



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

April 30, 2013

EA-13-081

Mr. Michael Annacone  
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.: 05000325/2013002 AND 05000324/2013002 AND EXERCISE  
OF ENFORCEMENT DISCRETION**

Dear Mr. Annacone:

On March 31, 2013, the U.S. 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 April 24, 2013, 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.

One NRC identified finding of very low safety significance (Green) was identified during this inspection. The finding did not involve a violation of NRC requirements. Additionally, a licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. The NRC is treating this violation as non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation/finding or the significance of the NCV/finding, 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.

If you disagree with the cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the Brunswick Steam Electric Plant.

In addition, a violation of Technical Specification 3.6.4.1, Secondary Containment was identified. Because the violation was identified during the discretion period described in Enforcement Guidance Memorandum 11-003, Revision 1, the NRC is exercising enforcement discretion in accordance with Section 3.5, "Violations Involving Special Circumstances," of the NRC Enforcement Policy and, therefore, will not issue enforcement action for this violation, subject to a timely license amendment request being submitted.

In accordance with 10 CFR 2.390 of the NRC's Rules of Practice, a copy of this letter, its enclosure, and your response (if any) 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, 324/2013002  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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/RA/

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Letter to Michael J. Annacone from Randall A. Musser April 30, 2013

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000325/2013002 AND 05000324/2013002

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-325, 50-324

License Nos.: DPR-71, DPR-62

Report Nos.: 05000325/2013002, 05000324/2013002

Licensee: Carolina Power and Light (CP&L)

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: 8470 River Road, SE  
Southport, NC 28461

Dates: January 1, 2013 through March 31, 2013

Inspectors: M. Catts, Senior Resident Inspector  
M. Schwieg, Resident Inspector  
C. Dykes, Health Physicist (Section 2RS5)  
L. Lake, Senior Reactor Inspection (Section 1R08)  
A. Nielsen, Senior Health Physicist (Sections 2RS2, 2RS4, 4OA1, 4OA5)  
W. Pursley, Health Physicist (Sections 2RS1, 2RS3, 4OA7)  
J. Worosilo, Project Engineer (Sections 1R04, 1R05, 1R20)

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

Enclosure

## SUMMARY OF FINDINGS

IR 05000325/2013002, 05000324/2013002; 01/01/13 – 03/31/13; Brunswick Steam Electric Plant, Units 1 & 2; Plant Modifications.

This report covers a three-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Green finding was identified by the inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, issued June 19, 2012 "Significance Determination Process" (SDP). The cross-cutting aspects were determined using IMC 0310, "Components Within the Cross-Cutting Areas", issued October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated January 28, 2013. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process" revision 4.

### A. NRC-Identified and Self-Revealing Findings

#### Cornerstone: Initiating Events

- Green. An NRC-identified Green finding was identified for the failure of the licensee to follow Procedure EGR-NGGC-0005, Engineering Change (EC), when performing the variable frequency drive (VFD) modification for the reactor recirculation pumps (RRPs). Specifically, between April 4, 2010 and the present, the licensee inappropriately used a Rapid Field Release (RFR) to revise the power supplies for the relays in the VFD system without re-evaluating the EC, the 10 CFR 50.59 Screen/Evaluation, and the Failure Modes and Effects Analysis (FMEA). This resulted in a new failure mode on a loss of the power supply causing a RRP runback and placing the plant in a flow transient, and a loss of cooling to the RRP seals. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 581202.

The performance deficiency associated with this finding was the failure of the licensee to follow Procedure EGR-NGGC-0005, Engineering Change (EC), when performing the VFD modification for the RRPs. The finding was more than minor because it was associated with the design control attribute of the Initiating Events Cornerstone and affects the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the VFD modification inappropriately causes a RRP runback on a loss of 480 VAC and core flow instability, and a loss of cooling to the RRP seals. Using IMC 0609, Appendix A, issued June 19, 2012, The SDP for Findings At-Power, the inspectors determined the finding was of very low safety significance because as a transient initiator due to the RRP runback, the finding did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The inspectors determined the finding was also of very low safety significance because as a loss of coolant accident (LOCA) initiator, after a reasonable assessment of degradation, the finding would not result in exceeding the reactor coolant system leak rate for a small break LOCA or likely affect other systems used to mitigate a LOCA resulting in a total loss of their function. The finding has a cross-cutting aspect in the area of human performance associated with the work control attribute because the licensee did not appropriately coordinate work activities by incorporating actions to address the impact of changes to the work scope, associated with the VFD modification, on the plant. [H.3(b)] (Section 1R18)

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B. Licensee-Identified Violations

A violation of very low safety significance that was identified by the licensee has been reviewed by inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee's CAP. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at 97 percent of rated thermal power (RTP). On February 8, 2013, the unit was down powered to 58 percent for a control rod sequence and power was returned to RTP on the same day and for the remainder of quarter.

Unit 2 began the inspection period at RTP. On January 5, 2013, the unit was down powered to 71 percent for rod improvement and power was returned to RTP on the same day. On January 12, 2013, the unit was down powered to 85 percent for rod improvement and power was returned to RTP on the same day. On March 2, 2013, the unit was shut down for a refueling outage and remained shut down for the remainder of the quarter.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R04 Equipment Alignment

##### .1 Quarterly Partial System Walkdowns (71111.04Q – 4 samples)

###### a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- Unit 2 125 VDC during fuel movement on January 20, 2013
- Unit 1 standby liquid control on February 28, 2013
- Unit 2 standby gas treatment A on March 18, 2013
- Unit 2 emergency diesel generator (EDG) 3 during Division I outage on March 28, 2013

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Final Safety Analysis Report (UFSAR), TS requirements, outstanding work orders (WOs), condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify that system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

Enclosure

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

During the week of March 25, 2013, the inspectors performed a complete system alignment inspection of the nuclear service water (NSW) system to verify the functional capability of the system. This system was selected because it was considered both safety-significant and risk-significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment line-ups, electrical power availability, system pressure and temperature indications, as appropriate, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding work orders (WOs) was performed to determine whether any deficiencies significantly affected the system's function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Quarterly Resident Inspector Tours (71111.05Q – 5 samples)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Heating, ventilation and air-conditioning equipment room, 70' elevation, 0PFP-CB-24
- Turbine building, 2PFP-TB2-8b, 2PFP-TB2-8d, and 2PFP-TB2-1n
- Battery rooms (1A, 1B, 2A, 2B), 1PFP-CB-7, 1PFP-CB-8, 1PFP-CB-9, and 1PFP-CB-10
- Service water building 13' & 20' elevations, 0PFP-SW-1b and 0PFP-SW-1a
- Radwaste building 23' elevation, 0PFP-RW-1b

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection

equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. The inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2 Annual Fire Protection Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

On February 5, 2013, the inspectors observed fire brigade performance during an unannounced fire drill. The observation was used to determine the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient firefighting equipment brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of pre-planned strategies; (9) adherence to the pre-planned drill scenario; and (10) drill objectives. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R06 Flood Protection Measures

.1 Review of Areas Susceptible to Internal Flooding (71111.06 – 1 sample)

a. Inspection Scope

The inspectors reviewed selected risk-important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures (AOPs), for licensee commitments. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire

suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the CAP to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant area to assess the adequacy of flood protection measures, and that the licensee complied with its commitments:

- Unit 2 rattle spaces between the turbine building and the Unit 2 reactor building, between the turbine building and Unit 1 reactor building, between the radwaste building and the Unit 1 reactor building, and between the radwaste building and the Unit 2 reactor building

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the licensee's testing of the Unit 1 Reactor Building Closed Cooling Water (RBCCW) "C" heat exchanger to verify that potential deficiencies did not mask the licensee's ability to detect degraded performance, to identify any common cause issues that had the potential to increase risk, and to ensure that the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk. The inspectors reviewed the licensee's observations as compared against acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of instrument inaccuracies on test results. Inspectors also visually inspected the service water side of the heat exchanger to ensure that the heat exchanger was free of debris and biological growth. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R08 In-service Inspection Activities (71111.08G – 1 sample)

From March 11, 2013 through March 15, 2013, the inspectors conducted a review of the implementation of the licensee's In-service Inspection (ISI) Program for monitoring degradation of the reactor coolant system, emergency feedwater systems, containment systems, and risk-significant piping and components.

.1 Piping Systems ISI

a. Inspection Scope

The inspectors observed or reviewed records of the following non-destructive examinations (NDE) mandated by the American Society of Mechanical Engineers (ASME) Code Section XI to evaluate compliance with the ASME Code Section XI and Section V requirements and, if any indications and defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement:

- Visual (VT-1) and Magnetic Particle Examination of Support 2-E21-40FS90, core spray system support
- Ultrasonic examination of weld 2E1146-20-FW62 on the residual heat removal (RHR) system
- Ultrasonic examination of weld 2E1145-15-FW58 on the RHR system
- Ultrasonic examination of Reactor Pressure Vessel (RPV) Flange to Vessel weld

The inspectors reviewed evaluations for unacceptable indications in the RPV flange to vessel weld that did not meet the acceptance requirements of IWB-3000 of Section XI. The inspectors also reviewed the results of examinations conducted this outage and the evaluations performed.

The inspectors observed or reviewed the following pressure boundary welds completed for risk-significant systems during the outage to evaluate if the licensee applied the pre-service NDE and acceptance criteria required by the construction code, NRC-approved code case, NRC-approved code relief request or the ASME Code Section XI. In addition, the inspectors reviewed the welding procedure specification and supporting weld procedure qualification records to evaluate if the weld procedures were qualified in accordance with the requirements of construction code and the ASME Code Section IX.

- WO 1489566 to cut out and replace Valve 2-E11-F046

The inspectors reviewed the following NDE activities associated with the inspection of reactor vessel internal components (boiling water reactors vessel internals project):

- Visual Examination (VT-1) of core spray T box
- Visual Examination (VT-3) of core spray lower bracket

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

## .2 Identification and Resolution of Problems

### a. Inspection Scope

The inspectors performed a review of ISI-related problems entered into the licensee's CAP and conducted interviews with licensee staff to determine if:

- The licensee had established an appropriate threshold for identifying ISI-related problems
- The licensee had performed a root cause (if applicable) and taken appropriate corrective actions
- The licensee had evaluated operating experience and industry generic issues related to ISI and pressure boundary integrity

The inspectors performed these reviews to evaluate compliance with 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, requirements. Documents reviewed are listed in the Attachment.

### b. Findings

No findings were identified.

## 1R11 Licensed Operator Requalification Program

### .1 Quarterly Review of Licensed Operator Requalification Testing and Training (71111.11Q – 1 sample)

#### a. Inspection Scope

On January 9, 2013, the inspectors observed a crew of licensed operators in the plant's simulator during an emergency preparedness (EP) drill to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and to ensure that training, where appropriate, was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- Licensed operator performance
- Crew's clarity and formality of communications
- Ability to take timely actions in the conservative direction
- Prioritization, interpretation, and verification of annunciator alarms
- Correct use and implementation of abnormal and emergency procedures
- Control board manipulations
- Oversight and direction from supervisors
- Ability to identify and implement appropriate TS actions and EP actions and notifications

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment.

Enclosure

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room (71111.11Q – 1 sample)a. Inspection Scope

Inspectors observed and assessed licensed operator performance in the plant and main control room, particularly during periods of heightened activity or risk and where the activities could affect plant safety. Specifically, on March 13, 2013, the inspectors observed Unit 2 evolutions following entry into AOP-20, Pneumatic (Air/Nitrogen) System Failures. The inspectors reviewed various licensee policies and procedures listed in the Attachment. The inspectors evaluated the following areas:

- Operator compliance and use of procedures
- Control board manipulations
- Communication between crew members
- Use and interpretation of plant instruments, indications and alarms
- Use of human error prevention techniques
- Documentation of activities, including initials and sign-offs in procedures
- Supervision of activities, including risk and reactivity management
- Pre-job briefs and crew briefs

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Unit 2 elevated integrated risk during fuel loading campaign on January 7, 2013
- Unit 1 elevated risk during repairs to reactor core isolation cooling (RCIC) on January 10, 2013
- Unit 2 elevated risk due to lower vessel inventory and reactor head lift during refueling outage on March 5, 2013
- Unit 2 elevated risk due to rattle space flooding on March 13, 2013
- Unit 2 elevated risk due to EDG 3 and emergency buses E3 and E7 outages on March 29, 2013



These activities were selected based on their potential risk-significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15 – 6 samples)

a. Inspection Scope

The inspectors reviewed the following six (6) issues:

- Unit 2 high pressure coolant injection (HPCI) flow controller indications when pump is secured on January 21, 2013
- Unit 1 RCIC flow controller battery issue on January 29, 2013
- Unit 1 1B-1 Battery low specific gravity on February 5, 2013
- Unit 2 RCIC steam detector failure on February 16, 2013
- Unit 2 reactor protection system electrical protection assembly 6 breaker potential to not trip on undervoltage on March 16, 2013
- Unit 2 Leakage past RHR discharge valves 2-E11-F027A and 2-E11-F028A on March 25, 2013

The inspectors selected these potential operability issues based on the risk-significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee's evaluations, to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors also reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R18 Plant Modifications

a. Inspection Scope

The following modification was reviewed and selected aspects were discussed with engineering personnel:

- Permanent modification to replace the 24 VDC power supply to the RRP VFD relays with a 120 VAC power supply

This document and related documentation were reviewed for adequacy of the associated 10 CFR 50.59 safety evaluation screening, consideration of design parameters, implementation of the modification, post-modification testing, and relevant procedures, design, and licensing documents were properly updated. The inspectors reviewed completed work activities to verify that installation was consistent with the design control documents.

b. Findings

Introduction. An NRC-identified Green finding was identified for the failure of the licensee to follow Procedure EGR-NGGC-0005, EC, when performing the VFD modification for the RRP. Specifically, between April 4, 2010 and the present, the licensee inappropriately used a RFR to revise the power supplies for the relays in the VFD system without re-evaluating the EC, the 10 CFR 50.59 Screen/Evaluation, and the FMEA. This resulted in a new failure mode on a loss of the power supply causing a RRP runback and placing the plant in a flow transient, and a loss of cooling to the RRP seals.

Description. Unit 1 and Unit 2 motor generator (MG) sets were replaced by the VFDs on April 14, 2010 and April 27, 2011, respectively. This modification was to provide a source of variable voltage and variable frequency for control of the RRP. The VFD/Recirculation Flow Control System (RFCS) was also installed to control the VFD inputs and outputs including inputs such as operator-demanded speed changes, runback signals and outputs such as VFD alarms and parameters. The RFCS interfaces with the digital feedwater control system (DFCS) where the DFCS generates portions of the signals needed to initiate runbacks of the RRP on low feedwater flow or low reactor vessel water level. During the modification to install the VFDs, licensee personnel believed that the relay contacts between the RFCS and the DFCS, that open to initiate the RRP runback, used 24 VDC across the contacts. Testing revealed that the contacts required 120 VAC in order to work correctly.

The licensee found this issue during a time critical portion of system installation and implemented a RFR to address the problem. The inspectors reviewed the procedure in effect at the time, Procedure EGR-NGGC-0005, EC, Revision 30, Section 9.3.9.3, which states that "If a revision is necessary during implementation of the EC, the responsible

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engineer may provide expedited revision information to the implementing organization using a RFR revision". The section further states to evaluate the needed change and ensure the following criteria are satisfied: 1) The revision does not involve changes to design inputs, and 2) The revision does not affect the conclusions of the original 10 CFR 50.59 Screen/Evaluation.

The 120 VAC source chosen to implement the interposing relay modification between the RFCS and the DFCS was the 480 V Emergency Buses E5 – E8, which was the same source for the previous relay configuration for the MG Set runback logic. However, when the loss of one of these emergency buses occurs, the interposing relay drops out, which signals the RFCS to command a runback of the RRP even though a runback is not needed for plant conditions. The previous MG Set control logic would issue a scoop tube lock when this power loss occurred and flow would remain stable. The new VFD control logic is not able to differentiate between the interposing relay dropping out because of a loss of power versus the relay dropping out due to a real runback condition. On a loss of a 480 V Emergency bus, the RRP will runback to approximately 34 percent speed, resulting in reactor power being reduced to 78 percent power and 80 Mlb/hr core flow. This will put the plant above the maximum extended load line limit on the power to core flow map, which the plant is not licensed to operate. Procedure 1(2)AOP-04.0, Low Core Flow, directs operations personnel to immediately take action to drive rods in and reduce core flow until recirculation flow matches between the two loops as required by TS 3.4.1, "Recirculation Loops Operating", which generally occurs around 35 percent power.

The licensee identified that this new failure mode existed on April 26, 2011 during operator training in the simulator; however, the licensee did not take actions to address this new failure mode. The inspectors determined that the licensee failed to follow Procedure EGR-NGGC-0005 when the RFR was created in April 2010, that the licensee did not evaluate the consequences or the acceptability of the modification when the issue was discovered in April 2011, or take corrective actions and revise the EC, the 10 CFR 50.59 Screen/Evaluation, and the FMEA.

The relay involved in the modification also provides part of the control logic for the RRP seal staging flow and the jet pump flow circuitry. On a loss of a 480 VAC bus, the RRP seal staging valve goes closed resulting in a loss of seal cooling to the RRP seal. The licensee evaluated this issue and determined that the control room operators will receive an annunciator for the seal staging valve being closed and will be directed to re-open the valve per the alarm response procedure in a timely manner. Also, on the loss of a 480 VAC bus, when the relay loses power, it appears to the jet pump flow indication logic that the RRP is not running, as opposed to having a runback. This results in one of the core flow indications being inaccurate; however, core flow indication will be available through another indicator. The inspectors reviewed these additional issues and determined the licensee's corrective actions were adequate.

After the inspectors' questions, the licensee performed a 10 CFR 50.59 Screen and Evaluation under NCR 581202. The licensee determined that a 10 CFR 50.59 Evaluation was needed since the 10 CFR 50.59 Screen determined the modification involved a change to a system, structure, or component that adversely effects an

UFSAR analysis described design function. The licensee performed the 10 CFR 50.59 Evaluation and determined a license amendment was not required.

The licensee plans to remove the power supply issues that result in the reactor recirculation runback, the loss of seal staging flow, and the jet pump flow indication issues in the Long Range Plan tracked under LTAM BNP-11-0248.

Analysis. The performance deficiency associated with this finding was the failure of the licensee to follow Procedure EGR-NGGC-0005, Engineering Change (EC), when performing the VFD modification for the RRP. The finding was more than minor because it was associated with the design control attribute of the Initiating Events Cornerstone and affects the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the VFD modification inappropriately causes a RRP runback on a loss of 480 VAC and core flow instability, and a loss of cooling to the RRP seals. Using IMC 0609, Appendix A, issued June 19, 2012, The SDP for Findings At-Power, the inspectors determined the finding was of very low safety significance because as a transient initiator due to the RRP runback, the finding did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The inspectors determined the finding was also of very low safety significance because as a LOCA initiator, after a reasonable assessment of degradation, the finding would not result in exceeding the reactor coolant system leak rate for a small break LOCA or likely affect other systems used to mitigate a LOCA resulting in a total loss of their function. The finding has a cross-cutting aspect in the area of human performance associated with the work control attribute because the licensee did not appropriately coordinate work activities by incorporating actions to address the impact of changes to the work scope, associated with the VFD modification, on the plant. [H.3(b)]

Enforcement. This finding does not involve enforcement action because no regulatory requirement violation was identified since the reactor recirculation pumps are not safety-related. The licensee entered this issue into the CAP as NCR 581202. Because this finding does not involve a violation and is of very low safety or security significance, it is identified as FIN 05000325/2013002-01 and 05000324/2013002-01, Failure to Follow Procedure for Variable Frequency Drive Reactor Recirculation Pump Design Modification.

#### 1R19 Post Maintenance Testing (71111.19 – 6 samples)

##### a. Inspection Scope

The inspectors reviewed the following post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- OPT-08.2.2b, 1B RHR Room Cooler Fan and Damper Test after damper failure and repair on November 9, 2012
- OPT-09.2, HPCI Operability Test after planned maintenance on January 8, 2013

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- OPT-12.2C, EDG 3 Operability Monthly Load Test after diesel outage on January 13, 2013
- 1PT-24.1-1, Unit 1 1B NSW pump after planned maintenance on January 16, 2013
- OPT-10.1.8, Unit 2 RCIC after maintenance outage on January 23, 2013
- 2OP-43, NSW header restoration after planned outage on March 22, 2013

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following, as applicable: the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing, and test documentation was properly evaluated. The inspectors evaluated the activities against TS and the UFSAR to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R20 Outage Activities

Refueling Outage Activities (71111.20)

a. Inspection Scope

The inspectors reviewed the outage plan and contingency plans for the Unit 2 refueling outage, conducted March 2, 2013 through the end of the quarter, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth.

During the refueling outage, the inspectors observed portions of the shutdown and cool down processes and monitored licensee controls over the outage activities listed below.

- Licensee configuration management, including maintenance of defense-in-depth for key safety functions and compliance with the applicable TS when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error

- Controls over the status and configuration of electrical systems to ensure that TS and outage safety plan requirements were met, and controls over switchyard activities
- Monitoring of decay heat removal processes, systems, and components
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss
- Controls over activities that could affect reactivity
- Maintenance of secondary containment as required by TS
- Defueling activities, including fuel handling and sipping to detect fuel assembly leakage
- Licensee identification and resolution of problems related to refueling outage activities

The completed sample will be documented in the second quarter report at the conclusion of the refueling outage. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R22 Surveillance Testing

.1 Routine Surveillance Testing (71111.22 – 3 surveillance test samples)

a. Inspection Scope

The inspectors either observed surveillance tests or reviewed the test results for the following activities to verify the tests met TS surveillance requirements, UFSAR commitments, in-service testing 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. Documents reviewed are listed in the Attachment.

- 0MST-BATT12W, Diesel Fire Pump Starting Batteries Weekly Operability Test on January 27, 2013
- 1MST-RSDP21R, Remote Shutdown and Main Control Panel Reactor Water Level Indication Channel Calibration on February 8, 2013
- 2MST-BATT11AR, 125VDC Battery 2A-1 Service Capacity Test on March 26, 2013

b. Findings

No findings were identified.

.2 In-Service Testing (IST) Surveillance (71111.22 – 1 IST sample)

a. Inspection Scope

The inspectors reviewed the performance of the following test:

- OPT-08.1.4B, RHR Service Water System Operability Test – Loop B on February 7, 2013

Inspectors evaluated the effectiveness of the licensee's ASME Section XI testing program for determining 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. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.3 Containment Isolation Valve Testing (71111.22 – 2 isolation valve samples)

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- OPT-20.3-E11, RHR Local Leak Rate Testing for 2-E11-F015B on March 18, 2013
- OPT-20.3-E21, CS Local Leak Rate Testing for 2-E21-F004A on March 19, 2013

The inspectors observed in-plant activities and reviewed procedures and associated records to determine whether: any preconditioning occurred; acceptance criteria were clearly stated and were consistent with the system design basis; measuring and test equipment calibration was current; test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied; test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; test data and results were accurate, complete, within limits, and valid; where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable; equipment was returned to a position or status required to support the performance of its safety functions; and all problems identified during the testing were appropriately documented and dispositioned in the CAP. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1EP6 Emergency Planning Drill Evaluation (71114.06 – 1 sample)

a. Inspection Scope

The inspectors observed a site EP training drill conducted on January 9, 2013. The inspectors reviewed the drill scenario narrative to identify the timing and location of classifications, notifications, and protective action recommendations development activities. During the drill, the inspectors assessed the adequacy of event classification and notification activities. The inspectors observed portions of the licensee's post-drill critique. The inspectors verified that the licensee properly evaluated the drill performance with respect to performance indicators and assessed drill performance with respect to drill objectives. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2. RADIATION SAFETY [RS]

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 1 sample)

a. Inspection Scope

Hazard Assessment and Instructions to Workers: During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, high radiation areas (HRA)s, Locked High Radiation Areas (LHRA)s, and Very High Radiation Areas (VHRA)s established within the radiologically controlled area (RCA) of the Unit 1 (U1) and Unit 2 (U2) reactor buildings, U1 and U2 turbine buildings, and radioactive waste (radwaste) processing and storage locations. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected RCA areas, including the Independent Spent Fuel Storage Installation (ISFSI). The inspectors reviewed survey records for several plant areas including surveys for alpha emitters, discrete radioactive particles, airborne radioactivity, and pre-job surveys for upcoming tasks. The inspectors also discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection. For selected outage jobs, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

Hazard Control and Work Practices: The inspectors evaluated access barrier effectiveness for selected LHRA locations and discussed procedural guidance for LHRA and VHRA controls with health physics (HP) supervisors. The inspectors reviewed implementation of controls for the storage of irradiated material within the spent fuel pool (SFP). Established radiological controls (including airborne controls) were evaluated for workers entering the U2 drywell and reactor building to conduct work associated with Quality Control (QC) inspections, motor operated valve activities, chemical decontamination associated with reactor water cleanup activities, inboard main steam isolation valve (MSIV) activities, and torus diving activities. In addition, the inspectors

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reviewed licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations.

Through direct observations and interviews with licensee staff, the inspectors evaluated occupational workers' adherence to selected RWPs and HP technician proficiency in providing job coverage. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for selected U2 Refueling Outage 21 (B221R1) job tasks. As part of Inspection Procedure (IP) 71124.04, the inspectors reviewed the use of personnel dosimetry (ED alarms, extremity dosimetry, multi-badging in high dose rate gradients, etc.). The inspectors also evaluated worker responses to dose and dose rate alarms during selected work activities.

Control of Radioactive Material: The inspectors observed surveys of material and personnel being released from the RCA using small article monitor (SAM), personnel contamination monitor (PCM), and portal monitor (PM) instruments. The inspectors reviewed calibration records for selected release point survey instruments and discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff. The inspectors evaluated the appropriateness of radionuclide sources used for detector testing and calibration. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Problem Identification and Resolution: The inspectors reviewed and assessed CAP documents associated with radiological hazard assessment and exposure control. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

Radiation protection activities were evaluated against the requirements of Updated Final Safety Analysis Report (UFSAR) Section 12, Technical Specifications (TS) Sections 5.7.1 and 5.7.2, 10 Code of Federal Regulations (CFR) Parts 19 and 20, and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material". Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2RS2 Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls (71124.02 – 1 sample)

a. Inspection Scope

Work Planning and Exposure Tracking: The inspectors reviewed planned work activities and their collective exposure estimates for the B221R1 outage. The inspectors reviewed ALARA planning packages for the following high collective exposure tasks: refuel floor work, small bore pipe replacement, and control rod drive activities. For the selected tasks, the inspectors reviewed established dose goals and discussed assumptions regarding the bases for the current estimates with responsible ALARA planners. The inspectors evaluated the incorporation of exposure reduction initiatives and operating

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experience, including historical post-job reviews, into RWP requirements. Day-to-day collective dose data for the selected tasks were compared with established dose estimates and evaluated against procedural criteria (work-in-progress review limits) for additional ALARA review. Where applicable, the inspectors discussed changes to established estimates with ALARA planners and evaluated them against work scope changes or unanticipated elevated dose rates.

Source Term Reduction and Control: The inspectors reviewed the collective exposure three-year rolling average from 2009 – 2011. The inspectors evaluated historical dose rate trends for recirculation system piping and compared them to current B221R1 data. Source term reduction initiatives, including cobalt reduction and noble metals injection, were reviewed and discussed with Chemistry and HP staff. The inspectors also reviewed temporary shielding packages for the B221R1 outage.

Radiation Worker Performance: The inspectors observed radiation worker performance for MSIV work and under-vessel activities. The inspectors observed ALARA briefings for Control Rod Drive Mechanism (CRDM) replacement and for various HRA jobs in the U2 reactor building and drywell. Radiation worker performance was also evaluated as part of IP 71124.01. While observing job tasks, the inspectors evaluated the use of remote technologies to reduce dose including teledosimetry and remote visual monitoring.

Problem Identification and Resolution: The inspectors reviewed and discussed selected CAP documents associated with ALARA program implementation. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

ALARA program activities were evaluated against the requirements of UFSAR Section 12, TS Section 5.4, 10 CFR Part 20, and approved licensee procedures. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03 – 1 sample)

a. Inspection Scope:

Engineering Controls: The inspectors evaluated the use of engineering controls to mitigate potential airborne conditions including operation of the U2 dry well purge, refueling floor ventilation, and installation of temporary High Efficiency Particulate Air (HEPA) filtration systems for selected tasks and operations during B221R1. The evaluation included procedural guidance, operability testing, and equipment configurations during specific tasks. In addition, plant guidance and its implementation for the monitoring of potential airborne beta-gamma and alpha-emitting radionuclides during insulation removal were reviewed and discussed with licensee representatives.

Use of Respiratory Protection Devices: The inspectors reviewed procedural guidance for the issuance and use of respiratory protection devices and discussed program implementation with responsible licensee representatives. The inspectors reviewed Total Effective Dose Equivalent (TEDE)-ALARA evaluations conducted for selected

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B221R1 tasks. The inspectors reviewed whole-body count routine and investigative analysis results for occupational workers. The use of respiratory protective equipment was evaluated for the workers involved in B221R1 initial dry well entry and those involved in dry well insulation removal activities. The inspectors toured selected onsite compressors available for supplying breathing air for current outage activities and reviewed Grade D or greater air certification records. The inspectors reviewed training, fit testing, and medical qualification records for selected HP, maintenance, and operations staff using respiratory protection devices for B221R1 activities.

Self-Contained Breathing Apparatus (SCBA) for Emergency Use: The inspectors reviewed the current status, operability and availability of selected SCBA equipment maintained within the operations support center, U1 and U2 control rooms, and reactor auxiliary building. Maintenance activities for selected respiratory protective equipment, e.g., compressed gas cylinders, regulators, valves, and hose couplings, by certified vendor technicians were evaluated for selected SCBA units. The inspectors evaluated training, fit testing, and medical qualification records for selected HP, maintenance, and operations staff assigned emergency response duties. The inspectors discussed SCBA use and training activities, including maintenance of corrective lens inserts and hands-on annual requalification training, with on-shift control room operators.

Problem Identification and Resolution: The inspectors reviewed CAP documents within the area of radiological airborne controls and respiratory protection activities. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedural guidance. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

HP program activities associated with airborne radioactivity monitoring and controls were evaluated against details and requirements documented in the UFSAR Sections 11 and 12; TS Section 5.4, 10 CFR Part 20; and approved licensee procedures. Documents reviewed are listed in the Attachment.

b. Findings:

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04 – 1 sample)

a. Inspection Scope

External Dosimetry: The inspectors reviewed National Voluntary Laboratory Accreditation Program (NVLAP) certification data (including thermoluminescent dosimeter (TLD) testing for neutron, gamma, and beta exposures) and discussed program guidance for storage, processing, and evaluation of results for active and passive personnel dosimeters currently in use. Comparisons between ED and TLD data were discussed in detail. In addition, the inspectors reviewed ED alarm logs and evaluated licensee assessment actions for selected alarm events.

Internal Dosimetry: Program guidance, instrument detection capabilities, and assessment results for internally deposited radionuclides were reviewed in detail. The inspectors reviewed selected *in vivo* (Whole Body Count) analyses associated with intakes of radionuclides. Capabilities for collection and analysis of bioassay samples collected from torus divers were evaluated and discussed with licensee staff.

Special Dosimetric Situations: The inspectors evaluated the licensee's use of multi-badging, extremity dosimetry, and dosimeter relocation within non-uniform dose rate fields (e.g. during under-vessel work) and discussed worker monitoring in neutron areas with licensee staff. The inspectors also reviewed records of monitoring for declared pregnant workers from March 2010 to March 2013 and discussed monitoring guidance with dosimetry staff. In addition, the adequacy of shallow dose assessments for selected Personnel Contamination Events occurring between March 2010 and December 2012 were reviewed and discussed.

Problem Identification and Resolution: The inspectors reviewed and discussed selected CAP documents associated with occupational dose assessment. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

Occupational dose assessment activities were evaluated against the requirements of UFSAR Section 12; TS Section 5.4; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05 – 1 sample)

a. Inspection Scope

Walkdowns and Observations: During tours of the reactor buildings, SFP areas, control room, and RCA exit point, the inspectors observed installed radiation detection equipment including the following instrument types: area radiation monitors (ARM)s, continuous air monitors, PCMs, SAMs, PMs, and liquid and gaseous effluent monitors. The inspectors observed the physical location of the components, noted the material condition, and compared sensitivity ranges with UFSAR requirements. In addition to equipment walk-downs, the inspectors observed source checks and alarm setpoint testing of various portable and fixed detection instruments, including ion chambers, a telepole, PCMs, SAMs, and PMs. Material condition of source check devices, device operation, and establishment of source check acceptance ranges were also discussed with calibration lab personnel.

Calibration and Testing: The inspectors reviewed the last two calibration records for selected ARMs, PCMs, PMs, SAMs, and containment high-range ARMs and the most recent calibration record for a whole body counter. Inspectors reviewed records of survey instrument function/source checks and observed and discussed performance of required checks with calibration lab personnel. Calibration source documentation was reviewed for the ARM high-range calibrator and the Cs-137 source used for portable instrument checks. Calibration stickers on portable survey instruments were reviewed

and inspections of storage areas for 'ready-to-use' equipment were completed during walkdowns. The inspectors reviewed alarm setpoint values for selected ARMs, PCMs, PMs, SAMs, and effluent monitors. The inspectors also reviewed count room QC records for germanium detectors and liquid scintillation detectors.

Problem Identification and Resolution: The inspectors reviewed selected NCRs in the area of radiological instrumentation. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

Operability and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737, "Clarification of TMI Action Plan Requirements"; TS Section 3; UFSAR Chapters 11 and 12; and applicable licensee procedures. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Initiating Events Cornerstone (71151 – 6 samples)

a. Inspection Scope

To verify the accuracy of the PI data reported to the NRC, the inspectors compared the licensee's basis in reporting each data element listed below to the PI definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, Regulatory Assessment Indicator Guideline.

- Units 1 and 2 unplanned scrams per 7000 critical hours
- Units 1 and 2 unplanned scrams with complications
- Units 1 and 2 unplanned power changes per 7000 critical hours

The inspectors sampled licensee submittals for the performance indicators listed above for the period from the 1<sup>st</sup> quarter 2012 through the 4<sup>th</sup> quarter 2012. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports and NRC inspection reports for the period to validate the accuracy of the submittals. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2 Occupational Radiation Safety Cornerstone (711151 – 1 sample)

a. Inspection Scope

The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from January 2012 through December 2012. For the assessment period, the inspectors reviewed ED alarm logs and NCRs related to controls for exposure significant areas. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the report Attachment.

b. Findings

No findings were identified.

.3 Public Radiation Safety Cornerstone (711151 – 1 sample)

a. Inspection Scope

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from January 2012 through December 2012. For the assessment period, the inspectors reviewed cumulative and projected doses to the public contained in liquid and gaseous release permits and NCRs related to Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the report Attachment.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems

.1 Routine Review of Items Entered Into the CAP

a. Inspection Scope

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 action request reports.

b. Findings

No findings were identified.

.2 Selected Issue Follow-up Inspection (71152 – 1 sample)

a. Inspection Scope

The inspectors reviewed a sample of critical components with no preventative maintenance scheduled. The inspectors reviewed these components to verify that the licensee fully identified all required preventative maintenance and that no further corrective actions were needed for these components. The inspectors evaluated these components against the requirements in the licensee's preventative maintenance program and the CAP. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4OA3 Follow-up of Events (71153 – 1 sample)

Notice of Unusual Event for Toxic, Corrosive, Asphyxiant or Flammable Gases in Amounts that Have or Could Adversely Affect Normal Plant Operation

a. Inspection Scope

For the plant event listed below, the inspectors reviewed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional NRC personnel, and compared the event details with criteria contained in IMC 0309, issued October 28, 2011, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that the licensee made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR 50.72. The inspectors reviewed the licensee's follow-up actions related to the events to assure that the licensee implemented appropriate corrective actions commensurate with their safety significance. Documents reviewed are listed in the Attachment.

- On February 26, 2013, a Freon leak from the 2A turbine building chiller oil pump discharge line was discovered by an area operator, meeting the criteria for a Notice of Unusual Event declaration in accordance with Emergency Action Level HU 3.1, Toxic, Corrosive, Asphyxiant or Flammable Gases in Amounts that Have or Could Adversely Affect Normal Plant Operations.

b. Findings

No findings were identified.

4OA5 Other Activities.1 Quarterly Resident Inspector Observations of Security Personnel and Activitiesa. 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. Inspectors also observed security shift turnover. These observations took place during both normal and off-normal plant working hours. These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status reviews and inspection activities.

b. Findings

No findings were identified.

.2 Operation of an Independent Spent Fuel Storage Installation (ISFSI) (60855.1 – 2 samples)a. Inspection Scope

During the inspection period the inspectors conducted two observations of ISFSI cask loadings to ensure fuel was loading in accordance with procedures. Inspectors walked down the ISFSI pad to ensure that the licensee has maintained fuel stored in the ISFSI in a safe manner and in compliance with approved procedures. Inspectors also reviewed selected records to ensure that the licensee has identified each fuel assembly placed in the ISFSI, has recorded the parameters and characteristics of each fuel assembly, and has maintained a record of each fuel assembly as a controlled document.

b. Findings

No findings were identified.

.3 Implementation of Enforcement Guidance (EGM) 11-003, Revision 1, Enforcement Guidance Memorandum on Dispositioning Boiling Water Reactor Licensee Noncompliance with Technical Specification Containment Requirements During Operations with a Potential for Draining the Reactor Vessela. Inspection Scope

The inspectors reviewed the plant's implementation of NRC EGM 11-003, Revision 1, during Unit 2 maintenance activities which had the potential to drain the reactor vessel during the Unit 2 refueling outage. The activities were:

- Draining of the control rod drive hydraulic control units on March 7, 2013
- Reactor bottom head drain maintenance on March 8, 2013

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- RHR Service Water B Loop draining on March 20, 2013
- RHR Service Water A Loop draining on March 23, 2013
- Reactor bottom head drain valve maintenance on March 25, 2013

These activities took place without secondary containment being operable. Inspectors verified compliance with the guidelines of EGM 11-003 prior to and during these activities.

b. Findings

A violation of TS 3.6.4.1 was identified. However, because the violation was identified during the discretion period described in EGM 11-003, Revision 1, the NRC is exercising enforcement discretion in accordance with Section 3.5, "Violations Involving Special Circumstances," of the NRC Enforcement Policy and, therefore, will not issue enforcement action for this violation, subject to a timely license amendment request being submitted.

.4 (Closed) NRC Temporary Instruction 2515/187 – Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns

a. Inspection Scope

Inspectors verified the following licensee's walkdown packages contained the elements as specified in Nuclear Energy Institutes 12-07 Walkdown Guidance document:

- Units 1 and 2, Flood Protection Feature 6BL, Service Water Building, 4' Elevation, Pipe Penetration Seal\20-8" Pipe Sleeves
- Units 1 and 2 Flood Protection Feature 6BL, Emergency Diesel Building, 12' Elevation, Pipe Penetration Seal\24-5" Pipe Sleeves

The inspectors accompanied the licensee on their walkdown of:

- Units 1 and 2 Flood Protection Feature 6BL, Emergency Diesel Building, 12' Elevation, Pipe Penetration Seal\20-5" Pipe Sleeves

The inspectors verified that the licensee confirmed the following flood protection features:

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed
- Reasonable simulation
- Critical SSC dimensions were measured
- Available physical margin, where applicable, was determined
- Flood protection feature functionality was determined using either visual observation or by review of other documents

The inspectors independently performed their walkdown and verified that the following flood protection features were in place:

Enclosure

- Unit 1 Reactor Building Rail Road Doors (Severe Weather Doors 209 and 210)

The inspectors verified that the licensee confirmed the following flood protection features:

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed
- Flood protection feature functionality was determined using either visual observation or by review of other documents

The inspectors verified that noncompliance with current licensing requirements, and issues identified in accordance with the 10 CFR 50.54(f) letter, Item 2.g of Enclosure 4, were entered into the licensee's CAP. In addition, issues identified in response to Item 2.g that could challenge risk-significant equipment and the licensee's ability to mitigate the consequences will be subject to additional NRC evaluation.

b. Findings

(Opened) Unresolved Item (URI) 05000325/2013002-02 and 05000324/2013002-02, Potential Flood Impacts due to Degraded Flood Protection Measures

Introduction: The inspectors are opening a URI associated with the potential for flood intrusion into the service water building, reactor building, and emergency diesel generator building due to degraded flood protection measures to determine if a performance deficiency exists.

Description: From August through October, 2012, the licensee performed walkdowns of flood protection measures in accordance with Nuclear Energy Institutes 12-07 Walkdown Guidance. The licensee and inspectors identified degraded or missing flood protection measures in the service water building, reactor building, and emergency diesel generator building. The inspectors are opening a URI to review the licensee's evaluation of these flood protection deficiencies and determine if a performance deficiency exists. The licensee entered these issues into the CAP as NCR 600850. This issue is being tracked as: URI 05000325/2013002-02 and 05000324/2013002-02, Flood Impacts due to Degraded Flood Protection Measures.

.5 Teleconference to Discuss Status Of Groundwater Monitoring Program

On March 12, 2013, the inspectors held a teleconference with licensee staff to discuss the status of the groundwater monitoring program. The licensee provided an update on tritium concentrations in water collected from onsite and offsite groundwater and surface water sampling locations and discussed ongoing remediation efforts associated with the Storm Drain Stabilization Pond (SDSP) and areas near a U1 Condensate Storage Tank (CST) underground pipe leak. Although seasonal fluctuations can occur, the inspectors noted that onsite tritium concentrations in and near the SDSP have generally trended downward since 2007 when the contamination was discovered and corrective actions were initiated. The licensee has installed shallow and intermediate-depth wells in the vicinity of a U1 CST piping leak (from December 2010) in order to better characterize the

tritium plume and to facilitate remediation of the groundwater. Some of these wells have detected low levels of tritium in the top of the Castle-Hayne aquifer in the area immediately below the Brunswick site. Wells have also been constructed further away from the leak site to monitor any plume migration through the Castle-Hayne. Samples taken from these wells have not shown any detectable tritium. The inspectors noted that although very low concentrations of tritium have been identified periodically in the offsite environs, e.g., Nancy's Creek immediately adjacent to the SDSP, all reported values for offsite samples have remained significantly below established regulatory limits. The licensee is currently remediating the groundwater around the SDSP through a network of sub-surface pumping wells. Water pumped from this network is transferred to a double-lined retention pond. Publicly available information regarding onsite groundwater monitoring and radionuclide concentrations in the environment near Brunswick Steam Electric Plant can be found in the Annual Radiological Environmental Operating Report. Recently issued reports can be found on the NRC's public website:

<http://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-specific-reports/bru1-2.html>.

#### 4OA6 Management Meetings

##### Exit Meeting Summary

On April 24, 2013, the inspectors presented the inspection results of the quarterly integrated inspection activities to Mr. Michael Annacone, and other members of the licensee staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection period.

#### 4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy, for being dispositioned as a Non-Cited Violation.

Technical Specification 5.7.1, "High Radiation Area", requires posting and barricading of HRAs with dose rates not exceeding 1 Rem/hour at 30 centimeters from the radiation source or from any surface penetrated by the radiation. Contrary to this, on April 25, 2012, an unposted and unbarricaded HRA was identified by the licensee in the Unit 1 Reactor Building 80' elevation Reactor Water Clean-Up (RWCU) Precoat Tank area. During the previous shift, following a RWCU Back Wash Receiving Tank (BWRT) resin transfer "drop" to the Radwaste RWCU phase separators, a survey was performed and the area was downposted from HRA to RA. However, the survey failed to detect dose rates on the piping underneath the Unit 1 RWCU Precoat tank of 2.5 Rem/hour contact and 0.4 Rem/hour at 30 centimeters. The elevated dose rates were not found until a procedurally required follow-up survey was performed approximately 3.5 hours later by another HP technician. The technician took immediate corrective actions including posting and barricading the affected area. This finding was of very low safety significance (Green) because there was no substantial potential for overexposure. This was based on the fact that no workers entered the hotspot area underneath the Precoat tank during the brief period that the area was not properly controlled. In addition, the

dose rates involved were not high enough to provide a substantial potential for overexposure. The licensee entered the issue into their CAP as NCR 532588.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

M. Annacone, Site Vice President  
Y. Anagostopoulos, General Manager – Major Projects  
A. Brittain, Manager – Security  
P. Dubrouillet, Manager – Nuclear Systems Engineering  
C. Dunsmore, Manager – Shift Operations  
G. Galloway, Superintendent – Nuclear Oversight  
S. Gordy, Manager – Maintenance  
L. Grzeck, Supervisor – Regulatory Affairs  
K. Hamm, Superintendent – Mechanical Maintenance  
B. Houston, Manager – Environmental and Radiological Controls  
F. Jefferson, Manager – Nuclear Systems Engineering  
J. Kalamaja, Manager – Operations  
G. Kilpatrick, Manager – Training  
J. Krakuszeski, Plant General Manager  
S. Larsen, Engineer – ISI Program  
M. McGowan, Supervisor – Environmental  
M. Millinor, Senior Chemistry Specialist  
W. Murray, Licensing Specialist  
D. Petrusic, Superintendent – Environmental and Chemistry  
A. Pope, Manager – Nuclear Support Services  
J. Price, Director – Engineering  
M. Regan, Contractor – Outage and Project Support  
T. Sherrill, Licensing Specialist  
T. Silar, Control Silar Services  
M. Stacy, Manager – Nuclear Major Projects  
J. Sullivan, Engineer – Containment  
M. Turkal, Licensing Specialist  
S. Williams, Internals Engineer – Containment  
E. Wills, Director – Site Operations  
O. Wisbon, Superintendent – Electrical, Instrumentation and Controls Maintenance

#### **NRC Personnel**

R. Cady, Sr. Performance Assessment Analyst, Office of Nuclear Regulatory Research  
R. Conatser, Health Physicist, Office of Nuclear Reactor Regulation  
G. Hopper, Chief, Reactor Projects Branch 7, Division of Reactor Projects Region II  
T. Nicholson, Sr. Technical Advisor for Radionuclide Transport, Office of Nuclear Regulatory Research  
R. Musser, Chief, Reactor Projects Branch 4, Division of Reactor Projects Region II  
T. Reis, Director, Division of Reactor Safety  
J. Worosilo, Project Engineer, Division of Reactor Projects Region II

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened and Closed

05000325, 324/2013002-01	FIN	Failure to Follow Procedure for Variable Frequency Drive Reactor Recirculation Pump Design Modification (Section 1R18)
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### Opened

05000325, 324/2013002-02	URI	Flood Impacts due to Degraded Flood Protection Measures (Section 4OA5.4)
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### Closed

NRC Temporary Instruction 2515/187	TI	Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (Section 4OA5.4)
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## LIST OF DOCUMENTS REVIEWED

### **Common Documents Reviewed**

Updated Final Safety Analysis Report  
 Individual Plant Examination  
 Individual Plant Examination of External Events  
 Technical Specifications and Bases  
 Technical Requirements Manual  
 Control Room Narrative Logs  
 Plan of the Day

### **Section 1R04: Equipment Alignment**

#### Procedures

OPT-21.1, Control Building Emergency Filter System Test  
 OOP-37, Control Building Ventilation System Operating Procedure  
 OPT-46.6, Control Room Inleakage Tracer Gas Test  
 OPT-46.4, Control Building HVAC Auto Initiation  
 OENP-54, Building Ventilation Pressure Control Program  
 2OP-43, Service Water System Operating Procedure  
 2OP-51, Unit 2 D.C. Distribution System Operating Procedure  
 OI-50, 125/250 VDC Load List  
 OPT-06.1, SLC System Operability Test  
 OP-39, Diesel Generator Operating Procedure  
 OP-10, Standby Gas Treatment System Operating Procedure

Condition Reports

578363	520942	505028	585123	583973	566104
488836	546427				

Work Orders

572213

Drawings

D-02537 Sheet 1, Reactor Building Service Water System Piping Diagram  
D-02537 Sheet 2, Reactor Building Service Water System Piping Diagram  
D-02274 Sheet 1, Diesel Generator Service Water and Demineralized Water Systems Piping Diagram  
D-02274 Sheet 2, Diesel Generator Service Water and Demineralized Water Systems Piping Diagram  
D-02041 Sheet 2, Service Water Piping Diagram  
F-04080, Unit 1 & 2 Control Building Air Flow Diagram  
F-04207, Fire Protection Control Building Diesel Generator Oil Tank Rooms Ventilation and Smoke Removal System  
F-03006, 125/250 VDC Switchboard 2A and 2B Single Line Unit 2  
D-25047, Unit 1 SLC System  
F-02271, Unit 2 EDG Lube Oil Piping Diagram  
D-02273, Units 2 EDG Jacket Water Piping Diagram  
D-02269, Units 2 EDG Fuel Oil Piping Diagram  
D-02266, Units 2 Starting Air for EDGs  
F-04073, Standby Gas Treatment

Miscellaneous

Regulatory Guide 1.196, Control Room Habitability At Light-Water Nuclear Power Reactors  
SD-37, Control Building Heating, Ventilation, and Air-Conditioning System  
SD-43 Service Water System  
SD-05, Standby Liquid Control System  
SD-39, Emergency Diesel Generator  
SD-10, Standby Gas Treatment System

**Section 1R05: Fire Protection**Procedures

0PFP-CB-24, Heating, Ventilation and Air-Conditioning Equipment Room, 70' Elevation  
0PFP-PBAA, Power Block Auxiliary Areas Prefire Plans  
2PFP-TB2-8b, Turbine building  
2PFP-TB2-8d, Turbine building  
2PFP-TB2-1n, Turbine building  
0PFP-CB, Control Building Prefire Plan  
2PFP-TB, Turbine Building Prefire Plans  
0PT-34.11.2.0, Portable Fire Extinguisher Inspection  
0FPP-014, Control of Combustible, Transient Fire Loads, and Ignition Sources  
0PLP-01, Fire Protection Program Document  
0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements

Condition Reports

591407

Drawings

F-04207, Fire Protection Control Building Diesel Generator Oil Tank Rooms Ventilation and Smoke Removal System

Miscellaneous

SD-37, Control Building Heating, Ventilation, and Air-Conditioning System

**Section 1R06: Flood Protection**

Procedures

0AI-68, Brunswick Nuclear Plant Response to Severe Weather Warnings  
 0PT-34.2.2.1, Fire Door, Pressure Boundary Door, Alternate Safe Shutdown Access/Egress Door, and Severe Weather/Flood Control Door Inspections  
 EGR-NGGC-0351 Condition Monitoring of Structures  
 0PEP-02.6, Severe Weather

Condition Reports

561238

Work Orders

2034173	2140411	2140410	2034123	2049722	2151286
2151285	2151028	2151026	2151885	2151883	2151881
2151880	2151878				

Drawings

FP-82632, Penetration Seals  
 D-02779, Reactor Building Floor & Wall Sleeves

Miscellaneous

Deficiencies with Penetrations to Rattlespaces, February 7, 2013  
 Link Seal Vendor Manual

**Section 1R07: Heat Sink Performance**

Procedures

0ENP-2704, Administrative Control of NRC Generic Letter 89-13 Requirements  
 NLS-90-005, CP&L Response To NRC Generic Letter 89-13  
 OP-21, Reactor Building Closed Cooling Water System

Drawings

D-25038, Unit 1 Reactor Building Closed Cooling Water System

Miscellaneous

SD-21, Reactor Building Closed Cooling Water System

**Section 1R08: In-service Inspection Activities**



Procedures

NDE Appendix B, NDE Surface Examination Criteria  
 NDEP-0301, Dry Powder Magnetic Particle Examination  
 NDEP-0425, Ultrasonic Examination of Austenitic Pipe Welds (PDI)  
 NDEP-0437, Manual Ultrasonic Examination Procedure for Ferritic Pipe Welds (PDI)  
 NDEP-0613, VT-3 Visual Examination of Nuclear Power Plant Components  
 OPT-20.5.1, Primary Containment Inspection  
 OPT-90.1, Vessel Internal Component Remote Examinations

Condition Reports

453572            595573            595476

Work Orders

1489566            1933588

Miscellaneous

Basis Document for Reactor Pressure Vessel & Internals OBNP-TR-013  
 BWB Weld Recovery Plan  
 Core Spray A Loop Tee Box Flaw Evaluation 2B11-0043  
 Reactor Pressure Vessel & Internals Inspection Plan  
 Structural Integrity Flaw Evaluation Report No. 1100470.401  
 Weld Procedure Qualification Records for SFA No. 518, 5.18/5.1  
 Weld Procedure Specification 01201

**Section 1R11: Licensed Operator Regualification**Procedures

0AOP-20, Pneumatic (Air/Nitrogen) System Failures  
 0AOP 36.1, Loss of Any 4160V Buses or 480V E-Buses  
 0AOP 36.2, Station Blackout  
 0TPP, Licensed Operator Continuing Training Program  
 TRN-NGGC-0014, NRC Initial Licensed Operator Exam Development and Administration  
 1EOP-01-LPC, Level/Power Control  
 0PEP-2.1.1, Emergency Control – Notification of Unusual Event, Alert, Site Area Emergency, or  
     General Emergency  
 0PEP-02.1, Initial Emergency Actions

Condition Reports

582383

**Section 1R13: Maintenance Risk Assessment and Emergent Work Control**Procedures

0AP-022, BNP Outage Risk Management  
 ADM-NGGC-0104, Work Management Process  
 0AI-144, Risk Management  
 ADM-NGGC-0006, Online EOOS Model  
 WCP-NGGC-0500, Work Activity Integrated Risk Management Program

Condition Reports

582492            595449            598293

Miscellaneous

Unit 1&amp; 2 control room logs

**Section 1R15: Operability Evaluations**Procedures

OPS-NGGC-1305, Operability Determinations

OPS-NGGC-1307, Operational Decision making

Condition Reports

584920	587203	513772	584296	587973
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Miscellaneous

Unit 1&amp; 2 control room logs

**Section 1R18: Plant Modifications**Procedures

0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses

0ENP-24.0, Reactor Engineering Guidelines

1AOP-04.0, Low Core Flow

EGR-NGGC-0005, Engineering Change

EGR-NGGC-0011, Engineering Product Quality

OPS-NGGC-1316, Aggregate Risk Impact Assessment Program

REG-NGGC-0010, 10 CFR 50.59 and Selected Regulatory Reviews

Condition Reports

355253	461690	474928	466834	504293	581202
592382					

Miscellaneous

Engineering Change 90286, Recirculation Motor VFD Interposing Relays with Digital Feedwater Control System

SD-02, Reactor Recirculation System

**Section 1R19: Post Maintenance Testing**Procedures

0PLP-20, Post Maintenance Testing Program

0PT-08.2.2b, Low Pressure Coolant Injection / Residual Heat Removal Operability Test

0PT-09.2, HPCI System Operability Test

0PT-10.1.8, RCIC System Valve Operability Test

0PT-12.2C, No. 3 Diesel Generator Monthly Load Test

2OP-43, Service Water Operating Procedure

1PT-24.1-1, Service Water Pump and Discharge Valve Operability Test

Condition Reports

572119

Work Orders

1951825      2024734      2161058

## **Section 1R20: Outage Activities**

### Procedures

1OP17, Residual Heat Removal System Operating Procedure  
 0GP-05, Unit Shutdown  
 0GP-06, Cold Shutdown to Refueling (Head Unbolted)  
 0GP-08, Refueling to Cold Shutdown  
 0GP-12, Power Changes  
 0MMM-015, Operation and Inspection of Cranes and Material Handling Equipment  
 0SMP-RPV501, Reactor Vessel Disassembly

### Condition Reports

590867	590870	590866	592781	592712	594819
595165	595490	597220	597476	593718	594780
594820	594937	595129	595186	595519	

### Clearances

279926	286978	289328	289338
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### Miscellaneous

Unit 2 B221R1 Key Milestones  
 Unit 2 B221R1 Risk Assessments  
 Unit 2 B221R1 System Windows  
 Main Control Room Logs  
 Outage Control Center Logs  
 Unit 2 Key Safety Function Component Status Sheets  
 Engineering Change 90817R2  
 Regulatory Guide 1.13, Spent Fuel Storage Facility Design Basis  
 Calculation 0G41-0021, Fuel Pool Cooling Heat Removal Capability  
 Calculation M-89-0011, Residual Heat Removal Heat Exchanger Heat Transfer Calculations  
 Calculation 0G41-0020, Refueling Outage Decay Heat Load Evaluation

## **Section 1R22: Surveillance Testing**

### Procedures

0MST-BATT12W, Diesel Fire Pump Starting Batteries Weekly Operability Test  
 1MST-RSDP21R, Remote Shutdown and RTGB Panel Reactor Water Level Indication Channel  
     Cal  
 0PT-08.1.4B, RHR Service Water System Operability Test – Loop B  
 2MST-BAT11AR, 125VDC Battery 2A-1 Service Capacity Test  
 0PT-08.1.4B, RHR Service Water System Operability Test – Loop B  
 0PT-20.3-E11, Local Leak Rate Testing for Residual Heat Removal System  
 0PT-20.3-E21, Local Leak Rate Testing for Core Spray System

### Condition Reports

595135

### Work Orders

02058192	01955948	01938738	01938787	01939354	01958829
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Drawings

F-03006, Single Line Diagram 125-250 Volt DC System  
 0FP-04151, Fire Pumps Control Diagram  
 F-03007, Stationary Battery Installation and Operating Instructions

Miscellaneous

SD-01, Nuclear Boiler System  
 SD-41, Fire Suppression Detection Systems

**Section 1EP6: Emergency Planning Drill Evaluation**Procedures

0AOP 36.1, Loss of Any 4160V Buses or 480V E-Buses  
 0AOP 36.2, Station Blackout  
 0PEP-2.1.1, Emergency Control – Notification of Unusual Event, Alert, Site Area Emergency, or General Emergency  
 0PEP-02.1, Initial Emergency Actions  
 0PEP-02.6.21, Emergency Communicator

Condition Reports

582383

Miscellaneous

Nuclear Power Plant Emergency Notification Form, 1/9/13

**Section 2RS1: Radiological Hazard Assessment and Exposure Controls**Procedures

0E&RC-0040, Administrative Controls for High Radiation Areas, Locked High Radiation Areas, and Very High Radiation Areas  
 0E&RC - 0175, Radiological Controls for Diving Operations  
 0E&RC-0100, Radiation Surveys Methods  
 0E&RC-0111, Survey Methods for Removable Surface Contamination  
 0E&RC-0112, Hot Particle Control  
 0E&RC-0175, Radiological Controls for Diving Operations  
 0E&RC-0215, Removal of Materials from the Radiological Control Area  
 0E&RC-0230, Issue and Use of Radiation Work Permit  
 0E&RC-0495, Failed Fuel Response  
 CAP-NGGC-200, Condition Identification and Screening Process  
 CAP-NGGC-205, Condition Evaluation and Corrective Action Process  
 HPS-NGGC-0003, Radiological Posting, Labeling and Surveys  
 HPS-NGGC-0013, Personnel Contamination Monitoring, Decontamination, And Reporting  
 HPS-NGGC-0014, Radiation Work Permits  
 HPS-NGGC-0016, Access Control  
 HPS-NGGC-0019, Conduct of Radiological Protection Briefings  
 HPS-NGGC-0024, Alpha Monitoring Guidelines  
 HPS-NGGC-1000, Radiation Protection – Conduct of Operations

Records and Data Reviewed

10 CFR 61 Analysis, Dry Active Waste, 9/24/12

BNP Outage Daily Radiological Status, 03/29/2013  
 BNP B221R1 Supervisors Turnover Log, 03/28/2013  
 B221R1 HP Action Plan – Hot Particle Control, 03/28/2013  
 Semi-Annual Inventory of Exempt Sources, 02/07/2013  
 Semi-Annual Inventory and Leak Check of non- Exempt Sources, 02/07/2013  
 BNP Weekly Verification of LHRA and VHRA Locks, 03/12/2013  
 BNP Weekly Control Room LHRA/VHRA Key Inventory, 03/10/2013  
 Confirmation of Annual NSTS Inventory Reconciliation, Dated 01/13/2013  
 Description of Materials in Spent Fuel Pool, Unit 1, Work Orders 02068005-01, Dated 02/13/2013; and 2083862-01, Dated 12/21/2012  
 Low-Level Radioactive Waste Analysis Data Sheet, Sample Tracking No. 12B00003, 2012 DAW Smears, Dated 10/24/12  
 Radiation Work Permit (RWP) No. 00005944 01, DW – Insulation Remove/Replace (B221R1)  
 RWP No. 00005248 02, DW – CRD Exchanges Requiring Multibadging (B221R1)  
 RWP No. 00005249 01, DW – ISI Inspection (B221R1) (High Risk)  
 RWP No. 00005932 02, DW – CRD Exchanges Requiring Multibadging (B222R1)  
 RWP No. 00006035 01, Misc Torus Desludge Activities (Requiring Multibadge)  
 Radiological Survey (RS) No. BNP-M-20121221-2, ISFSI Quarterly Survey  
 Radiological Survey (RS) No. BNP-M-20130329-35, ISFSI Quarterly Survey  
 RS No. BNP-M-20120319-12, U1 RX-17 SRHR RBEDT Room  
 RS No. BNP-M-20120425-3, 1-1R35-1RB 61' RWCW BWRT Drop to Radwaste  
 RS No. BNP-M-20120425-4, U1 Precoat Tank ARA/HRA Up Post  
 RS No. BNP-M-20130315-18, 1-2R89\_2RB Torus with Catwalk  
 RS No. BNP-M-20130316-20, 1-2R89\_2RB Torus with Catwalk Outboard Survey  
 RS No. BNP-M-20130320-21, 1-2R89\_2RB 0' Torus with Catwalk  
 RS No. BNP-M-20130321-04, 2R89 2RB Torus Conditions Verification Survey  
 RS No. BNP-M-20130307-13, DW 17' CRDM Carousel Overhead  
 RS No. BNP-M-20130310-20, DW 17' Pre-Shielding on Various Valves  
 RS No. BNP-M-20130311-24, DW 17' Post-Shielding Survey  
 RS No. BNP-M-20130314-19, DW FO43A Bypass Line Survey  
 RS No. BNP-M-20130319-19, DW 17' 2-B21-51PG-104 Survey  
 RS No. BNP-M-20130309-26, DW 17' Overhead  
 RS No. BNP-M-20130319-19, DW 5' & 17' Under Vessel  
 RS No. BNP-M-20130307-26, DW 5' & 17' Under Vessel  
 RS No. BNP-M-20130312-28, DW 5'  
 RS No. BNP-M-20130321-21, DW 5'  
 RS No. BNP-M-20130324-18, DW 5'  
 RS No. BNP-M-20130325-20, DW 5'  
 RS No. BNP-M-20130315-17, DW 52'  
 RS No. BNP-M-20130316-05, DW 38'

#### Condition Reports

546876	564154	522924	524835	593083	593454
532558					

## **Section 2RS2: Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls**

### Procedures

ADM-NGGC-0105, ALARA Planning  
 0AI-90, Cobalt Reduction Program  
 CAP-NGGC-0200, Condition Identification and Screening Process

### Records and Data Reviewed

RWP 5973, Refuel Floor Activities  
 RWP 5932, DW – CRD Exchanges Requiring Multibadging  
 RWP 5950, DW – Inboard MSIV – Modification/Repair/Support  
 Radiological Survey BNP-M-20130308-31, U2 DW Undervessel  
 Radiological Survey BNP-M-20130314-25, U2 DW 38'  
 Radiological Survey BNP-M-20130313-26, U2 DW 17' MSIVs  
 ALARA Work Plan 2107, Refuel Floor Activities, Rev. 0  
 ALARA Work Plan 2090, B221R1 CRDM Exchange, Rev. 0  
 ALARA Work Plan 2051, (B221R1) Small Bore Activities (L86), Rev. 0  
 ALARA Work Plan 2476, 2013 Dry Fuel Storage Fuel Loading Campaign, Rev. 1  
 TEDE-ALARA Evaluation, AWP 2090, I&C Under Vessel Activities, 3/9/13  
 Five Year ALARA Plan, August 2011  
 Work Order 01908499, Replace Valve 2-EX-V17  
 In-Progress ALARA Evaluation, AWP 2476, 2013 Dry Fuel Storage Campaign  
 Post-Job ALARA Critique, AWP 2441, Setup for 2013 Dry Fuel Storage Campaign  
 ALARA Committee Meeting Minutes, 11/26/12  
 BRAC Point Trending, U1 Recirculation System, 2000 – 2012  
 BRAC Point Trending, U2 Recirculation System, 1999 - 2013  
 B221R1 Outage Daily Radiological Status, 3/11/13 – 3/29/13  
 Temporary Shielding Requests 2-RF-752, 2-RF-737, 2-RF-747  
 Permanent Shielding Requests associated with AR 484210 and AR 484207

### Condition Reports

Self-Assessment 475807-11, Inadequate CRE Performance Improvements, 8/15/11 – 8/16/11  
 586746          582124          458724          513366          525431          457723

## **Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation**

### Procedures, Guidance Documents, and Manuals

OERP, BNP Radiological Emergency Plan  
 0E&RC - 0220, Respiratory Protection Program  
 0E&RC-0120, Routine/Special Airborne Radioactivity Survey  
 HPS-NGGC-0020, Calibration and Operation of The Eberline AMS-4 Air Monitor  
 0E&RC-0295, Operation/Calibration of the CANBERRA iCAM  
 0E&RC-0135, Sampling of Breathing Air  
 0E&RC-0136, Set Up and Use of Air Line Respiratory Protection Devices  
 0E&RC-0221, Cleaning, Maintenance, and Leak Testing of Respiratory Equipment  
 0E&RC-0229, Control and Use of HEPA Vacuum Cleaners and Mobile Air Filtration Units  
 0E&RC - 0292, SCBA Use and Maintenance  
 0E&RC-0311, Calibration of Air Sampling Equipment  
 HPS-NGGC-0006, Quantitative Fit Testing  
 HPS-NGGC-0024, Alpha Monitoring Guidelines

Records and Data Reviewed

BNP, Units 1&2; Crystal River, Unit 3 Nuclear Generating Plant; Shearon Harris Nuclear Power Plant, Unit No. 1; and H.B. Robinson Steam Electric Plant, Unit No. 2 – Authorization For Use of Delta Protection Mururoa Single-Use, Supplied –Air Suits, Models V4 F1 and V4 MTH2 (TAC Nos. MD1384, MD 1385, MD1386, MD1387, and MD1388), Dated, October 19, 2006

BNP, Log Entries for BNP Radiation Protection, 03/05/2013

Analysis of Breathing Air Data Sheets and Supporting Data Sheets for Unit 1 Reactor Building 20 Foot Southwest (1RB 20'SW) Valve Number 1 SA-V351; Unit 2 (2)RB 20' SW Valve 2-SA-V351; Fire House SCBA Compressor; Sandblast Shack – Ingersol Rand Compressor; and Sandblast Shack – Clemco CAP-1 Compressor; for the following quarters: 3rd Quarter 2012 and 4th Quarter 2012

Checklist for Respiratory Protection Equipment, Control Room Kit, 02/26/2013

Checklist for Respiratory Protection Equipment, Operation Support Center Kit, 02/26/2013

Checklist for Respiratory Protection Equipment, TSC/EOF Kit, 02/26/2013

RS No. 032111-049, Condenser Bay North, 03/21/2011

RS No. 032211-004, Condenser Bay North, 03/21/2011

RS No. BNP-M-20130304-31, Condenser Bay North, 03/04/2013

Assessment Number: 00542944 Dates of Assessment: 11/27-28/12

Annual QHSA Self Assessment of Alpha Monitoring Program, 11/28/2012

Progress Energy Nuclear Generation, Student Handout Respiratory Protection Training, Rev. 19

Progress Energy Nuclear Generation, Respiratory Protection Training, Lesson Number GNC10G/GN7C10G/GNgC24G, Rev. 19

Eberline AMS-4 Calibration Record for: Electronics and Sample Head #1134 dated, 02/21/2013

Eberline AMS-4 Calibration Record for: Electronics and Sample Head #1136 dated, 02/21/2013

RS No.030413-015, One-Line Air Sample Survey Form (OLASSF), U2 RB 117'

RS No.030513-039, OLASSF, U2 RB 117' Backup

RS No.030513-039, OLASSF, U2 RB 117' Backup

RS No.030513-016, OLASSF, 5' Drywell 45

RS No.031013-037, OLASSF, U2 RB Drywell Carousel

RS No.031213-005, OLASSF, U/2 RB 117' Insulation Removal i/s RPV Insulation Package

RS No.031213-005, OLASSF, U/2 RB 117' Initial from RPV "Doghouse" Insulation Removal

RS No.031213-017, OLASSF, U/2 RB 117' RPV "Doghouse" Insulation Removal

RS No.031213-017, OLASSF, U/2 RB 117' Insulation Removal from RPV Insulation Package

SCBA Maintenance and Testing Certifications for Certification ID #s, C-031829-3, C-020243-2 and C-000289-1

Scott-Air-Pak 4.5 and Ska-Pak Inspection Record, 4th Quarter 2012, 1st Quarter 2013

Condition Reports

574259	490788	455307	455490	456466	516917
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**Section 2RS4: Occupational Dose Assessment**Procedures and Guidance Documents

DOS-NGGC-0002, Dosimetry Issuance

HPS-NGGC-0016, Access Control

DOS-NGGC-0005, Skin Dose from Contamination

DOS-NGGC-0007, Internal Dose Calculations

DOS-NGGC-0006, Personnel Exposure Investigations

DOS-NGGC-0008, In-Vitro Bioassay

CAP-NGGC-0200, Condition Identification and Screening Process

Records and Data Reviewed

Dosimetry Technical Report: 98-04, Dosimetric Impact of Exposing Personnel TLDs to Security X-ray Machines, 10/15/98  
 Dosimetry Technical Report: 10-03, Verification of Backscatter Correction Factor and Bias Change for DMC 2000 Calibration, 8/26/10  
 Approved Supplier List, Vendor Code 182081-01  
 NVLAP Accreditation Certificate, Harris Energy and Environmental Center, 10/1/12 – 9/30/13  
 WBC Daily QA Check Results, 1/1/13 – 3/25/13  
 WBC Calibration 3-12-08-28, 8/28/12  
 Dosimetry Passive Monitoring Analysis, 2/9/12  
 Personnel Exposure Investigations 4573 and 4574  
 PCE Logs 3/1/10 – 12/31/12  
 PCE Records 11-005, 11-006, 11-007, 11-008, 11-019  
 Internal Dose Assessment associated with NCR 389711  
 ED Alarm Logs, 3/1/11 – 3/15/13  
 ED Alarm Evaluations 00572341, 0056209, 0026600, 0083479, 0083474, 0057313

Condition Reports

2011 Management Review of the Progress Energy Dosimetry Laboratory Quality System  
 470219      577020      528940      460702      569444      528878

**Section 2RS5: Radiation Monitoring Instrumentation**Procedures

HPS-NGGC-0005, Calibration of Portable Radiation/Contamination Survey Instruments  
 DOS-NGGC-0020, Whole Body Counter (WBC) System Calibration  
 OE&RC-0344, Calibration and Use of Canberra Personnel Monitors  
 OE&RC-0294, Operation of the Hopewell BX-3 Box Calibrator  
 OE&RC-0344, Calibration of NMC Continuous Air Monitors (CAMS)  
 OE&RC-0344, Use and Calibration of the Small Article Monitors  
 HPS-NGGC-0009, Operation of Radiation/Contamination Survey Instruments/Equipment  
 CAP-NGGC-0200, Corrective Action Program

Data & Records

WO #0139943901, PM Preoutage 0MST-AMI21R Post Accident, 2/15/10  
 WO#0175535301, PM 0MST-RLE22R Radwaste Liquid Effluent Mon, 1/17/12  
 Model BX-3A Box Irradiator Calibration Report, 02/23/12  
 Canberra Personnel Monitor Calibration Data Sheet, Serial # 0704-044, 06/25/07; Serial #0808-0707, 07/31/12, 08/01/11; Serial # 0808-171, 03/04/09, 09/7/12, 10/29/11; Serial # 0808-072, 09/08/11, 09/06/12  
 WO #0203054201, PM 0MST-RGE14Q Main Stack Effluent Monitor, 12/5/12  
 WO #0199495001, PM 0MST-RGE14Q Main Stack Effluent Monitor, 08/23/12  
 WO #0139886201, PM Preout perform 0MST-AMI22R Post Accident, 2/18/10  
 WO #0181031801, PM Preout 0MST-AMI22R Post Accident High Range Cont RM, 2/14/12  
 WO #0181074801, PM Preout 0MST-AMI24R Post Accident High Range Cont RM, 2/16/12  
 WO #1810316-02, Reactor Building Roof Vent Radiation Monitor Channel Calibration CAC-AQH-1264, 05/30/12  
 WO #1922183-04, General Atomic Stack Radiation Monitor Channel Calibration (2-D12-RM-23S), 11/29/12  
 Quarterly Detector QC Data Report for Detector 3, 1/7/12



CRONOS Calibration Record Serial # 1211-201, 12/27/12; Serial # 1112-233, 12/27/12; Serial # 1112-231, 12/29/12; Serial # 1112-204, 12/2/12;  
HPS-NGGC-0009 Attachment 3 Instrument Source Check Failure Investigation Form, dates 8/17/12, 9/13/12, 1/23/13

Condition Reports

443464      542673      445821      534421      521599

**Section 40A1: Performance Indicator Verification**

Procedures

REG-NGGC-0009, NRC Performance Indicators and Monthly Operating Report Data

Condition Reports

554230      565616      573810      521599      524835      568334

Miscellaneous

Brunswick Unit 1 PI Summary, January – December, 2012  
Brunswick Unit 2 PI Summary, January – December, 2012  
Monthly PI Reports, January, 2012 – December, 2012  
Liquid Effluent Dose Summary, January, 2012 – December, 2012  
Gaseous Effluent Dose Summary, January, 2012 – December, 2012  
Liquid Effluent Dose Summary, January, 2012 – December, 2012  
Gaseous Effluent Dose Summary, January, 2012 – December, 2012

**Section 40A3: Event Followup**

Procedures

OPEP-02.1, Initial Emergency Actions  
OPEP-02.1.1, Emergency Control – Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency  
OPEP-02.2.1, Emergency Action Level Bases

Condition Reports

591470      591869      591875      591890      591893      591894  
591897

Work Orders

566516

Miscellaneous

Event Notification, Discovery of a Condition that Met the EAL Classification of an Unusual Event  
February 26, 2013  
NUREG-1022, Event Reporting Guidelines

**Section 40A5: Other Activities**

Procedures

IFS-NGGC-0015, Transfer Cask and Dry Shielded Canister Preparation for Loading  
IFS-NGGC-0016, ISFSI Dry Shielded Canister Sealing Operations  
IFS-NGGC-0017, Transfer Cask and Dry Shielded Canister to the Horizontal Storage Module

Attachment

REG-NGGC-0013, Evaluating and Reporting of Defects and Noncompliance in Accordance With 10 CFR 21

OPT-34.2.2.1, Fire Door, Pressure Boundary Door, ASSD Access/Egress Door, and Severe Weather/Flood Control Door Inspections

0AOP-13.0, Operation During Hurricane, Flood Conditions, Tornado or Earthquake

0AI-68, Brunswick Nuclear Plant Response to Severe Weather Warnings

0AP-100, External Events Protection Features Equipment Inspection

0BNP-TR-019, External Event Protection Features

OPS-NGGC-1305, Operability Determinations

PRO-NGGC-0201, NGG Procedure Writer's Guide

#### Condition Reports

590139	589767	586746	569765	490292	556860
556861	556862	556863	556864	556865	556866
556867	556868	556869	556870	563077	402755

#### Drawings

1-FP-09319, Reactor Building Railroad Doors, Sheet 1

1-FP-09319, Reactor Building Railroad Doors, Sheet 2

#### Miscellaneous

Specification 024-001, Specification for Special Doors

Walkdown Record Form for 1-RB1-DR-EL020-209, Railroad Track Door/Equipment Access Air Lock, October 4, 2012

NEI 12-07, Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features

IPEEE – Individual Plant Examination for External Events, June 1995