic channel. In accordance with procedure 1MST-RHR27M, a trip signal is inserted for the 1E11-F009 valve, verified, reset, and tripped again. Following the second verification of the trip

signal, the procedure directs the tester to perform the same sequence of steps for the 1E11-F008 valve. Following completion of the testing activities, the procedure failed to provide direction to reset the remaining logic trip signal prior to re-energizing the breakers. This failure to reset the trip signal resulted in the 1E11-F009 valve stroking closed on the re-energization of its breaker. This procedural inadequacy is contrary to the requirements of 10 CFR 50, Appendix B and is a Violation, Inadequate Test Procedure (325,324/94-02-02).

The control operator and the senior control operator recognized the condition immediately when the core spray or RHR pump running annunciator alarmed and the 1E11-F009 valve was observed in mid position. An immediate attempt to reopen the valve failed. The operator then depressed the group isolation reset pushbuttons, the valve was successfully opened, and the A loop of RHR was returned to its shutdown cooling line-up. In accordance with the requirements of 10 CFR 50.72, the licensee made the appropriate NRC notifications.

The licensee's proposed corrective actions were to revise 1MST-RHR27M to include steps to reset the isolation logic and verify that the isolation relays are energized prior to re-energizing the breakers for the isolation valves. In conjunction with this effort, the licensee plans to review other related MSTs which test isolation circuitry and verify that the procedures are adequate to keep this from recurring.

Within the areas inspected, one violation was identified.

4. Engineering Support

Control Building Instrument Air Dryer

The control room air conditioners tripped on January 17, due to low instrument air pressure. The control building HVAC instrument air system provides air to the control building HVAC dampers. This closure rendered 2A and 2B Emergency Air Filtration (CBEAF) system inoperable and placed Units 1 and 2 in an LCO which required that a CBEAF system be restored or that both units be placed in hot shutdown within 12 hours [TS 3.7.2(a)(2)]. An investigation by the licensee revealed that the instrument air dryer was blocking instrument air flow. The dryer was bypassed and instrument air and both CBEAF systems were restored.

It was initially believed that due to extremely cold weather, possible freezing had occurred due to moisture entrained in the instrument air system. However; further investigation revealed that the dryer system had partially lost its refrigerant charge which resulted in it failing to remove the moisture in the instrument air system. This allowed condensate to build up in the air system and the extremely cold weather caused it to freeze. The dryer refrigerant was recharged and its operation observed to ensure it was functioning correctly.

The licensee initiated a root cause evaluation of this item to determine the cause and needed corrective actions. It was determined that this system did not have adequate preventive maintenance assigned. The past maintenance on this component and other refrigerant cooling systems had in the past been under a contract with a local HVAC contractor. The licensee has found this practice to be unsatisfactory and is presently developing a maintenance program for these components to be accomplished by plant personnel. This is identified as a weakness in the existing preventive maintenance program.

An additional issue identified that the failures of this single instrument dryer, which caused the loss of both CBEAF systems may not meet single failure criteria. The licensee performed a 10 CFR 50.59 evaluation of this issue and determined that the failure of the air dryer system was the result of a passive failure (loss of the pressure integrity of the refrigerant tubing) of mechanical components and was not required to met the single failure criteria.

The inspector reviewed the 10 CFR 50.59 evaluation, met and discussed this issue with the engineer who performed the evaluation, and attended a PNSC presentation on this issue. This conclusion was accepted by the PNSC. The inspector also found the evaluation to be reasonable and acceptable. The inspector will follow the licensee's actions in developing and implementing a PM program on this equipment.

Violations and deviations were not identified.

5. Plant Support (71707)

a. Radiological Controls

The inspectors verified that the licensee's HP policies and procedures were followed. This included observation of HP practices and a review of area surveys, radiation work permits, posting and instrument calibration.

b. Security

The inspectors verified by general observations that: the security organization was properly manned and security personnel were capable of performing their assigned functions; persons and packages were checked prior to entry into the PA; vehicles were properly authorized, searched and escorted within the PA; persons within the PA displayed photo identification badges; personnel in vital areas were authorized; effective compensatory measures were employed when required; and security's response to threats or alarms was adequate.

c. Fire Protection

On January 28, at approximately 10:30 a.m., the inspector observed control room response to a suspected fire in the Unit 2 control

room back panel area. The response was initiated when an operator smelled what seemed to be an electrical fire in the area. No open flames or smoke were ever observed by the operators or the inspector. The fire brigade was assembled and quickly responded to the back panel area. An announcement was made by control room personnel over the PA system to all plant personnel.

After a thorough search of the backpanel area revealed no fire, a continuous fire watch was established in the area. The actual source of the smell was never determined although a burned out cabinet cooling fan was suspected. The smell dissipated quickly after the incident. The inspector concluded that the initial response by control room personnel and the fire brigade was prompt and followup actions were adequate.

Violations and deviations were not identified.

6. Other Areas

a. Evaluation of Licensee Self-Assessment (40500)

The inspectors attended selected Plant Nuclear Safety Committee meetings conducted during the period. The inspectors verified that the meetings were conducted in accordance with Technical Specification requirements regarding quorum membership, review process, frequency, and personnel qualifications. Meeting minutes for those meetings not attended were reviewed to confirm that decisions and recommendations were reflected in the minutes and followup of corrective actions was completed.

At the January 13 meeting, a supplemental response to NOV 325,324/93-39-01 on the DG LOCA issue, an administrative procedural change to eliminate a HPCI door alarm, a procedural change for space control authority, and an update on planned testing for the testing of the reactor vessel reference leg water level modification were discussed. The supplemental response was sent back to have NED, Technical Support, and Regulatory Compliance provide additional clarification. The other three issues were items that did not require PNSC approval but were presented to provide information updates which had been previously requested by the PNSC. This meeting had active participation and good questions were asked by the PNSC members.

The January 28 meeting was conducted to complete the requirements of Administrative Instructions, Drywell Inspection and PNSC Outage Prestartup Checklist (AI-96). AI-96 is used to establish a PNSC/managers startup checklist which tracks and statuses each plant group's responsibilities and ensures that necessary issues are also closed and the unit is ready for restart. This meeting lasted for the majority of the day and each unit manager provided a detailed discussion of the activities that had been completed and provided a listing of all activities to be completed prior to

startup. The inspector attended, reviewed, and evaluated the listing of startup exceptions that were provided by each manager. Although the meeting was lengthy, it provided adequate detail on each issue to ensure that the correct decision for readiness could be made by the PNSC and unit general plant manager. There were several issues presented at the meeting that required completion prior to Unit 1 restart. The inspector received a listing of the open items and independently tracked these items until their completion to ensure plant readiness for restart. Overall, the above process as prescribed by AI-96 was found to be an effective management tool to ensure restart readiness.

There were no significant concerns identified relative to the PNSC meetings attended. The resolution of safety issues presented during these meetings was considered to be acceptable.

b. Meetings with Local Officials (94600)

The Senior Resident Inspector (SRI) conducted several informational meetings with local officials at towns near the plant to provide an update on the NRC's organization, mission, and responsibilities. He also provided a summary of the plant status, business telephone numbers of appropriate NRC contacts, and a brief resume of the NRC resident inspectors. While making arrangements for these meetings, the inspector offered to make a presentation to the town and/or county governing board or meet with officials selected by the municipal governing body.

The SRI met with the Mayor and Council of Yaupon Beach in a regularly scheduled meeting on January 10, at 7:00 p.m. After the presentation, several questions involving past plant problems and current plant status were answered.

On January 11, the SRI and a resident inspector attended the City Council meeting at Carolina Beach at 7:30 p.m. After the presentation, the Mayor asked several questions involving the repairs on the reactor vessel shroud and plant readiness for restartup. These questions were answered and the SRI offered to respond to any future questions the Mayor or Council may have.

On January 18, the SRI and the Region II Branch Chief for Reactor Projects, Branch 1, met with the Wilmington Mayor and Council during a regularly scheduled council meeting at 6:30 p.m. No questions were asked following the presentation. The SRI offered to respond to any future questions the Council or Mayor may have.

On February 1, the SRI met with the Mayor and Council of Boiling Spring Lakes during their regularly scheduled meeting at 7:00 p.m. After the prepared NRC presentation, several questions were asked about a local issue involving a proposed quarry near the plant site. The SRI stated that this issue would be reviewed by NRR and any questions regarding this issue should be referred to the NRR

Project Manager. An offer to provide his telephone number was also made. No additional questions were asked.

The inspector is currently scheduled to meet with the town of Kure Beach on February 15 to complete this series of meetings. That meeting will be reported in Inspection Report 325,324/94-04.

c. Nuclear Safety Review Committee (40500)

The inspector attended the BNP Nuclear Safety Review Committee (NSRC) meeting held on January 12. The meeting was chaired by the Site Vice President and was attended by the CP&L Vice President - Engineering and two outside members, Messrs. Byron Lee and Ken Harris. The NSRC reviewed previous Action Item status and was given briefings by various site organizations. The outside members raised questions relative to the differences between the site and the other two CP&L sites. The Vice President-Engineering raised many issues from lessons learned at Robinson and questioned Brunswick's vulnerability to the same issues. The inspector viewed the discussions to be frank and open and questions were asked about potential problems which the site had not considered. The inspector believes that the NSRC provided added value to the licensee's review process.

Violations and deviations were not identified.

7. Licensee Action on Previous Findings (92701, 92702)

(Closed) IFI 93-55-01, Eighteen Month Surveillances. The Readiness Assessment Team identified that Unit 1 had some 18-month surveillances which would expire within 18 months of startup. On January 19, in a public meeting, the licensee informed the NRC that they planned to refuel Unit 1 in Spring 1995, and no required surveillances would expire prior to that time. They additionally stated that in the event a required 18-month surveillance was about to expire, they would shut the unit down to perform the surveillance. This response addressed the Readiness Assessment Team's concern.

(Closed) IFI 325/93-55-03, Refueling Floor Activities. The Readiness Assessment Team identified that several problems had occurred on the refueling floor involving the work associated with the reactor vessel shroud repair and other refueling floor activities. They noted that the licensee and other inspection groups had identified problems involving personnel performance and management oversite of contractor activities.

Inspection Report 325,324/93-54 covered the completion of the reactor vessel shroud repair activities, the start of core reload activities, and identified equipment and personnel problems involving core reload, operation of the refueling bridge, and the lack of exclusion of foreign material from the refueling floor area.

After identification of the above problems, the licensee took positive steps to strengthen their oversite and control of these activities by appointing a stronger manager for the refueling floor activities and increased NAD and QC oversite of this area. Subsequently, the reactor vessel head was set and tensioned on January 17, and the unit entered Mode 4. The preparations for Unit 1 restart appeared to be progressing without significant problems until activities involving installation of the drywell dome started. The cleaning activities associated with the efforts (i. e., removal of the flange protective covers, O ring removal, and flange cleanup) resulted in the creation of airborne activity which spread contamination on three elevations of the Unit 1 reactor building. This resulted in a work stoppage, cleaning of the contaminated areas, and reassessing how this task should be accomplished. Due to this occurrence, a Health Physics/Radiation Protection Specialist Inspector was dispatched from Region II to investigate this event and evaluate the licensee's corrective actions. (This will be documented in Inspection Report 325,324/94-01.) After cleanup of the above contamination, the drywell dome was installed on January 22, 1994.

(Closed) Unresolved Item 325/93-58-03, Concurrence for Alternate Method of Signing Document Approvals. A regional inspector identified that GE's engineering specifications and drawings did not have hand written approval signatures on the face of the document. This issue was discussed with NRR and they had a concern about the use of electronic signatures for E-mail. Subsequent discussions with GE revealed that they use a Computer Assisted Drawing (CAD) process for their drawings. They use an alternative method which is in accordance with ANSI 45-2.9 and NQA1.

On January 6, GE discussed this issue with NRR. Since GE does not use electronic signatures in E-mail and approval signatures for CAD generated drawings are maintained in a method which is in accordance with ANSI 45-2.9, NRR no longer had concerns. GE documented the resolution of this issue in a letter to the licensee (LLA-94-040) dated January 27, 1994. The inspector discussed GE's response with Region II and NRR and both are satisfied with GE's actions. This item is closed.

(Closed) TI 2515/112, Licensee Evaluations to the Environs Around Licensed Reactor Facilities. The inspector reviewed the licensee's program to evaluate the environs around the plant. This is not a formal program but is included under their program for annual FSAR updates. The inspector reviewed Regulatory Compliance Instruction (RCI) 04.1, FSAR Changes, Revision 2, and noted that the procedure does not specifically address this issue. The inspector's review determined that the licensee has an informal program to review changes in the environs which could affect the plant. The licensee indicated to the inspector that they plan to formalize the program by including it in the next revision of RCI 04.1.

The inspector reviewed the 1993 FSAR submittal and noted that it contained updated information relating to changes in the environs including a new natural gas pipe line which crosses CP&L property. The

inspector noted a small discrepancy in the physical location of the pipe line. The inspector informed the licensee who stated that the correction would be included in their next annual FSAR update.

The North Carolina Division of Emergency Management has a Brunswick Task Force which meets monthly. This task force is composed of representatives from the state, Brunswick and New Hanover Counties, the Highway Patrol, Coast Guard, the licensee, and others. The task force reviews drills, improved communications, cooperation and changes, as well as other significant factors affecting emergency management. The licensee's representative disseminates task force information among the affected organizations for their review.

In addition, the inspector reviewed the licensee's submittal to the NRC for the updated organizational structure, GLS-93-216, dated December 31, 1993. He also reviewed the licensee's request asking that the state deny Martin Marietta's application for a mining permit for a quarry to be located near site boundaries. The inspector concluded from his review that the license's program is adequate and addresses the necessary elements.

Violations and deviations were not identified.

8. Exit Interview (30703)

The inspection scope and findings were summarized on February 4, 1994, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings in the summary and listed below. Dissenting comments were not received from the licensee. Proprietary information is not contained in this report.

Item Number	Description/Reference Paragraph
94-02-01	Unresolved Item, Inadequate Surveillance Procedure (paragraph 3.b.)
94-02-02	Violation, Inadequate Test Procedure (paragraph 3.b)

9. Acronyms and Initialisms

ACR	Adverse Condition Report
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
AO	Auxiliary Operator
BNP	Brunswick Nuclear Project
CBEAF	Control Building Emergency Air Filters
CRD	Control Rod Drive
DG	Diesel Generator
ECCS	Emergency Core Cooling System
ENP	Engineering Procedure
ESF	Engineered Safety Feature

EWR	Engineering Work Request
FACTS	Facility Automated Commitment Tracking System
FSAR	Final Safety Analysis Report
GP	General Plant Operating Procedures
HCU	Hydraulic Control Unit
HP	Health Physics
HPCI	High Pressure Coolant Injection
HVAC	Heating Ventilation and Air Conditioning
INPO	Institute of Nuclear Power Operations
IPBS	Integrated Planning, Budgeting and Scheduling
JATR	Jet Assist Timing Relay
LCO	Limiting Conditions for Operation
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
MST	Maintenance Surveillance Test
NAD	Nuclear Assessment Department
NED	Nuclear Engineering Department
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NSRC	Nuclear Safety Review Committee
PA	Protected Area
PM	Plant Modification
PM	Preventive Maintenance
PNSC	Plant Nuclear Safety Committee
QC	Quality Control
RAT	Readiness Assessment Team
RBCCW	Reactor Building Closed Cooling Water
RCIC	Reactor Core Isolation Cooling
RFP	Reactor Feedwater Pump
RHR	Residual Heat Removal
RPS	Reactor Protection System
RTGB	Reactor Turbine Gauge Board
SBGT	Stand By Gas Treatment
SCO	Senior Control Operator
SJAE	Steam Jet Air Ejector
SLC	Standby Liquid Control
SRI	Senior Resident Inspector
SRO	Senior Reactor Operator
STA	Shift Technical Advisor
TS	Technical Specification
URI	Unresolved Item
WR/JO	Work Request/Job Order