



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

October 30, 2008

Mr. Benjamin C. Waldrep
Vice President
Carolina Power and Light Company
Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461

**SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED
INSPECTION REPORT NOS.: 05000325/2008004 AND
05000324/2008004**

Dear Mr. Waldrep:

On September 30, 2008, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick Unit 1 and 2 facilities. The enclosed integrated inspection report documents the inspection findings, which were discussed on October 29, 2008, with you and other members of your staff.

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

Based on the results of this inspection, no findings of significance were identified. Four licensee-identified violations which were determined to be of very low safety significance are listed in this report. The NRC is treating these findings as non-cited violations (NCVs), in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Brunswick Steam Electric Plant.

In accordance with 10 CFR 2.390 of the NRC's Rules of Practice, a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Randall A. Musser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos.: 50-325, 50-324
License Nos.: DPR-71, DPR-62
Enclosure: Inspection Report 05000325, 324/2008004
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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cc w/encl:

Brian C. McCabe
Manager
Nuclear Regulatory Affairs
Progress Energy
Electronic Mail Distribution

Michael J. Annacone
Director Site Operations
Brunswick Steam Electric Plant
Carolina Power & Light Company
Electronic Mail Distribution

R. J. Duncan, II
Vice President
Nuclear Operations
Carolina Power & Light Company
Electronic Mail Distribution

Benjamin C. Waldrep
Vice President
Brunswick Steam Electric Plant
Carolina Power & Light Company
Electronic Mail Distribution

Paul Fulford
Manager
Performance Evaluation and Regulatory
Affairs PEB5
Carolina Power & Light Company
Electronic Mail Distribution

Edward L. Wills, Jr.
Plant General Manager
Brunswick Steam Electric Plant
Carolina Power and Light Company
Electronic Mail Distribution

Donald L. Griffith
Manager
Brunswick Steam Electric Plant
Progress Energy Carolinas, Inc.
Electronic Mail Distribution

Phyllis N. Mentel
Manager
Support Services
Carolina Power & Light Company
Electronic Mail Distribution

Garry D. Miller
Manager
License Renewal
Progress Energy
Electronic Mail Distribution

Gene Atkinson
Supervisor
Licensing/Regulatory Programs
Brunswick Steam Electric Plant
Electronic Mail Distribution

James Ross
Nuclear Energy Institute
Electronic Mail Distribution

Senior Resident Inspector
Carolina Power and Light Company
Brunswick Steam Electric Plant
U.S. NRC
8470 River Road, SE
Southport, NC 28461

John H. O'Neill, Jr.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, NW
Washington, DC 20037-1128

Beverly O. Hall
Chief, Radiation Protection Section
Department of Environmental Health
N.C. Department of Environmental
Commerce & Natural Resources
Electronic Mail Distribution

CP&L

4

Peggy Force
Assistant Attorney General
State of North Carolina
P.O. Box 629
Raleigh, NC 27602

Chairman
North Carolina Utilities Commission
Electronic Mail Distribution

Robert P. Gruber
Executive Director
Public Staff - NCUC
4326 Mail Service Center
Raleigh, NC 27699-4326

Public Service Commission
State of South Carolina
P.O. Box 11649
Columbia, SC 29211

David R. Sandifer
Brunswick County Board of Commissioners
P.O. Box 249
Bolivia, NC 28422

Warren Lee
Emergency Management Director
New Hanover County Department of
Emergency Management
230 Government Center Drive
Suite 115
Wilmington, NC 28403

CP&L

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Letter to Benjamin C. Waldrep from Randall A. Musser dated October 30, 2008

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED
INSPECTION REPORT NOS.: 05000325/2008004 AND
05000324/2008004

Distribution w/encl:

C. Evans, RII EICS

L. Slack, RII EICS

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F. Saba, NRR

R. Pascarelli

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-325, 50-324

License Nos.: DPR-71, DPR-62

Report Nos.: 05000325/2008004, 05000324/2008004

Licensee: Carolina Power and Light (CP&L)

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: 8470 River Road, SE
Southport, NC 28461

Dates: July 1, 2008 through September 30, 2008

Inspectors: J. Austin, Senior Resident Inspector
P. O'Bryan, Senior Resident Inspector
G. Kolcum, Resident Inspector
R. Lewis, Senior Reactor Inspector (1R17)
R. Moore, Senior Reactor Inspector (1R17)
C. Even, Reactor Inspector (1R17)
M. Coursey, Reactor Inspector (1R17)
B. Collins, Reactor Inspector (1R17)
J. Eargle, Reactor Inspector (1R17)

Approved by: Randall A. Musser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000325/2008004, 0500324/2008004; 07/01/2008 - 09/30/2008; Brunswick Steam Electric Plant Unit 1 and Unit 2; Routine Baseline Inspection Report.

This report covered a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

None

B. Licensee Identified Violations

Violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective actions are listed in Section 4OA7.

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REPORT DETAILS

Summary of Plant Status

Unit 1

Unit 1 began the inspection period operating at full power. On August 1, power was reduced to 69 percent for valve testing and returned to 100 percent. On August 3, power was reduced to 88 percent and returned to 100 percent for a control rod improvement. On August 4, power was reduced to 93 percent for a control rod improvement and returned to full power that day and remained there for the duration of the inspection period.

Unit 2

Unit 2 began the inspection period operating at 100 percent power. On July 17, power was reduced to 98 percent for a control rod improvement. The unit was returned to full power that day. On July 31, power was reduced to 98 percent for a control rod improvement. The unit was returned to full power that day. On August 11, power was reduced to 90 percent for a control rod improvement. The unit was returned to full power that day. On August 17, power was reduced to 89 percent for a control rod improvement. The unit was returned to full power that day. On August 24, power was reduced to 89 percent for a control rod improvement. The unit was returned to full power that day. On August 30, the unit scrambled from a power load unbalance trip. The unit commenced startup on Sept 2. Unit 2 maintained power at 75 percent due to the arrival of Tropical Storm Hanna on September 6. Power ascension continued after the passing of Tropical Storm Hanna to 97 percent on September 7. On September 8, power was reduced to 88 percent for a control rod improvement. The unit was returned to full power that day. Again on September 8, power was reduced to 97 percent for a control rod improvement. The unit was returned to full power that day. On September 14, power was reduced to 97 percent for a control rod improvement. The unit was returned to full power that day. Again on September 14, power was reduced to 90 percent due to 1D and 2A circulating water ocean discharge (CWOD) pumps out of service. On September 17, after the repair of 1D CWOD, the unit was returned to full power. On September 21, power was reduced to 95 percent for a control rod improvement and to rinse in 2D condensate deepbed demineralizer. The unit was returned to full power that day and remained there for the duration of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

.1 Evaluate Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed actions taken by the licensee in accordance with Procedure AOP-13, Operation During Hurricane, Flood Conditions, Tornado, or Earthquake, prior to the onset of Hurricane Hanna, to ensure that the adverse weather conditions would

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neither initiate a plant event nor prevent any system, structure, or component from performing its design function. The inspectors also evaluated implementation of the adverse weather preparation procedures and compensatory measures for the affected conditions before the onset of and during adverse weather conditions. Severe weather occurred on:

- September 4 for a Hurricane watch
- September 5 for a Tornado watch
- September 6 for a Tropical Storm warning

Documents reviewed are listed in the Attachment to this report. The inspectors also reviewed corrective action program items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures.

- AR 295107, Oil in storm drain collection basin during Tropical Storm Hanna
- AR 295057, Switchyard fence laid down during Tropical Storm Hanna

b. Findings

No findings of significance were identified.

.2 Evaluate Readiness to Cope with External Flooding

a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the Updated Final Safety Analysis Report (UFSAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined that barriers required to mitigate the flood were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also reviewed the abnormal operating procedures (AOP) for mitigating the design basis flood to ensure it could be implemented as written. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns

a. Inspection Scope

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

- Unit 1 RCIC alignment while U1 HPCI OOS on July 18, 2008 for main pump seal failure
- Unit 2 RCIC alignment while HPCI was OOS for scheduled maintenance on August 12, 2008
- EDG #1, #2, and #3 recirculation dampers while EDG #4 recirculation damper was calibrated on September 10, 2008

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 296030, Formal processes not used on diesel building ventilation exhaust damper
- AR 296190, EDG #2 lube oil pressure trending greater than action limit
- AR 295847, 2A CSW pump declared inop due to d/p within the alert range
- AR 293334, Particulate increase in EDG #1 4-day tank
- AR 296006, SW chlorination out of spec

b. Findings

No findings of significance were identified.

.2 Detailed Equipment Walkdown

a. Inspection Scope

The inspectors performed a complete walkdown of the accessible portions of Emergency Diesel Generator #1, #2, #3, and #4 the week of July 21, 2008. The inspectors focused on verifying adequate material condition and correct system alignment. The inspectors

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reviewed the Technical Specifications (TS), operating procedures, and the Updated Final Safety Analysis Report. The inspectors held discussions with the applicable plant personnel to review system status including a review of open system modifications and temporary modifications. The inspectors reviewed open work requests (WRs) for the system, operator work-arounds, and open adverse conditions or ARs to ensure that the impact on equipment functionality was properly evaluated. The inspectors reviewed the documents listed in the Attachment.

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 286819, EDG #2 adverse trends on jacket water temperatures on monthly runs
- AR 295456, EDG exhaust recirculation damper position out of position relative to cell temperature

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Area Walkdowns

a. Inspection Scope

The inspectors reviewed ARs and work orders (WOs) associated with the fire suppression system to confirm that their disposition was in accordance with Administrative Procedure OAP-033, Fire Protection Program Manual. The inspectors reviewed the status of ongoing surveillance activities to verify that they were current to support the operability of the fire protection system. In addition, the inspectors observed the fire suppression and detection equipment to determine whether any conditions or deficiencies existed which would impair the operability of that equipment. The inspectors toured the following eight areas important to reactor safety and reviewed the associated prefire plans to verify that the requirements for fire protection design features, fire area boundaries, and combustible loading were met. The inspectors reviewed Plant Operating Manual, Volume XIX, Prefire Plan 0PFP-DG, Diesel Generator Building Prefire Plans in preparing for the inspection.

- Unit 1 and Unit 2 Reactor Building East 50' elevation (2 areas)
- Unit 1 and Unit 2 Reactor Building West 50' elevation (2 areas)
- Unit 1 and Unit 2 Reactor Building North 20' elevation (2 areas)
- Unit 1 and Unit 2 Reactor Building South 20' elevation (2 areas)

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 286392, U1 turbine building exhaust fan room door blocked

- AR 288605, EDG Building fire detection modification
- AR 288771, EDG fuel tank AFFF level
- AR 290506, Offsite fire in vicinity of transmission lines
- AR 290609, Cracking issues on red angus fire hose
- AR 292935, Open holes found in diesel generator building fire barrier
- AR 293942, Fire brigade drill failure
- AR 295613, EDG lockout relay compensatory actions
- AR 296866, Diesel fire pump out of service > 48 hrs

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

.1 Internal Flooding

a. Inspection Scope

The inspectors performed a walkdown of the U1 and U2 Core Spray rooms to verify that internal flood protection features were consistent with the licensee's internal flooding analysis as described in UFSAR Section 3.4.2, Protection From Internal Flooding. The inspectors reviewed the effects of postulated piping failures for the area to verify that analysis assumptions and conclusions were based on the current plant configuration. The internal flooding design features and equipment for coping with internal flooding were also inspected. The walkdown included sources of flooding and drainage, sump pumps, level switches, watertight doors, curbs, pedestals and equipment mounting. The inspectors reviewed the procedures for coping with internal flooding.

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs and WRs:

- AR 296021, 2C CSW pump strainer leakage
- AR 297816, Safety system outage delay
- AR 298190, Water intrusion into turbine building 4kV switchgear area

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification

.1 Quarterly Review

a. Inspection Scope

The inspectors observed licensed operator performance and reviewed the associated

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training documents during simulator-evaluated scenarios for training cycle 2008-03. The simulator observations and review included evaluations of emergency operating procedure and abnormal operating procedure utilization. The inspectors reviewed Procedure OTPP-200, Licensed Operator Continuing Training Program, to verify that the program ensures safe power plant operation. On August 12, 2008, simulator sessions were observed on anticipated and unanticipated plant transients during seismic event, nitrogen leak, steam leak, high radiation alarm, reactor scram, and a drywell high range radiation monitor alarm. The scenarios tested the operator's ability to respond to failures. The inspectors reviewed operator activities to verify consistent clarity and formality of communication, conservative decision-making by the crew, appropriate use of procedures, and proper alarm response. Group dynamics and supervisory oversight, including the ability to properly identify and implement appropriate TS actions, regulatory reports, and notifications, were observed. The inspectors observed instructor critiques and preliminary grading of the operating crews and assessed whether appropriate feedback was planned to be provided to the licensed operators.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the two equipment issues described in the ARs listed below, the inspectors reviewed the licensee's implementation of the Maintenance Rule (10 CFR 50.65) with respect to the characterization of failures, the appropriateness of the associated Maintenance Rule a(1) or a(2) classification, and the appropriateness of the associated a(1) goals and corrective actions. The inspectors reviewed the work controls and work practices associated with the degraded performance or condition to verify that they were appropriate and did not contribute to the issue. The inspectors also reviewed operations logs and licensee event reports to verify unavailability times of components and systems, if applicable. Licensee performance was evaluated against the requirements of Procedure ADM-NGGC-0101, Maintenance Rule Program.

- AR 287869, U1 HPCI main pump seal failure
- AR 288267, Cable spread room damper solenoid failed shortly after replacement

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 292192, 2-CAC-TY-4426-2 Suppression pool temperature monitoring system failed
- AR 296146, 1D CWOD pump discharge head liner missing bolts
- AR 287851, 10 VDC reading out of tech spec during 0MST-IRM24R on IRM H
- AR 289850, 1A CSW pump inop

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's implementation of 10 CFR 50.65 (a)(4) requirements during scheduled and emergent maintenance activities, using Procedure 0AP-025, BNP Integrated Scheduling and Technical Requirements Manual 5.5.13, Configuration Risk Management Program. The inspectors reviewed the effectiveness of risk assessments performed due to changes in plant configuration for maintenance activities (planned and emergent). The review was conducted to verify that, upon unforeseen situations, the licensee had taken the necessary steps to plan and control the resultant emergent work activities. The inspectors reviewed the applicable plant risk profiles, work week schedules, and maintenance WOs for the following four conditions:

- Unit 2 entered Yellow risk condition for performing 0MST-RHR-26Q, RHR and Core Spray low reactor pressure functions during week of July 7, 2008
- WO 1386051 for Unit 1 RCIC when U1 HPCI OOS on July 18, 2008 for main pump seal failure (emergent)
- WO 1398802 Unit 2 RCIC while HPCI was OOS for scheduled maintenance on August 13, 2008
- EDG #1, #3, and #4 while EDG #2 was OOS for scheduled maintenance on September 30, 2008

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 294746, Adverse trend seen in U2 control rod performance due to double notching
- AR 295008, U2 main stop valve #3 indication
- AR 286221, 1A reactor recirculation pump seal #2 pressure
- AR 292706, Unplanned LCO entry for suppression pool level indicator 2-CAC-LI-3342
- AR 298353, Unanticipated LCO entry EDG #2 fuel oil differential pressure switch failed
- AR 294164, Unit 2 Scram

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

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

- AR 292361, U2 NSW thru wall header leak
- AR 295999, 2C CSW discharge strainer shear pin failure
- AR 291455, Unexpected Rx Bldg ventilation isolation and auto start of 2A Standby Gas Treatment system
- AR 295460, Gas void found in 1A RHR loop during UT
- AR 292232, EDG #4 failed during OPT-12.14L local control operability

b. Findings

No findings of significance were identified.

1R17 Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed selected samples of evaluations to confirm that the licensee had appropriately considered the conditions under which changes to the facility, Updated Final Safety Analysis Report (UFSAR), or procedures may be made, and tests conducted, without prior NRC approval. The inspectors reviewed evaluations for eleven changes and additional information, such as drawings, calculations, supporting analyses, the UFSAR, and Technical Specifications (TS) to confirm that the licensee had appropriately concluded that the changes could be accomplished without obtaining a license amendment. The nine evaluations reviewed are listed in the List of Documents Reviewed.

The inspectors reviewed samples of changes for which the licensee had determined that evaluations were not required, to confirm that the licensee's conclusions to "screen out" these changes were correct and consistent with 10 CFR 50.59. The 19 "screened out" changes reviewed are listed in the List of Documents Reviewed.

The inspectors evaluated engineering design change packages for eleven material and design based modifications to evaluate the modifications for adverse effects on system

availability, reliability, and functional capability. The eleven modifications and the associated attributes reviewed are as follows:

EC 58110, Allow Use of Improved Bonnet/Gland Design for 10" ADV DDGV Applicable to E41-F001/2/3, Rev. 2 (Mitigating Systems)

- Materials Replacement Components
- Operations
- Licensing Basis
- Post Modification Testing

EC 51218, Enhance Valve Stem Anti-Rotation Arm for Valves 1(2)-E51-F022, Rev. 0 (Mitigating Systems)

- Materials Replacement Components
- Operations
- Licensing Basis
- Post Modification Testing

EC 66710, Replacement of CST Level Switches for HPCI/RCIC Suction, Rev. 3 (Mitigating Systems)

- Materials Replacement Components
- Operations
- Licensing Basis
- Post Modification Testing
- Energy Needs
- Control signals

EC 63126, Replace DG Excitation Potential Transformers, Rev. 2 (Mitigating Systems)

- Energy Needs
- Materials/Replacement Components
- Licensing Basis

EC 66593, DG Shutdown Circuit Logic Change, Rev. 1 (Mitigating Systems)

- Timing
- Control Signals
- Licensing Basis

EC 62707, EDG Jacket Water Cooler Expansion Joint, Rev 1 (Mitigating Systems)

- Materials/Replacement Components
- Process Medium
- Pressure Boundary

EC 64711, Modification to Replace Aging and Obsolete Shutdown Interlock Valves on Diesel Generators, Rev. 3 (Mitigating Systems)

- Energy Needs
- Materials/Replacement Components
- Timing

- Heat Removal
- Control Signals
- Equipment Protection
- Flowpaths
- Structural
- Process Medium
- Licensing Basis
- Failure Modes

EC 65981, Specification 21A9206 Material Reconciliation, Rev. 000 (Barrier Integrity)

- Materials/Replacement Components
- Pressure Boundary

EC 50913, MOVs 1/2-E11-F007A/B Operator Motor Gear Ratio Changes (Mitigating Systems)

- Timing
- Control Signals
- Process Medium

EC 59437, Diesel Starting Air Inventory Requirements (Mitigating Systems)

- Energy Needs
- Timing
- Flowpaths
- Process Medium

EC 63274, Replace Obsolete Reactor Building RR (209 and 210) Lock Components (Barrier Integrity)

- Materials/Replacement Components
- Structural

Documents reviewed included procedures, engineering calculations, modification design and implementation packages, work orders, site drawings, corrective action documents, applicable sections of the UFSAR, supporting analyses, Technical Specifications, and design basis information. The inspectors additionally reviewed test documentation to ensure adequacy in scope and conclusion. The inspectors' review was also intended to verify that all details were incorporated in licensing and design basis documents and associated plant procedures.

The inspectors also reviewed selected ARs and the licensee's recent self-assessment associated with modifications and screening/evaluation issues to confirm that problems were identified at an appropriate threshold and were entered into the corrective action process, and appropriate corrective actions had been initiated and tracked to completion.

b. Findings

No findings of significance were identified.

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1R18 Plant Modifications.1 Temporary Modificationsa. Inspection Scope

The inspectors reviewed Plant Operating Manual OPLP-22, Temporary Changes, to assess the need for implementation of a temporary modification to route the water from the north core spray sump to the residual heat removal (RHR) sump during a maintenance activity (which was supported by the engineering change listed below) to replace the Unit 1 North core spray sump liner. The inspectors also assessed drawings and procedures for appropriate updating and post-modification testing.

- Engineering Change (EC) 69995, Unit 1 North core spray sump liner degradation

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testinga. Inspection Scope

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

- WO 1383024, Emergency Diesel Generator (EDG) #2 oscillations
- WO 1414604, 1A Nuclear Service Water (NSW) pump inop due to not being able to rack breaker in
- WO 1407370, Control Rod Drive (CRD) flow controller replacement and PMT
- WO 1386051, High Pressure Coolant Injection (HPCI) main pump seal failure
- WO 1398802, HPCI seal plate bushing measurements

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing.1 Routine Surveillance Testinga. Inspection Scope

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

- Unit 1, OPT-9.2 HPCI System Operability Test Revision 127 on July 12, 2008
- Unit 2, OPT- 40.2.12 Main Turbine Bypass Valves Operability Test Revision 8 on August 10, 2008
- Unit 2, OPT-07.1.8 Core Spray System Component Test Revision 24 on August 27, 2008
- Unit 1, OPT-9.2 HPCI System Operability Test Revision 127 on August 29, 2008
- Unit 1, OPT-02.3.1B Suppression Pool to Drywell Vacuum Breaker Position Check Revision 9 on August 29, 2008
- Unit 2, OPT-14.1A Control Rod Coupling Check and CRD Testing Revision 38 on September 3, 2008
- Unit 2, OPT-24.0.-2 Service Water System Valve Lineup Revision 12 on September 26, 2008

To assess the licensee's ability to identify and correct problems, the inspectors reviewed:

- AR 290930, U2 main turbine bypass valve failures
- AR 294914, Unexpected inoperability U2 main turbine bypass system

b. Findings

No findings of significance were identified.

.2 In-service Surveillance Testinga. Inspection Scope

The inspectors reviewed the performance of Periodic Test OPT-16.1, CAD system Component Test, Revision 24, performed on August 2, 2008. The inspectors evaluated the effectiveness of the licensee's American Society of Mechanical Engineers (ASME) Section XI testing program to determine equipment availability and reliability. The inspectors evaluated selected portions of the following areas: 1) testing procedures; 2) acceptance criteria; 3) testing methods; 4) compliance with the licensee's IST program, TS, selected licensee commitments, and code requirements; 5) range and accuracy of

test instruments; and 6) required corrective actions. The inspectors also assessed any applicable corrective actions taken.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed one site emergency preparedness training drill and two simulator scenarios conducted on July 22, 2008, July 29, 2008 and August 13, 2008. The inspectors reviewed the drill scenario narrative to identify the timing and location of classifications, notifications, and protective action recommendations development activities. The inspectors evaluated the drill conduct from the control room simulator, technical support center, and the emergency operations facility. During the drill, the inspectors assessed the adequacy of event classification and notification activities. The inspectors observed portions of the licensee's post-drill critiques at the technical support center and emergency operating facility. The inspectors verified that the licensee properly evaluated the drill's performance with respect to performance indicators and assessed drill performance with respect to drill objectives.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors sampled licensee data for the performance indicator (PI) listed below. To verify the accuracy of the PI data reported during the period reviewed, PI definitions and guidance contained in NEI 99-02, Regulatory Assessment Performance Indicator Guideline, and Rev. 5 was used to verify the basis for each data element.

Reactor Safety Cornerstone

The inspectors sampled licensee submittals for the Units 1 and 2 PIs listed below for the period September 2007 through June 2008.

- Mitigating Systems Performance Index, Residual Heat removal system
- Reactor coolant system specific activity
- Reactor coolant system leakage

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Routine Review of ARs

To aid in the identification of repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed frequent screenings of items entered into the licensee's CAP. The review was accomplished by reviewing daily ARs.

.2 Annual Sample Review

a. Inspection Scope

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

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

The inspectors reviewed the following issues:

- AR 277188, Unit 1 HPCI main pump seal failure (inadequate venting)
- AR 277732, Unit 1 HPCI inboard seal failure (improper bushing clearance)

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up

.1 Personnel Performance During Plant Evolutions

a. Inspection Scope

The inspectors reviewed the operator response to an unplanned scram which occurred

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on August 30, 2008. To assess operator performance during the transient, the inspectors reviewed operator logs, plant computer data, associated operator actions and Emergency Operating Procedure 2EOP-01-RSP, Reactor Scram Procedure. The inspectors monitored and reviewed the Scram Investigation Team and the post-trip review. Unit 2 entered Mode 3 (Hot shutdown) following the scram on August 30. Mode 2 (startup) was entered on September 2 and Mode 1 (Power Operation) was entered on September 3. Documents reviewed are listed in the Attachment. The following specific areas were reviewed during the inspection period:

Outage Plan. The inspectors reviewed the outage plan to verify that the licensee has considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth.

Licensee Control of Outage Activities. The inspectors observed and reviewed activities and plant conditions to verify that the licensee maintained defense-in-depth commensurate with the outage risk control plan. The inspectors reviewed the electric power systems to ensure emergency power was available.

Monitoring of Startup Activities. The inspectors verified on a sampling basis, that TS, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant configurations. The inspectors observed and monitored the startup of Unit 2 including the approach to criticality, parallel to the grid, and power ascension.

Identification and Resolution of Problems. The inspectors reviewed ARs to verify that the licensee was identifying problems related to outage activities at an appropriate threshold and entering them in the corrective action program. The inspectors reviewed the following issues identified during the outage to verify that the appropriate corrective actions were implemented or planned:

- AR 295164, Unit 2 scram
- AR 294333, Scram discharge volume level switch reset time excessive for Unit 2 scram
- AR 294337, Offset on plant process computer and ERFIS times affecting scram investigation
- AR 294505, Common cause implementation of engineering changes

b. Findings

No findings of significance were identified.

- .2 (Closed) LER 05000325/2006-007 and Supplement 1: Operations Prohibited by Technical Specifications Due to Inoperable Emergency Diesel Generator 1. On November 1, 2006, Emergency Diesel Generator (EDG) tripped on low lube oil pressure while running unloaded in response to a loss of the Unit 2 start-up transformer. NRC Inspection Report 05000325, 324/2006004 identified the event as an unresolved issue (URI 05000325, 324/2006004-01). NRC Inspection Report 05000325, 324/2007008

closed the URI to a preliminary White apparent violation of TS 3.8.1, AC Sources – Operating (AV 05000324/2007008-01). Final significance of the event was determined to be White (i.e. an issue of low to moderate safety significance) in NRC Inspection Report 05000325, 324/2007009 and the issue was documented as a violation of TS 3.8.1, AC Sources-Operating (VIO 05000324/2007009-01). This LER is closed.

- .3 (Closed) Licensee Event Report (LER) 05000324/2007003 and Supplement 1: As-Found Values for Safety/Relief Valve Lift Setpoints Outside Technical Specification Allowed Tolerance. This LER reported that as-found testing for four of the eleven safety/relief valves removed from Unit 2 during the Spring 2007 outage (i.e., B218R1) were outside the Technical Specification allowed setpoint tolerance. The cause of the failure of the valves was due to maintenance practices. The licensee has instituted corrective actions to preclude recurrence, including replacing all of the affected valves and revising maintenance procedures. The failure of these four safety/relief valves to lift within the allowed setpoint limits constituted a condition prohibited by TS 3.4.3. This finding is similar to example 2a of Manual Chapter 0612 appendix E in that the equipment exceeded technical specification limits and the finding is therefore greater than minor. However, an evaluation of the as-found condition of the safety/relief valves was compared to the current overpressure analysis. The analysis concluded that the overpressure analysis remained bounding. Since the valves' degradation would have had a minimal impact on design basis events, this finding has very low safety significance (Green). The enforcement aspects of this finding are discussed in Section 4OA7 of this report. This LER is closed.
- .4 (Closed) Unresolved Item (URI) 05000325,324/2008002-01: Review Adequacy of Suppression Pool Temperature Monitoring System Calibration. In NRC Inspection Report 05000325,324/2008002, dated April 25, 2008, the Resident Inspectors identified an unresolved item (URI 05000325,324/2008002-01) to further review the adequacy of suppression pool temperature monitoring system calibration relative to Technical Specification SR 3.3.3.1.3. The inspectors reviewed the licensee's investigation (AR 267562) and concluded that there have been multiple instances of "non-gross" failures (e.g. drift high or low without reaching the automatic gross failure limit), within the temperature loops. However, a review of licensee actions taken to address the failures did not identify any specific deficiencies with the requirements of SR 3.3.3.1.3. No violations of regulatory requirements were identified. This URI is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities

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did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

.2 (Open) Temporary Instruction (TI) 2515/176, Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing.

a. Inspection Scope

The objective of this TI was to gather information to assess the adequacy of nuclear power plant emergency diesel generator (EDG) endurance and margin testing as prescribed by plant-specific technical specifications (TS). The inspector interfaced with the appropriate station staff to obtain the information specified in Attachment 1 of the TI, Worksheet. The TI applies to all operating nuclear power reactor licensees that use EDGs as the onsite standby power supply. The inspector verified the accuracy of the information by review of TS, EDG Design Basis Event (DBE) loading calculations, EDG endurance run test procedures, test data from the last three endurance tests performed on each EDG, EDG ratings, and EDG operating history. The information gathered will be forwarded to the office of Nuclear Reactor Regulation/Division of Engineering/Electrical Engineering Branch (NRR/DE/EEEB) for further review to assess the adequacy and consistency of EDG testing at nuclear stations.

b. Findings and Observations

The TI is presently scheduled to be open until August 31, 2009, pending completion of the NRR/DE/EEEB review.

40A6 Meetings, Including Exit

On October 29, 2008, the resident inspectors presented the inspection results to Mr. Ben Waldrep and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

40A7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are a violation of NRC requirements which meet the criteria of Section VI.A.1 of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCV's.

- .1 Technical Specification 5.4.1, Administrative Control (Procedures), requires that written procedures shall be established, implemented, and maintained covering applicable procedures recommended in Regulatory Guide 1.33, Appendix A, November 1972. Regulatory Guide 1.33, Section D (7) states, in part, that instructions for energizing, filling, venting, draining, startup, shutdown, and changing modes of operation should be prepared, as appropriate for the Emergency Core Cooling System. Contrary to the above, the licensee's procedure OP-19, HPCI System Operating Procedure, Revision

112, was inadequate because it contained unclear actions which resulted in a main pump seal failure from an inadequate fill and vent of the Unit 1 HPCI system cross-around piping after a complete drain and refill during outage B117R1. On April 29, 2008, as a result of inadequate venting of the HPCI pump, the inboard seal failed. This issue is more than minor because it affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent core damage and is associated with the cornerstone attribute of equipment performance. This finding is of very low safety significance because the HPCI pump did not exceed its allowed TS outage time. This issue has been entered into the CAP as AR 277188.

- .2 Technical Specification 5.4.1, Administrative Control (Procedures), requires that written procedures shall be established, implemented, and maintained covering applicable procedures recommended in Regulatory Guide 1.33, Appendix A, November 1972. Regulatory Guide 1.33, Section I (1) states that maintenance that can affect the performance of safety-related equipment should be properly preplanned, and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to the above, the licensee's procedure OCM-PHM504, Pacific Pumps, Model RHCH, HPCI main pump maintenance, Revision 7, was inadequate because the pump was reassembled with an improper clearance between the seal sleeve and seal plate bushing. On July 18, 2008, the main pump inboard seal failed due to excessive heating at the shaft sleeve due to contact between the seal plate bushing and the shaft sleeve such that the shaft sleeve set screw force applied to the shaft was relieved, and the pump internal pressure forced the seal sleeve out 1/8 inch. This 1/8 inch extension caused excessive force to be applied on the seal faces which resulted in premature failure due to seal face overheating followed by a quench. This issue is more than minor because it affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent core damage and is associated with the cornerstone attribute of equipment performance. This finding is of very low safety significance because the HPCI pump did not exceed its allowed TS outage time. This issue has been entered into the CAP as AR 287869.
- .3 Technical Specification Limiting Condition for Operation 3.4.3, Safety/Relief Valves, requires 10 safety/relief valves to be operable while in Mode 1 with their lift setpoints within a specified range. Contrary to this, during surveillance testing on safety/relief valves removed from Unit 2 during the Spring 2007 refueling outage (B218R1), four of the eleven valves actuated at pressures outside the technical specification limits. This finding is of very low safety significance because the as-found lift setpoint conditions of the Unit 2 safety/relief valves were analyzed and determined to meet the design basis criteria for an over-pressurization event. This issue has been entered into the CAP as AR 287535.
- .4 10 CFR 50.65(a)(4) states, in part, that before performing maintenance activities, the licensee shall assess and manage the risk that may result from the proposed maintenance activities. Contrary to the above, the licensee did not perform an adequate risk assessment of switchyard activities which involved operating a test device in the generator terminal current sensing circuitry in the switchyard relay house. Unit 2

automatically scrambled due to a spurious power load unbalance (PLU) turbine trip signal while the unit was in operation at 100% rated thermal power. This spurious signal was determined to be generated from the maintenance activities in the switchyard. The licensee determined that procedure OAP-025 "BNP Integrated Scheduling," which was used to implement Engineering Change, 68642, Digital Fault Recorder Replacement (Switchyard), did not adequately evaluate the post modification testing to be performed on the PLU circuit, and therefore did not characterize the maintenance as a contributor to the risk of a plant transient or reactor scram. The finding is of very low safety significance because the incremental core damage probability deficit is less than $1E-6$ and the incremental large early release probability deficit is less than $1E-7$. This issue has been entered into the CAP as AR 294164.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Annacone, Director Site Operations
G. Atkinson, Supervisor - Emergency Preparedness, Licensing/Regulatory Programs
L. Beller, Superintendent, Operations Training
A. Brittain, Manager – Security
B. Davis, Manager – Engineering
J. Fergusen, Manager - ER&C
M. Grantham, Superintendent of Design Engineering
D. Griffith, Manager - Training Manager
L. Grzeck, Lead Engineer - Technical Support
S. Howard, Manager - Operations
R. Ivey, Manager - Site Support Services
J. Johnson, Chemistry Manager
M. Millinor, Environmental
W. Murray, Licensing Specialist
T. Pearson, Supervisor - Operations Training
A. Pope, Manager - Maintenance
E. Rochelle, RC Supervisor
T. Sherrill, Engineer - Technical Support
J. Titrington, Manger - Nuclear Assessment Services
M. Turkal, Lead Engineer - Technical Support
J. Vincelli, RC Manager
B. Waldrep, Site Vice President
M. Williams, Manager - Operations Support
E. Wills, Plant General Manager

NRC Personnel

Randall A. Musser, Chief, Reactor Projects Branch 4, Division of Reactor Projects Region II

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

None

Closed

05000325/2006-007 and Supplement 1	LER	Operations Prohibited by Technical Specifications Due to Inoperable Emergency Diesel Generator (4OA3)
05000324/2007-003 and Supplement 1	LER	As-Found Values for Safety/Relief Valve Lift Setpoints Outside Technical Specification Allowed Tolerance. (4OA3)

05000325,324/2008002-01

URI Review Adequacy of Suppression Pool Temperature Monitoring System Calibration (4OA3)

Opened

2515/176

TI Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing (4OA5)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Plant Operating Manual (POM), Volume XXI, Abnormal Operating Procedure, 0AOP-13.0, Operation during Hurricane, Flood Conditions, Tornado, or Earthquake, Rev. 42
POM, Volume I, Administrative Instruction, 0AI-68, Brunswick Nuclear Plant Response to Severe Weather Warnings, Rev. 31
POM, Volume XIII, Plant Emergency Procedure 0PEP-02.6, Severe Weather, Rev. 12
POM, Volume XIII, Plant Emergency Procedure 0PEP-02.1, Initial Emergency Actions, Rev. 50

Section 1R04: Equipment Alignment

POM, Volume III, Operating Procedure 0OP-50.1, Diesel Generator Emergency Power System Operating Procedure, Rev. 72
POM, Volume III, Operating Procedure 1OP-16, Reactor Core Isolation Cooling System Operating Procedure, Rev. 68
POM, Volume III, Operating Procedure 2OP-16, Reactor Core Isolation Cooling System Operating Procedure, Rev. 102
POM, Volume III, Operating Procedure 1OP-19, High Pressure Cooling Injection System Operating Procedure, Rev. 72
POM, Volume III, Operating Procedure 2OP-19, High Pressure Cooling Injection System Operating Procedure, Rev. 114

Section 1R17: Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications

Full Evaluations

AR 00275771, Modification to Under-Vessel Carousel Platform, dated 4/22/08
AR 00196088, Decommission of Rx Bldg. Air compressor, dated 2/21/08
AR 197913, Add Time Delay Relays to Chlorine Detector System, Rev. 0
AR 164665, Once Through Ventilation Test, Rev. 1
AR 224213, Removal of SRI Function, Rev. 0
AR 210719, EDG Manual Voltage Regulator Circuit Removal, Rev. 3
AR 215565, Restoration of 2-VA-2D-CU-CA to Operable, dated 12/13/06
AR 246162, Turbine Building Once Through Ventilation Modification, dated 1/17/08
AR 262727, Service Air Injection to Gland Seal Ejector for Chemistry Control, dated 5/28/08

Screened Out Items

AR 00216822, HPCI On-line Overspeed Test, dated 12/20/06
AR 00193588, Unit 2 Recirc Runback Time Delay, dated 5/11/06
AR 00229639, Recoating of Condensate Storage Tank Interior Surface, dated 4/27/07
AR 00232195, Replacement of CST Level Switches for HPCI/RCIC Suction, dated 5/9/07
AR 00164318, Enhance Valve Stem Anti-Rotation Arm for Valves 1/2-E51-5022, dated 9/9/05
AR 00185706, Replace Each EDG Excitation System Power Potential Transformer With A Larger Unit, 2/06
AR 00231514, Modify DG Shutdown Circuit Logic, 7/08
AR 00202635, Unit Sub E7 and E8 Breaker Coordination, 8/06
AR 00232544, Evaluate Replacement Relays for the Diesel Generator LOCR, LTACR, and N2CR Relays, 5/07
AR 00269613, Replace 90P Potentiometer, Rev. 0
AR 00175278, EDG Jacket Water Cooler Expansion Joint Elastomer Change, Rev. 1

AR 00229761, Replacement of Existing Shutdown Interlock Valves, dated 4/16/07
 AR 00220601, Specification 21A9206 Material Reconciliation, Rev. 0
 AR 199795, Replacement Valves for Obsolete 1/2-E11-V20/21 within RHR, dated 8/11/06
 AR 202001, Replace Obsolete RB RR (209 and 210) Lock Components, dated 9/20/06
 AR 201376, SRV Pilot Valve Seat Material (Stellite-21), dated 8/3/06
 AR 201849, Service Water Pump Bearing Material Specification Waiver, dated 8/3/06
 AR 222476, Install a 24" Manway on 1/3-SW-199/100-30-157 Line Upstream of 1/2-SW-V4,
 dated 2/23/07
 AR 217678, Sodium Hypochlorite Injection Study with TRASAR Chemical, dated 1/15/07

Modifications

EC 58110, Allow Use of Improved Bonnett/Gland Design for 10" ADV DDGV Applicable to E41-F001/2/3, Rev. 2
 EC 51218, Enhance Valve Stem Anti-Rotation Arm for valves 1(2)-E51-F022, Rev. 0
 EC 66710, Replacement of CST Level Switches for HPCI/RCIC Suction, Rev. 3
 EC 63126, Replace DG Excitation Potential Transformers, Rev. 2
 EC 66593, DG Shutdown Circuit Logic Change, Rev. 1
 EC 62707, EDG Jacket Water Cooler Expansion Joint, Rev 1
 EC 64711, Modification to Replace Aging and Obsolete Shutdown Interlock Valves on Diesel Generators, Rev. 3
 EC 65981, Specification 21A9206 Material Reconciliation, Rev. 0
 EC 50913, 1/2-E11-F007A/B Gear Ratio Changes, Rev. 0
 EC 59437, EDG Starting Air Inventory Requirements, Rev. 0
 EC 63274, Replace Reactor Building RR Door Lock Components, Rev. 0

Basis Documents

Technical Specifications, Current
 Updated Final Safety Analysis Report, Current
 Technical Requirements Manual, Current
 LDCR 08-FSAR-013, UFSAR Change Request, Rev. 0
 LDCR 08-FSAR-006, UFSAR Change Request, Rev. 0

Condition Reports

AR 00165765, EDG Excitation Transformer Overloading Condition, dated 8/05
 AR 00017292, D/G #2 Tripped During System Operation, dated 3/00
 AR 00173322, Shortfalls in Troubleshooting Control Form (TCF) Handling, dated 10/05
 AR 00172627, 50.59 Screens for 2 Work Orders not Vaulted with WO, dated 10/05

Self Assessments

BNAS 08-031, BNP Technical Specification and Operating License Assessment, dated 6/11/08
 BNAS 08-019, BNP Independent Review Trend Report for the Period July 1 through December 31, 2007, dated 3/22/08
 BNAS 07-041, BNP Independent Review Trend Report for the Period from January 1 through June 30, 2007, dated 9/26/2007
 BNAS 07-005, BNP Independent Review Trend Report for the Period from July 1 through December 31, 2006, dated 3/8/07
 BNAS 06-044, BNP Independent Review Trend Report for the Period from January 1 through June 30, 2006, dated 9/18/08

Procedures

OPT-09.8, HPCI System Coupled Overspeed Trip Test, Rev. 1
 OPT-10.1.8, RCID System Valve Operability Test, performed 7/26/07 and 4/18/07
 OPT-10.1.1 RCIC System Operability Test, performed 4/18/07
 OOP-39 Diesel Generator Operating Procedure, Rev. 119

OPM-GEN009 Emergency Diesel- Generator Voltage Regulator Calibration, Rev. 3
 OPT-12.2A NO. 1 Diesel Generator Monthly Load Test, Rev. 92
 OPT-12.8 Diesel Generator Operability Test, Rev. 33
 1APP-UA-19 Annunciator Procedure For panel UA-19, Rev.22
 2APP-UA-19 Annunciator Procedure For panel UA-19, Rev.22
 OCM-ENG509 Emergency Diesel Generator Jacket Water, Robert Shaw Temperature Regulator Valve, Model 1-1011-B1, Rev. 3
 OCM-PSX001, Installation of Instrument Tubing, Rev. 3
 OPM-ENG508, Test and Adjustment of Woodward Overspeed Dump Valve and Functional Test of Overspeed Shutdown System, Rev. 15
 OPM-ENG508, Test and Adjustment of Woodward Overspeed Dump Valve and Functional Test of Overspeed Shutdown System, Rev. 17
 OSPP-HYDRO501, Functional Pressure Testing, Rev. 15
 OSPP-HYDRO501, Functional Pressure Testing, Rev. 16
 EGR-NGGC-0005, Engineering Change, Rev. 27
 REG-NGGC-0010, 10 CFR 50.59 and Selected Regulatory Review, Rev. 11
 OOP-39, Diesel Generator Operating Procedure, Rev. 119
 0AOP-05.0. Radioactive Spills, High Radiation, and Airborne Activity, Rev. 22
 0OI-37. Preparation and Review of the Plant Specific Technical Guide, Rev. 53
 0EOP-04-RRCP. Radioactivity Release Control Procedure, Rev. 15
 0OI-37.10. Radioactivity Release Control Procedure Basis Document, Rev. 6
 0EOP-01-AEDP. Alternate Emergency Depressurization Procedure, Rev. 17
 2ENP-63.1. Configuration of the U2 Turbine Building Ventilation System for Test of Once Through Operation, Rev. 001
 OPM-MO0504, Mechanical Inspection and Lubrication of Limitorque Operators, Rev. 30
 OPT-08.2.2b/c, LPCI/RHR System Operability Test – Loop B/A, Rev. 79/68
 EGR-NGGC-0106, AC and DC Overcurrent Protection and Coordination, Rev. 3
 EGR-NGGC-0203, Motor Operated Valve Performance Prediction, Actuator Settings, and Diagnostic Test Data Reconciliation, Rev. 13
 EGR-NGGC-0101, Electrical Calculation of Motor Output Torque for AC and DC Motor Operated Valves (MOVs), Rev. 9
 EGR-NGGC-0359, Motor Operated Valve Structural Evaluation, Rev. 8
 OOP-39, Diesel Generator Operating Procedure, Rev. 119
 OPT-11.0, Safety/Relief Valve Set Pressure and Seat Leakage Test, Rev. 23
 NGG-PMB-PRV-01, NGG Equipment Reliability Template Pressure Relief Valves (Spring Actuated), Rev. 0
 EGR-NGGC-0003, Design Review Requirements, Rev. 10
 EGR-NGGC-0204, Evaluation and Selection of Materials for Plant Components, Rev. 6
 EGR-NGGC-0020, Preparation and Control of Specifications, Rev. 2
 1APP-UA-48, Annunciator Procedures for Panel UA-48, Rev. 22

Work Orders

WO 00567352 01, Rebuild Valve 2-E41-F002, dated 2/23/05
 WO 00533756 08, Rebuild the 1-E41-F003 valve if Failed LLRT, dated 1/16/06
 WO 00847734 01, Seat Leakage, 2-E41-F001, dated 8/30/06
 WO 00137350 01, Replace Stem and Stem Clamp on 2-E51-F022. dated 11/13/06
 WO 00137352 02, Remove One Piece Stem and Clamp on 1-E51-F022, dated 5/10/07
 WO 01063082 01, 1-E41-LSL-N003 and 1-E51-LSL-4464 Replacement, dated 6/7/07
 WO 01086659 04, Post Maintenance Testing of CRD Platform; Functional Stroke Test of IRM-SRM Detectors, dated 4/18/08
 WO 00812509 03, Tie In & Test New Excitation Potential Transformers, 10/06
 WO 00812506 03, Tie In & Test New Excitation Potential Transformers, 6/06
 WO 00812507 03, Tie In & Test New Excitation Potential Transformers, 9/06
 WO 00812508 03, Tie In & Test New Excitation Potential Transformers, 2/07

WO 01059719 02, DG #1: Install EC #66593, 6/07
 WO 01057922 02, DG #2: Install EC #66593, 6/07
 WO 01059740 02, DG #3, Install EC #66593, 6/07
 WO 01059753 02, DG #4, Install EC #66593, 6/07
 WO 00890584 01, 2-DG1-SHTDN-INTLK-VLV EC 64711, dated 9/16/07
 WO 00890584 02, 2-DG1-SHTDN-INTLK-VLV EC 64711, dated 9/16/07
 WO 00890584 03, 2-DG1-SHTDN-INTLK-VLV EC 64711, dated 9/16/07
 WO 00471001 01, 2-E11-F007B-MO EC 50913 Motor Pinion, dated 2/24/07
 WO 00471001 02, 2-E11-F007B-MO EC 50913 I&C Support, dated 2/24/07
 WO 00471001 04, 2-E11-F007B-MO EC 50913 O/L Heater Replacement, dated 2/24/07
 WO 00471001 06, 2-E11-F007B-MO EC 50913 Testing Per OPDM-MO005C, dated 3/3/07
 WO 00471001 07, 2-E11-F007B-MO EC 50913 Testing Per OPT-08.2.2B, dated 2/21/07
 WO 00471001 09, 2-E11-F007B-MO EC 50913 ME, PMT Requirements, dated 3/3/07
 WO 00646072 01, 2-DG1-PSL-6536-1, Cal DG1 Low DSA Alarm per EC 59437, dated 5/17/05
 WO 00984785 01, 2D Cont Building A/C Unit Not Cooling, dated 7/23/07

Calculations

BNP-RAD-017, Temporary Mod to U1 or U2 Exhaust Duct – x/Q and MSLB Radiological Consequences, Rev 0
 0B21-0199, ECCS Analysis Results, Rev. 5
 8S42-P-101, Station Blackout Coping Analysis Report, Rev. 10
 BNP-E-8.007, AC MOV Strike Time Calculation, Rev. 3
 BNP-E-8.013/14, Unit 1/2 Motor Torque Analysis for AC Motor Operated Valves, Rev. 7/7
 BNP-MECH-E11-F007A/B, Mechanical Analysis and Calculations for 1/2-E11-F007A/B RHR Minimum Flow Valves
 0DSA-0005, Diesel Generator Starting Air Requirements, Rev. 0
 BNP-RAD-008, Non-LOCA Radiological Consequence Dose with Alternative Source Term, Rev 3

Drawings

B-4108602, Size 4 Class 900-GB Assembly, Stem clamp, dated 11/3/03
 SK-66710-M-2010, Installation Drawing for 2-E41-LSL-N002, Rev. 0
 SK-66710-M-2009, Installation Drawing for 2-E41-LSL-N003, Rev. 0
 0-FP-82845, 10"-600 Weld Ends Carbon Steel Double Disc Gate Valve with Limitorque SMB-1-25 Actuator, Rev. B
 0-FP-82855, Size 10 Fig 600-DD Bonnet and Gland Bushing Installation Details, Rev. A
 F-03077, 4160 Volt Switchgear "E1" Div. I, Rev. 23
 0-FP-2788, Diesel Generator Elementary Wiring Diagram, Rev. B
 F-09345, Sh. 2, Diesel Generator No. 1 Control Wiring Diagram, Rev. 36
 F-03946, Sh. 2, Diesel Generator No. 2 Control Wiring Diagram, Rev. 33
 F-03947, Sh. 2, Diesel Generator No. 3 Control Wiring Diagram, Rev. 33
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List of Acronyms and Abbreviations

ALARA	As Low As Reasonably Achievable
AR	Action requests
B117R1	Brunswick Unit 1 Cycle 17 Refueling Outage
B218R1	Brunswick Unit 2 Cycle 18 Refueling Outage
CAP	Corrective Action Program
CY	calendar year
DRD	Direct Reading Dosimeter
ESS	Environmental Sampling Station
H-3	tritium
HPGe	high purity germanium
HPT	Health Physics Technician
HRA	High Radiation Area
LHRA	Locked High Radiation Area
LSC	liquid scintillation counter
NCR	Nuclear Condition Report
ODCM	Offsite Dose Calculation Manual
pCi/L	picocuries per liter
QC	quality control
radworker	radiation worker
RCA	radiologically controlled area
REMP	Radiological Environmental Monitoring Program
RP	Radiation Protection
RWP	Radiation Work Permit
SCBA	self-contained breathing apparatus
SDCB	storm drain collector basin
SDSP	Storm Drain Stabilization Pond
SFP	Spent Fuel Pool
SSC	systems, structures, and components
TB	turbine building
U1	Unit 1
U2	Unit 2
VHRA	Very High Radiation Area