



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
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ATLANTA, GEORGIA 30303-1257

May 5, 2017

William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

**SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION
REPORT NOS.: 05000325/2017001 AND 05000324/2017001**

Dear Mr. Gideon:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick Steam Electric Plant, Units 1 and 2. On April 20, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented four findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as an NCV consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or the significance of these violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, and the NRC resident inspector at the Brunswick Steam Electric Plant.

If you disagree with a 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC resident inspector at the Brunswick Steam Electric Plant.

W. Gideon

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This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Steven D. Rose, 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, 324/2017001
w/Attachment: Supplemental Information

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SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION
REPORT NUMBERS: 05000325/2017001 AND 05000324/2017001 May 5, 2017

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-325, 50-324

License Nos.: DPR-71, DPR-62

Report No.: 05000325/2017001, 05000324/2017001

Licensee: Duke Energy Progress, Inc.

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: Southport, NC

Dates: January 1, 2017 through March 31, 2017

Inspectors: M. Catts, Senior Resident Inspector
M. Schweg, Resident Inspector
B. Collins, Reactor Inspector (Section 1R08)
J. Dodson, Senior Project Engineer (Section 4OA2)
W. Loo, Senior Health Physicist (Section 2RS2)
J. Panfel, Health Physicist (Section 2RS3, 2RS4)
J. Rivera, Health Physicist (Section 2RS1)

Approved by: Steven D. Rose, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

Integrated Inspection Report 05000325/2017001, 05000324/2017001; January 1, 2017, through March 31, 2017; Brunswick Steam Electric Plant, Units 1 and 2; Fire Protection, Plant Modifications, and Problem Identification and Resolution.

The report covered a 3-month period of inspection by resident inspectors and regional inspectors. There were four NRC-identified violations documented in this report. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," (SDP) dated April 29, 2015. The cross-cutting aspects are determined using IMC 0310, "Aspects within the Cross-Cutting Areas" dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated November 1, 2016. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Mitigating Systems

- Green. An NRC-identified Green non-cited violation (NCV) of License Condition 2.B.(6), Fire Protection Program, was identified for the licensee's failure to implement compensatory measures for nonfunctional sprinklers. Specifically, from January 11, 2017, until January 14, 2017, fire sprinklers were impaired when scaffolding was built over the service water (SW) system discharge valves without the proper fire protection evaluation and compensatory measures, as required by licensee procedure 0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements. The licensee's corrective actions included declaring the sprinklers nonfunctional, and implementing an hourly fire watch and backup suppression until the scaffold could be removed. This issue was entered into the licensee's corrective action program (CAP) as nuclear condition report (NCR) 2091795.

The inspectors determined that the licensee's failure to implement compensatory measures for nonfunctional sprinklers, in accordance with procedure 0PLP-01.2, was a performance deficiency. The finding was more than minor because it was associated with the Protection against External Events attribute (i.e. fire) of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this resulted in nonfunctional sprinklers in a safety-related area without compensatory measures. The finding was screened using NRC IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, because the finding affected the fixed fire protection system capability. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection SDP Phase 1 Worksheet," dated September 20, 2013, the finding was assigned to the Fixed Fire Protection System category because the nonfunctional sprinklers affected the automatic fire suppression system. Proceeding to Task 1.3.1 of IMC 0609, Appendix F, Attachment 1, the inspectors determined the finding was of very low safety significance (Green), because with the sprinklers nonfunctional, the reactor was able to reach and maintain safe shutdown. The finding has a cross-cutting aspect in the area of human performance associated with the field presence attribute because leaders did not observe, coach, and reinforce standards and expectations regarding scaffolding. Deviations from standards and expectations for building scaffolding near fire protection sprinklers were not corrected promptly. [H.2] (Section 1R05)

- Green. An NRC-identified Green NCV of License Condition 2.B.(6), Fire Protection Program, was identified for the licensee's failure to adequately control fire ignition sources in the Unit 2 standby liquid control (SLC) pump area in accordance with licensee procedure AD-EG-ALL-1523, Temporary Ignition Source Control. Specifically, between January 7, 2017, and January 13, 2017, a temporary electric portable heater was energized 2 feet from an SLC pump motor without continuously attending the temporary ignition source or obtaining a continuous fire watch. The licensee's corrective actions included turning off the heater and removing it from near the SLC pumps. This issue was entered into the licensee's CAP as NCR 2091736.

The inspectors determined that the licensee's failure to control fire ignition sources in accordance with licensee procedure AD-EG-ALL-1523, was a performance deficiency. The finding was more than minor because it was associated with the Protection Against External Events attribute (i.e. fire) of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the temporary ignition source could have affected a nearby safety-related SLC pump motor and cables, which provide a shutdown mitigation function. The finding was screened using NRC IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection SDP Phase 1 Worksheet," dated September 20, 2013, the finding was assigned to the Fire Prevention and Administrative Controls category because the portable heater is part of the plants combustible materials control program. Proceeding to Task 1.3.1 of IMC 0609, Appendix F, Attachment 1, the inspectors determined the finding was of very low safety significance (Green), because even if one train of SLC had been inoperable, the reactor was able to reach and maintain safe shutdown. This finding had a cross cutting aspect in the area of human performance associated with the teamwork aspect because individuals failed to effectively communicate and coordinate their activities to ensure that the temporary heaters were energized following prescribed fire protection control measures and written instructions. [H.4] (Section 1R05)

- Green. An NRC-identified Green NCV of 10 CFR Part 50, Appendix B, Criterion III, Design Control, was identified for the failure of the licensee to install flood barrier seals around the emergency diesel generator (EDG) 2, four-day fuel oil tank vent as described in engineering change (EC) 400606. This resulted in a nonfunctional flood barrier into the EDG 2 four-day tank room. As an immediate corrective action, the licensee grouted the opening to prevent water intrusion into the EDG 2 four-day fuel oil tank room. The licensee entered this issue into the CAP as NCR 2093563.

The inspectors determined the failure of the licensee to control the design of the installation of the new EDG 2 four-day fuel oil tank vent was a performance deficiency. The finding is more than minor because it is associated with the protection against external factors (i.e., flood hazard) attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee failed to install flood barrier seals around the EDG 2 four-day fuel oil tank vent designed to mitigate a flood of the EDG 2 four-day fuel oil tank room. Using IMC 0609, Appendix A, issued June 9, 2012, The SDP for Findings At-Power, the inspectors determined the finding screened to Exhibit 4, External Events Screening Questions, since the finding involved the loss of equipment specifically designed to mitigate a flood. The inspectors determined the finding screened to Green since if the flood barrier is assumed to be completely failed, it

would not result in the inoperability or degradation of EDG 2, and would not involve the total loss of any safety function that contributes to external event initiated core damage accident sequences. The finding has a cross-cutting aspect in the area of human performance associated with the design margins attribute because the licensee failed to maintain equipment within design margins and failed to change margins through a systematic and rigorous process. Specifically, the licensee changed the installation of the EDG 2 fuel oil tank roof vent without ensuring flood protection during the modification. [H.6] (Section 1R18)

Cornerstone: Barrier Integrity

- Green. An NRC-identified Green NCV of Technical Specification (TS) 3.7.4, Control Room Air Conditioning (AC) System, was identified for the failure to declare the 1D control room AC unit inoperable. Specifically, on December 1, 2016, the licensee failed to declare the 1D control room AC unit inoperable due to extensive corrosion on the support channels. As a result, the 1D control room AC unit was inoperable from December 1, 2016, until the next time it was inspected on January 30, 2017, and exceeded the TS allowed outage time. As corrective actions, the licensee replaced the supports of the 1D and 2D control room AC units and inspected the 2E control room AC unit for corrosion. The licensee entered this issue into the CAP as NCRs 2113799 and 2113800.

The inspectors determined the licensee's failure to declare the 1D control room AC unit inoperable on December 1, 2016, and enter TS 3.7.4 was a performance deficiency. The finding was more than minor because it was associated with the structures, systems, and components (SSC) attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, this resulted in the 1D control room AC unit being inoperable from December 1, 2016, to January 30, 2017. 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 (Green) because the finding did not only represent a degradation of the radiological barrier function for the control room and the finding did not represent a degradation of the barrier function of the control room against smoke or toxic atmosphere. This finding had a cross cutting aspect in the area of problem identification and resolution associated with the resolution aspect because the licensee failed to take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, the licensee did not correct the degradation of the 1D control room AC unit until the unit was inoperable. [P.3] (Section 4OA2)

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

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent rated thermal power (RTP). On March 3, 2017, the unit was reduced to 25 percent power to inspect the 1A and 1B recirculation pumps for possible oil leaks. It was discovered the 1B oil level indicator was stuck and the indicator was repaired. The unit was returned to 100 percent RTP following a control rod adjustment on March 6, 2017. The unit remained at or near 100 percent RTP for the remainder of the inspection period.

Unit 2 began the inspection period at or near 100 percent RTP. On March 17, 2017, the unit was shutdown for refueling outage B223R1 and remained shutdown for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 3 samples)

a. Inspection Scope

.1 Summer Readiness of Offsite and Alternate AC Power System

The licensee did not implement equipment or procedure changes that potentially affect operation or reliability of offsite and alternate AC power systems since the last time the inspectors assessed grid reliability. The inspectors reviewed the material condition of offsite and onsite alternate AC power systems (including switchyard and transformers) by performing a walkdown of the switchyard. Documents reviewed are listed in the Attachment.

.2 Impending Adverse Weather Conditions

The inspectors reviewed the licensee's preparations to protect risk-significant systems from Winter Storm Helena, expected on January 5, 2017. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures, including operator staffing, before the onset of, and during the adverse weather conditions. The inspectors reviewed the licensee's plans to address the ramifications of potentially lasting effects that may result from Winter Storm Helena. The inspectors verified that operator actions specified in the licensee's adverse weather procedure maintain readiness of essential systems. The inspectors verified that required surveillances were current, or were scheduled and completed, if practical, before the onset of anticipated adverse weather conditions. The inspectors also verified that the licensee implemented periodic equipment walkdowns or other measures to ensure that the condition of plant equipment met operability requirements. Documents reviewed are listed in the Attachment.

.3 Readiness to Cope with External Flooding

The inspectors evaluated the licensee's implementation of flood protection procedures and compensatory measures during impending conditions of flooding or heavy rains. The inspectors reviewed the updated final safety analysis report and related flood

analysis documents to identify those areas containing safety related equipment that could be affected by external flooding and their design flood levels. The inspectors walked down flood protection barriers, reviewed procedures for coping with external flooding, and reviewed corrective actions for past flooding events. The inspectors verified that the procedures for coping with flooding could reasonably be achieved. For those areas where operator actions are credited, the inspectors assessed whether the flooding event could limit or preclude the required actions. Documents reviewed are listed in the Attachment.

The inspectors conducted walkdowns of the following plant areas containing risk-significant SSCs that are below flood levels or otherwise susceptible to flooding:

- SW building
- EDG four-day fuel oil tank building

b. Findings

No findings were identified.

1R04 Equipment Alignment

a. Inspection Scope

.1 Partial Walkdown (71111.04 – 4 samples)

The inspectors verified that critical portions of the selected systems were correctly aligned by performing partial walkdowns. The inspectors selected systems for assessment because they were a redundant or backup system or train, were important for mitigating risk for the current plant conditions, had been recently realigned, or were a single-train system. The inspectors determined the correct system lineup by reviewing plant procedures and drawings. Documents reviewed are listed in the Attachment.

The inspectors selected the following systems or trains to inspect:

- Unit 2, standby gas treatment (SBGT) following venting on January 25, 2017
- Unit 2, EDG 4 following a planned maintenance outage on February 16, 2017
- Units 1 and 2, electric fire pump during the diesel fire pump maintenance on March 2, 2017
- Unit 2, EDG 3 during the EDG 4 planned maintenance outage on March 15, 2017

.2 Complete Walkdown (71111.04 – 1 sample)

The inspectors verified the alignment of the Unit 2 residual heat removal (RHR) system. The inspectors selected this system for assessment because it is a risk-significant mitigating system. The inspectors determined the correct system lineup by reviewing plant procedures, drawings, the updated final safety analysis report, and other documents. The inspectors verified that the selected system was correctly aligned by performing a complete walkdown of accessible components.

To verify the licensee was identifying and resolving equipment alignment discrepancies, the inspectors reviewed corrective action documents. The inspectors also reviewed periodic reports containing information on the status of risk-significant systems, including

maintenance rule reports and system health reports. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R05 Fire Protection

a. Inspection Scope

.1 Quarterly Inspection (71111.05Q – 5 samples)

The inspectors evaluated the adequacy of selected pre-fire plans by comparing the pre-fire plans to the defined hazards and defense-in-depth features specified in the fire protection program. In evaluating the pre-fire plans, the inspectors assessed the following items:

- control of transient combustibles and ignition sources
- fire detection systems
- water-based fire suppression systems
- gaseous fire suppression systems
- manual firefighting equipment and capability
- passive fire protection features
- compensatory measures and fire watches
- issues related to fire protection contained in the licensee's CAP

The inspectors toured the following fire areas to assess material condition and operational status of fire protection equipment. Documents reviewed are listed in the Attachment.

- Unit 2, RHR Room, 17 foot elevation, 2PFP-RB2-01C/D
- Unit 2, Core Spray Room, 17 foot elevation, 2PFP-RB2-01A/B
- Unit 1, Reactor Building, 20 foot elevation, 1PFP-RB1-01G
- Unit 2, Reactor Building West, 80 foot elevation, 2PFP-RB2-1j
- Units 1 and 2, SW Building, 4 foot elevation, 0PFP-SW-1b

.2 Annual Inspection (71111.05A – 1 sample)

The inspectors evaluated the licensee's fire brigade performance during a drill on January 11, 2017, and assessed the brigade's capability to meet fire protection licensing basis requirements. The inspectors observed the following aspects of fire brigade performance:

- capability of fire brigade members
- leadership ability of the brigade leader
- use of turnout gear and fire-fighting equipment
- team effectiveness
- compliance with site procedures

The inspectors also assessed the ability of control room operators to combat potential fires, including identifying the location of the fire, dispatching the fire brigade, and sounding alarms. Documents reviewed are listed in the Attachment.

b. Findings

.1 Nonfunctional Sprinklers in the SW Building Without Compensatory Measures

Introduction. An NRC-identified Green NCV of License Condition 2.B.(6), Fire Protection Program, was identified for the licensee's failure to implement compensatory measures for nonfunctional sprinklers. Specifically, from January 11, 2017, until January 14, 2017, fire sprinklers were impaired when scaffold was built over the SW system discharge valves without the proper fire protection evaluation and compensatory measures as required by licensee Procedure 0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements.

Description. On January 14, 2017, the NRC inspectors performed a walkdown of the SW building. The inspectors identified scaffolding had been built over the Unit 1 and Unit 2 SW pump discharge valves, with some scaffold planks too close to the sprinklers (less than 18 inches), and some scaffold planks with continuous plates with no holes.

The inspectors determined this scaffold did not meet the requirements of licensee procedure AD-MN-ALL-0015, Nuclear Station Scaffold Erection, Tracking, and Dismantling. Procedure AD-MN-ALL-0015, Section 5.12.1, Equipment Interface Requirements, required: 4. Contact Operations for approval prior to obstructing fire suppression systems...(a) If any of the following are met, then fire suppression systems shall be considered obstructed: (4) Sprinklers: If any of the following conditions exist, then the sprinkler coverage obstruction requires Operations review, or initiation of compensatory measures per applicable site Fire Protection Procedures...(a) The scaffold deck is within 18 inches of a sprinkler.

The inspectors also reviewed Procedure 0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements, Section 5.3, Spray and Sprinkler Systems, which requires the sprinklers to be operable. If the sprinklers in the SW building are not operable, in accordance with 5.3.2, 1(c) the licensee is required to "establish an hourly fire watch with backup fire suppression equipment for the unprotected area(s) within 1 hour and restore the equipment to operable status within 14 days."

When notified of the condition by the inspectors, the licensee implemented immediate corrective actions including declaring the sprinklers non-functional, and implementing an hourly fire watch and backup suppression until the scaffold could be removed. The scaffold planks were moved later that day. This issue was entered into the licensee's CAP as NCR 2091795.

Analysis. The inspectors determined that the licensee's failure to identify the sprinkler obstruction and initiate compensatory measures, in accordance with licensee procedures AD-MN-ALL-0015 and 0PLP-01.2, was a performance deficiency. The finding was more than minor because it was associated with the Protection against External Events attribute (i.e. fire) of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this resulted in nonfunctional sprinklers in a safety-related area without compensatory measures. The finding was screened using NRC IMC 0609, Appendix F,

“Fire Protection Significance Determination Process,” dated September 20, 2013, because the finding affected the fixed fire protection system capability. Using IMC 0609, Appendix F, Attachment 1, “Fire Protection SDP Phase 1 Worksheet,” dated September 20, 2013, the finding was assigned to the Fixed Fire Protection System category because the nonfunctional sprinklers affected the automatic fire suppression system. Proceeding to Task 1.3.1 of IMC 0609, Appendix F, Attachment 1, the inspectors determined the finding was of very low safety significance (Green), because with the sprinklers nonfunctional, the reactor was able to reach and maintain safe shutdown. The finding has a cross-cutting aspect in the area of human performance associated with the field presence attribute because leaders did not observe, coach, and reinforce standards and expectations regarding scaffolding. Deviations from standards and expectations for building scaffolding near fire protection sprinklers were not corrected promptly. [H.2]

Enforcement. License Condition 2.B.(6), Fire Protection Program, requires, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program. Procedure 0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements, Section 5.3, Spray and Sprinkler Systems, requires the sprinklers to be operable. If the sprinklers in the SW building are not operable, in accordance with 5.3.2, 1(c), establish an hourly fire watch with backup fire suppression equipment for the unprotected area(s) within 1 hour and restore the equipment to operable status within 14 days. Contrary to the above, from January 11, 2017, until January 14, 2017, fire sprinklers were impaired when scaffold was built over the SW system discharge valves without establishment of an hourly fire watch with backup fire suppression equipment for the unprotected area, as required by licensee procedure 0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements. The licensee’s corrective actions included declaring the sprinklers non-functional, and implementing an hourly fire watch and backup suppression until the scaffold could be removed. Because this finding is of very low safety significance and was entered into the licensee’s CAP as NCR 2091795, consistent with Section 2.3.2.a of the NRC’s Enforcement Policy, this violation is being treated as an NCV: NCV 05000325;324/2017001-01, Nonfunctional Sprinklers in the Service Water Building Without Compensatory Measures.

.2 Failure to Control Fire Ignition Sources Near the Unit 2 SLC Pump Motor and Cables

Introduction. An NRC-identified Green NCV of License Condition 2.B.(6), Fire Protection Program, was identified for the licensee’s failure to adequately control fire ignition sources in the Unit 2 SLC pump area in accordance with licensee procedure AD-EG-ALL-1523, Temporary Ignition Source Control.

Description. On January 13, 2017, the inspectors performed walkdowns to verify the portable heaters, used for cold weather, were installed in accordance with licensee procedure AD-EG-ALL-1523, Temporary Ignition Source Control. While walking down the Unit 2 reactor building, the inspectors identified an unattended portable heater 2 feet from the “B” SLC pump motor and motor cables. The inspectors reviewed procedure AD-EG-ALL-1523, Section 5.2, Temporary Ignition Source Control, Table 1, which requires a minimum separation distance for portable forced air electric heaters be at least 3 feet horizontally, from common types of temporary ignition sources such as cables, cable trays, and electrical components. Section 5.2, Step 3, states, in part, if the separation distances defined in Table 1 are not met, then perform one of the following while the temporary ignition source is in the power block and energized: (a) continuously attend the temporary ignition source, or (b) obtain a continuous fire watch. The

inspectors questioned whether a continuous fire watch had been established when the heater was energized and learned that no fire watch had been in place since the heater was turned on January 7, 2017. The licensee took immediate corrective actions including turning off the heater and removing it from near the SLC pumps. This issue was entered into the licensee's CAP as NCR 2091736.

Analysis. The inspectors determined that the licensee's failure to control fire ignition sources in accordance with licensee procedure AD-EG-ALL-1523, was a performance deficiency. The finding was more than minor because it was associated with the Protection Against External Events attribute (i.e. fire) of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the temporary ignition source could have affected a nearby safety-related SLC pump motor and cables which provide a shutdown mitigation function. The finding was screened using NRC IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection SDP Phase 1 Worksheet," dated September 20, 2013, the finding was assigned to the Fire Prevention and Administrative Controls category because the portable heater was part of the plants combustible materials control program. Proceeding to Task 1.3.1 of IMC 0609, Appendix F, Attachment 1, the inspectors determined the finding was of very low safety significance (Green), because even if one train of SLC had been inoperable, the reactor was able to reach and maintain safe shutdown. This finding had a cross cutting aspect in the area of human performance associated with the teamwork aspect because individuals failed to effectively communicate and coordinate their activities to ensure that the temporary heaters were energized following prescribed fire protection control measures and written instructions. [H.4]

Enforcement. License Condition 2.B.(6), Fire Protection Program, requires, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program. Procedure AD-EG-ALL-1523, Section 5.2, Temporary Ignition Source Control, Table 1, requires a minimum separation distance for portable forced air electric heaters be at least 3 feet horizontally, from common types of temporary ignition sources such as cables, cable trays, and electrical components. Section 5.2, Step 3, states, in part, if the separation distances defined in Table 1 are not met, then perform one of the following while the temporary ignition source is in the power block and energized: (a) continuously attend the temporary ignition source, or (b) obtain a continuous fire watch. Contrary to the above, between January 7, 2017, and January 13, 2017, a temporary electric portable heater was energized within 3 feet of a SLC pump motor without continuously attending the temporary ignition source or obtaining a continuous fire watch. The licensee's corrective actions included turning off the heater and removing it from near the SLC pumps. Because this finding is of very low safety significance and was entered into the licensee's CAP as NCR 2091736, consistent with Section 2.3.2.a of the NRC's Enforcement Policy, this violation is being treated as a NCV: NCV 05000324/2017001-02, Failure to Control a Temporary Fire Ignition Source Near the Unit 2 Standby Liquid Control Pump Motor and Cables.

1R07 Heat Sink Performance (71111.07 – 2 samples)a. Inspection ScopeAnnual Review

The inspectors verified the readiness and availability of the 2B RHR heat exchanger and the 2B RHR room cooler heat exchanger to perform their design function by observing performance tests, observing the licensee's implementation of biofouling controls, observing the licensee's heat exchanger inspections, verifying critical operating parameters through direct observation or by reviewing operating data, and verifying correct categorization and receipt of maintenance under the Maintenance Rule. Additionally, the inspectors verified that the licensee had entered any significant heat exchanger performance problems into the CAP and that the licensee's corrective actions were appropriate. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08 – 1 sample)a. Inspection ScopeNon-Destructive Examination Activities and Welding Activities

From March 27 through March 31, 2017, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 2.

The inspectors either directly observed or reviewed the following non-destructive examinations (NDEs) mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record: 2007 Edition with 2008 Addenda) to evaluate compliance with the ASME Code, Section XI and Section V requirements and, if any indications or defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement. The inspectors also reviewed the qualifications of the NDE technicians performing the examinations to determine whether they were current and in compliance with the ASME Code requirements.

- Ultrasonic Testing (UT) examination of weld 2B11N9-RPV-FW2CRD-52, ASME Class 1, Reactor Coolant system, 5.5" diameter nozzle-to-cap weld (observed)
- Automated UT examination of core shroud weld H4, 306.6° of 177.5" weld, BWRVIP-03 (reviewed)
- Enhanced Visual Testing examination of weld JPCRS-1, Jet Pump "C" Riser lower elbow, BWRVIP-41 (observed)

The inspectors either directly observed or reviewed the following welding activities, qualification records, and associated documents in order to evaluate compliance with procedures and the ASME Code, Section XI and Section IX requirements. Specifically, the inspectors reviewed the work order (WO), repair and replacement plan, weld data

sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- WO 20077944-07, Cut Out and Replace Flanges for 2-SW-V10, Nuclear Service Water System, 20" flange-to-valve weld 2-SW-20-20-157A-FW-01, ASME Class 3

During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service; therefore, no NRC review was completed for this inspection procedure attribute.

Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the CAP to determine if the licensee had appropriately described the scope of the problem and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure 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 and Licensed Operator Performance (71111.11 – 2 samples)

a. Inspection Scope

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification

On February 15, 2017, the inspectors observed an evaluated simulator scenario administered to an operating crew as part of the annual requalification operating test required by 10 CFR 55.59, "Requalification. The scenario involved a loss of offsite power (LOOP), and a loss of all onsite alternating current power.

The inspectors assessed the following:

- licensed operator performance
- the ability of the licensee to administer the scenario and evaluate the operators
- the quality of the post-scenario critique
- simulator performance

Documents reviewed are listed in the Attachment.

.2 Resident Inspector Quarterly Review of Licensed Operator Performance in the Actual Plant/Main Control Room

The inspectors observed licensed operator performance in the main control room on March 3, 2017, when Unit 1 was reduced to 25 percent power to inspect the 1A and 1B

recirculation pumps for possible oil leaks, and on March 17, 2017, when Unit 2 shutdown to start refueling outage B223R1.

The inspectors assessed the following:

- use of plant procedures
- control board manipulations
- communications between crew members
- use and interpretation of instruments, indications, and alarms
- use of human error prevention techniques
- documentation of activities
- management and supervision

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12 – 2 samples)

a. Inspection Scope

The inspectors assessed the licensee's treatment of the issues listed below to verify the licensee appropriately addressed equipment problems within the scope of the maintenance rule (10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"). The inspectors reviewed procedures and records to evaluate the licensee's identification, assessment, and characterization of the problems as well as their corrective actions for returning the equipment to a satisfactory condition. Documents reviewed are listed in the Attachment.

- Unit 1, 1B recirculation pump low oil level
- Units 1 and 2, control building heating, ventilation, and AC (HVAC) supply fan seal degradation

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 6 samples)

a. Inspection Scope

The inspectors reviewed the maintenance activities listed below to verify that the licensee assessed and managed plant risk as required by 10 CFR 50.65(a)(4) and licensee procedures. The inspectors assessed the adequacy of the licensee's risk assessments and implementation of risk management actions. The inspectors also verified that the licensee was identifying and resolving problems with assessing and managing maintenance-related risk using the CAP. Additionally, for maintenance resulting from unforeseen situations, the inspectors assessed the effectiveness of the licensee's planning and control of emergent work activities. Documents reviewed are listed in the Attachment.

- Unit 2, January 4, 2017, elevated risk due to maintenance outage on the 2B RHR and RHR SW system
- Units 1 and 2, January 10, 2017, elevated risk for degraded fire pumps
- Units 1 and 2, January 31, 2017, elevated risk due to unplanned inoperability of the 1D control room AC unit
- Unit 2, February 16, 2017, elevated risk during the drywell wet vent modification
- Unit 2, February 22, 2017, elevated risk during the drywell wet vent modification
- Unit 2, March 17, 2017, risk associated with refueling outage B223R1

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 samples)

a. Inspection Scope

Operability and Functionality Review

The inspectors selected the operability determinations or functionality evaluations listed below for review based on the risk-significance of the associated components and systems. The inspectors reviewed the technical adequacy of the determinations to ensure that TS operability was properly justified and the components or systems remained capable of performing their design functions. To verify whether components or systems were operable, the inspectors compared the operability and design criteria in the appropriate sections of the TS and updated final safety analysis report to the licensee's evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment.

- Units 1 and 2, January 10, 2017, diesel and electric fire pumps nonfunctional, NCR 2090488
- Unit 2, January 11, 2017, 2B RHR/RHR SW heat exchanger 2B relief valve 2-E11-V54 lifting, NCR 2090164
- Unit 1, January 24, 2017, control rod speed too fast, NCR 2093639
- Units 1 and 2, February 28, 2017, EDG 2 pressure switch leaking oil, NCR 2104151
- Units 1 and 2, March 29, 2017, EDG 1 wrong material used for manifold on governor modification, NCR 2112304
- Unit 2, March 30, 2017, relevant indication found on a control rod drive return line nozzle to end cap dissimilar metal weld B211N9-RPV-FW2CRD52, NCR 2112313

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 3 samples)a. Inspection Scope

The inspectors verified that the plant modifications listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modifications did not degrade the design bases, licensing bases, and performance capability of risk significant SSCs. The inspectors also verified modifications performed during plant configurations involving increased risk did not place the plant in an unsafe condition. Additionally, the inspectors evaluated whether system operability and availability, configuration control, post-installation test activities, and changes to documents, such as drawings, procedures, and operator training materials, complied with licensee standards and NRC requirements. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with modifications. Documents reviewed are listed in the Attachment.

- Units 1 and 2, EC 400606, National Fire Protection Association 805 Modification – four-day diesel fuel oil storage tank vent for EDG 2
- Units 1 and 2, WO 20053915-1, scaffold installation in SW building 4-foot elevation
- Unit 2, WO 11458005-2, temporary heater near SLC pumps

b. Findings

Introduction. An NRC-identified Green NCV of 10 CFR Part 50, Appendix B, Criterion III, Design Control, was identified for the failure of the licensee to install flood barrier seals around the EDG 2 four-day fuel oil tank vent as described in EC 400606, resulting in a nonfunctional flood barrier for the EDG 2 four-day tank room.

Description. On January 20, 2017, the inspectors performed a walkdown on the EDG 2 four-day fuel oil tank vent installation. The licensee was implementing a modification to install eight-inch vent pipes for the four-day fuel oil tanks to meet National Fire Protection Association 805 requirements. Per EC 400606, the pipes were to be installed in the roof with a flood barrier seal around the pipes to prevent water intrusion into the EDG rooms during the Probable Maximum Precipitation (PMP) event.

The inspectors identified a one-inch gap all the way around the eight-inch vent pipes for the EDG 2 four-day fuel oil tank room. The inspectors determined the gap had existed since January 18, 2017. The failure to install the flood barrier created an opening in the roof that would have allowed water intrusion into the EDG 2 four-day fuel oil tank room during a PMP event, which called into question the operability of EDG 2. Per the Updated Final Safety Analysis Report (UFSAR), Section 2.4.10.2, Protection from the Probable Maximum Precipitation (PMP), the PMP event is 31.6 inches of rain over 6 hours or 5.3 inches per hour. The EDG four-day fuel oil tank roof also has a curb around it which allows water to build up over the nonfunctional flood barrier and enter the room. As immediate corrective actions, the licensee performed a temporary repair to grout the opening to prevent water intrusion into the EDG 2 four-day fuel oil tank room. The licensee performed a past operability determination for EDG 2, and through a calculation, determined the room would not flood sufficiently to make EDG 2 inoperable. The inspectors reviewed the calculation and agreed with the conclusion that EDG 2 was operable with the nonfunctional flood barrier.

Analysis. The inspectors determined the failure of the licensee to control the design of the installation of the new EDG 2 four-day fuel oil tank vent was a performance deficiency. The finding is more than minor because it is associated with the protection against external factors (i.e., flood hazard), attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee failed to install flood barrier seals around the EDG 2 four-day fuel oil tank vent, designed to mitigate a flood of the EDG 2 four-day fuel oil tank room. Using IMC 0609, Appendix A, issued June 9, 2012, The SDP for Findings At-Power, the inspectors determined the finding screened to Exhibit 4, External Events Screening Questions, since the finding involved the loss of equipment specifically designed to mitigate a flood. The inspectors determined the finding screened to Green since if the flood barrier is assumed to be completely failed, it would not result in the inoperability or degradation of EDG 2, and would not involve the total loss of any safety function that contributes to external event initiated core damage accident sequences. The finding has a cross-cutting aspect in the area of human performance associated with the design margins attribute because the licensee failed to maintain equipment within design margins and failed to change margins through a systematic and rigorous process. Specifically, the licensee changed the installation of the EDG 2 fuel oil tank roof vent without ensuring flood protection during the modification. [H.6]

Enforcement. Appendix B to 10 CFR Part 50, Criterion III, Design Control, requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in §50.2 and as specified in the license application, for those SSCs to which this appendix applies, are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents, and that deviations from such standards are controlled. Contrary to the above, between January 18, 2017 and January 20, 2017, the licensee failed to install the flood barrier seals around the EDG 2 four-day fuel oil tank vent as described in EC 400606, resulting in a nonfunctional flood barrier into the EDG 2 four-day tank room. As immediate corrective actions, the licensee grouted the opening to prevent water intrusion into the EDG 2 four-day fuel oil tank room. Because this finding is of very low safety significance (Green) and was entered into the licensee's CAP as NCR 2093563, consistent with Section 2.3.2.a of the NRC's Enforcement Policy, this violation is being treated as an NCV: NCV 05000325;324/2017001-03, Failure to Install Flood Barrier Seals Around the EDG 2 Four-Day Fuel Oil Tank Vent.

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

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the maintenance activities listed below to verify the work performed was completed correctly and the test activities were adequate to verify system operability and functional capability.

- WO 20054126, supplemental diesel test on January 5, 2016
- WO 20097659, RHR "B" room cooler maintenance on February 2, 2017
- WO 20144536, 1B RHR SW loop instrument leakage on February 3, 2017
- WO 13500159, 1A Control Building HVAC calibration failure on February 10, 2017

- WO 20122888, Diesel Fire Pump modification on March 5, 2017
- WO 12224416, EDG 4 Automatic voltage regulator modification on March 17, 2017

The inspectors evaluated these activities for the following:

- Acceptance criteria were clear and demonstrated operational readiness
- Effects of testing on the plant were adequately addressed
- Test instrumentation was appropriate
- Tests were performed in accordance with approved procedures
- Equipment was returned to its operational status following testing
- Test documentation was properly evaluated

Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with post-maintenance testing. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

For Unit 2 refueling outage B223R1 from March 17, 2017, through the remainder of the inspection period, the inspectors evaluated the following outage activities:

- outage planning
- shutdown, cooldown, refueling
- reactor coolant system instrumentation and electrical power configuration
- reactivity and inventory control
- decay heat removal and spent fuel pool cooling system operation

The inspectors verified that the licensee:

- considered risk in developing the outage schedule
- controlled plant configuration in accordance with administrative risk reduction methodologies
- developed work schedules to manage fatigue
- developed mitigation strategies for loss of key safety functions
- adhered to operating license and TS requirements

Inspectors verified that safety-related and risk-significant SSCs not accessible during power operations were maintained in an operable condition. The inspectors also reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with outage activities. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 8 samples)a. Inspection Scope

The inspectors reviewed the surveillance tests listed below and either observed the test or reviewed test results to verify testing activities adequately demonstrated that the affected SSCs remained capable of performing the intended safety functions (under conditions as close as practical to design bases conditions or as required by TS) and maintained their operational readiness.

The inspectors evaluated the test activities to assess for preconditioning of equipment, procedure adherence, and equipment alignment following completion of the surveillance. Additionally, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with surveillance testing. Documents reviewed are listed in the Attachment.

Routine Surveillance Tests

- OPT-12.2B, Units 1 and 2, No. 2 Diesel Generator Monthly Load Test
- 0MST-RCIC26Q, Unit 1, Reactor High Water Level Trip Unit Channel Calibration
- OPT-46.6, Units 1 and 2, Control Room Inleakage Tracer Gas Test
- OPT-40.2.6, Unit 2, Turbine Overspeed Trip Test

Containment Isolation Valve

- OPT-20.3A.5, Unit 2, Main Steam Isolation Valve Leak Test
- OPT-16.1.1, Unit 2, Containment Atmosphere Control System Valve Operability Test

In-Service Tests (IST)

- OPT-08.1.3B, Unit 2, Low Pressure Coolant Injection / RHR System Component Test - Loop A
- 2PT-24,1-2, Unit 2, Conventional SW Pump 2B

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)a. Inspection Scope

The inspectors observed the emergency preparedness drill conducted on February 15, 2017, involving a LOOP and a loss of all onsite alternating current power. The inspectors observed licensee activities in the simulator and/or technical support center to evaluate implementation of the emergency plan, including event classification, notification, and protective action recommendations. The inspectors evaluated the licensee's performance against criteria established in the licensee's procedures. Additionally, the inspectors attended the post-exercise critique to assess the licensee's effectiveness in identifying emergency preparedness weaknesses and verified the

identified weaknesses were entered in the CAP. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2. RADIATION SAFETY (RS)

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 7 samples)

a. Inspection Scope

Hazard Assessment and Instructions to Workers

During facility tours, the inspectors directly observed radiological postings and container labeling for areas established within the radiologically controlled area (RCA) of the Unit 2 reactor building, Unit 1 and Unit 2 spent fuel pools, and radioactive waste processing and storage locations. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected RCAs. The inspectors reviewed survey records for several plant areas including surveys for airborne radioactivity, gamma surveys with a range of dose rate gradients, surveys for alpha-emitters and other hard-to-detect radionuclides, 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. 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.

Control of Radioactive Material

The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. The inspectors discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Hazard Control

The inspectors evaluated access controls and barrier effectiveness for selected High Radiation Area (HRA), Locked High Radiation Area (LHRA), and Very High Radiation Area (VHRA) locations and discussed changes to procedural guidance for LHRA and VHRA controls with radiation protection (RP) supervisors. The inspectors reviewed implementation of controls for the storage of irradiated material within the spent fuel pool. Established radiological controls, including airborne controls and electronic dosimeter (ED) alarm setpoints, were evaluated for selected Unit 2 Refueling Outage (RFO) B223R1 tasks. In addition, the inspectors reviewed licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations. The inspectors also reviewed the use of personnel dosimetry in high dose rate gradients to include the use of multi-badging and extremity dosimetry.

Radiation Worker Performance and RP Technician Proficiency

Occupational workers' adherence to selected RWPs and RP technician proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. The significant job observed was torus cleaning/diving activities in high radiation and contaminated areas. The inspectors also evaluated worker responses to dose and dose rate alarms during selected work activities.

Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Inspection Criteria

RP activities were evaluated against the requirements of UFSAR Chapter 12, TS Section 5.7, 10 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 and records 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 - 2 samples)

a. Inspection Scope

Work Planning and Exposure Tracking

The inspectors reviewed work activities and their collective exposure estimates for the last Unit 1 and Unit 2 RFOs (B121R1 and B222R1). The inspectors reviewed ALARA planning packages for activities related to the following high collective exposure tasks: B121R1 Under Vessel, Reactor Reassembly, and Welding Activities; and B222R1 Motor-operated Valve 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 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 2013 – 2015. Source term reduction initiatives, including cobalt reduction and zinc injection,

were reviewed and discussed with RP staff. The inspectors also reviewed temporary shielding packages for the last Unit 1 and Unit 2 refueling outages.

Radiation Worker Performance

As part of Inspection Procedure (IP) 71124.01, the inspectors observed pre-job ALARA briefings and radiation worker performance for various HRA jobs in the auxiliary building and containment associated with RFO B223R1. 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. The inspectors also reviewed recent self-assessment results.

Inspection Criteria

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 - 4 samples)

a. Inspection Scope

Engineering Controls

The inspectors reviewed the use of temporary and permanent engineering controls to mitigate airborne radioactivity during RFO B223R1. The inspectors observed the use of portable air filtration units for work in contaminated areas of the RCA and reviewed filtration unit testing certificates. The inspectors evaluated the effectiveness of continuous air monitors to provide indication of increasing airborne levels and the placement of air samplers in work area "breathing zones." The inspectors also evaluated alarm set point determinations on air monitors for the inclusion of different nuclide hazards.

Respiratory Protection Equipment

The inspectors reviewed the use of respiratory protection devices to limit the intake of radioactive material. This included review of devices used for routine tasks and devices stored for use in emergency situations. The inspectors reviewed ALARA evaluations for the use of respiratory protection for several outage jobs including the control rod drive exchange and reactor cavity decontamination. Selected Self-Contained Breathing Apparatus (SCBA) units and negative pressure respirators (NPR) staged for routine and emergency use in the Main Control Room and other locations were inspected for material condition, SCBA bottle air pressure, number of units, and number of spare

masks and availability of air bottles. The inspectors reviewed maintenance records for selected SCBA units for the past two years and evaluated SCBA and NPR compliance with National Institute for Occupational Safety and Health certification requirements. The inspectors also reviewed records of air quality testing for supplied-air devices and SCBA bottles.

The inspectors observed different aspects of the respiratory protection program including the donning and doffing of respirators and the checkout process for various types of respirators. The inspectors discussed training for various types of respiratory protection devices with licensee staff and interviewed radiation workers and control room operators on use of the devices including SCBA bottle change-out and use of corrective lens inserts. The inspectors reviewed respirator qualification records (including medical qualifications) for several Main Control Room operators and emergency responder personnel. In addition, inspectors evaluated qualifications for individuals responsible for testing and repairing SCBA vital components.

Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with airborne controls and respiratory protection activities. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Inspection Criteria

RP program activities associated with airborne radioactivity monitoring and controls were evaluated against details and requirements documented in the UFSAR Chapters 9 and 12; TS Sections 5.4 and 5.5.7, 10 CFR Part 20; Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection" and approved licensee procedures. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04 – 5 samples)

a. Inspection Scope

Source Term Characterization

The inspectors reviewed the plant radiation characterization (including gamma, beta, alpha, and neutron) being monitored and verified the use of scaling factors to account for hard-to-detect radionuclides in internal dose assessments.

External Dosimetry

The inspectors reviewed National Voluntary Laboratory Accreditation Program (NVLAP) certification data for the licensee's Thermoluminescent Dosimeter (TLD) processor for the current year for Ionizing Radiation Dosimetry. The inspectors observed and evaluated onsite storage of TLDs. Comparisons between ED and TLD results, including correction factors, were reviewed and discussed. The inspectors also evaluated

licensee procedures for unusual dosimetry occurrences. ED alarm logs were reviewed as part of IP 71124.01.

Internal Dosimetry

The inspectors reviewed and discussed the in vivo bioassay program with the licensee. Inspectors reviewed procedures that addressed methods for determining internal or external contamination, releasing contaminated individuals, and the assignment of dose. The inspectors evaluated the licensee's program for in vitro monitoring and also reviewed contamination logs and evaluated events with the potential for internal dose.

Special Dosimetric Situations

The inspectors reviewed records for declared pregnant workers (DPW) from April 2015 through March 2016 and discussed guidance for monitoring and instructing DPW. Inspectors reviewed the licensee's program for monitoring external dose in areas of expected dose rate gradients, including the use of multi-badging and extremity dosimetry. The inspectors evaluated the licensee's neutron dosimetry program including instrumentation used to perform neutron surveys. In addition, the inspectors reviewed the licensee's program for evaluation of shallow dose equivalent (SDE). The inspectors also reviewed contamination logs and evaluated events with the potential for SDE.

Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with occupational dose assessment activities. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Inspection Criteria

The licensee's 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.

4. OTHER ACTIVITIES

40A1 Performance Indicator (PI) Verification (71151 – 6 samples)

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator data, submitted by the licensee, for the Unit 1 and Unit 2 PIs listed below. The inspectors reviewed plant records compiled between January 1, 2016, and December 31, 2016 verify the accuracy and completeness of the data reported for the station. The inspectors verified that the PI data complied with guidance contained in Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guideline," and licensee procedures. The inspectors verified the accuracy of reported data that were used to calculate the value of each PI. Documents reviewed are listed in the Attachment.

Cornerstone: Initiating Events

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

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review

The inspectors screened items entered into the licensee's CAP to identify repetitive equipment failures or specific human performance issues for follow-up. The inspectors reviewed NCRs, attended screening meetings, or accessed the licensee's computerized corrective action database.

.2 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of the following NCRs:

- NCR 2095663, Ineffective Management of Control Building HVAC System Material Condition
- NCRs 2096803, 2099750, 2099289, 2095320, 2095356, 2095452, and 2095357, Seismic Concerns Regarding Unrestrained Scaffold and Unchoked Cart Wheels

The inspectors evaluated the following attributes of the licensee's actions:

- complete and accurate identification of the problem in a timely manner
- evaluation and disposition of operability and reportability issues
- consideration of extent of condition, generic implications, common cause, and previous occurrences
- classification and prioritization of the problem
- identification of root and contributing causes of the problem
- identification of any additional NCRs
- completion of corrective actions in a timely manner

Documents reviewed are listed in the Attachment.

b. Findings

.1 Failure to Enter the Technical Specification for an Inoperable 1D Control Room Air Conditioning Unit

Introduction. An NRC-identified Green NCV of TS 3.7.4, Control Room Air Conditioning (AC) System, was identified for the failure to declare the 1D control room AC unit inoperable. Specifically, on December 1, 2016, the licensee failed to declare the 1D control room AC unit inoperable due to extensive corrosion on the support channels. As a result, the 1D control room AC unit was inoperable from December 1, 2016, until the

next time it was inspected on January 30, 2017, and exceeded the TS allowed outage time.

Description. On December 13, 2016, while performing preventative maintenance (PM) on the 2D control room AC unit, the licensee identified significant corrosion on the support channels. The unit was returned to service, and the PM was closed out. The licensee determined on December 14, 2016, that the 2D control room AC unit was inoperable with the corrosion since it would not be able to withstand a seismic event. The licensee entered 30-day shutdown TS 3.7.4, Condition A, and documented this issue in NCR 2086073. The licensee provided a structural repair by replacing the supports and declared the unit operable on December 22, 2016.

On January 30, 2017, the licensee performed an extent of condition inspection on the 1D control room AC unit and found significant corrosion on the support members. The unit was declared inoperable, the supports were replaced under WO 20139332, and the unit was returned to operable on February 3, 2017.

The inspectors reviewed the bases for TS 3.7.4, which states the function of the control room AC system is to provide temperature and humidity control for the control room during normal and accident conditions. The design basis of the system is to maintain the control room temperature for a 30-day continuous occupancy following a design basis event. The system consists of three 50-percent capacity subsystems (1D, 2D, and 2E), and any two of the three provide the required temperature control.

The licensee determined the corrosion was due to trapped moisture in contact with steel supports in exposure to a local marine environment. The corrosion degraded the supports to the point that the safety function of the AC unit would be lost during a seismic event. The licensee determined that since the 1D and 2D control room AC units were inoperable due to corrosion, the duration of the inoperability could not be determined, and the duration could have been longer than 30 days. On February 13, 2017, the licensee submitted licensee event report (LER) 05000325/324; 1-2016-006, Control Room Air Conditioning Units Inoperable Due to Corroded Supports, in accordance with 10 CFR 50.73(a)(2)(i)(B) for Units 1 and 2, operating in a condition prohibited by TS 3.7.4, Condition A, with one control room AC subsystem inoperable, restore the subsystem to operable within 30 days; and Condition B, with two control room AC subsystems inoperable, restore one inoperable subsystem to operable status within 72 hours. If either of these conditions are not met, the licensee is required to enter Condition C, be in Mode 3 within 12 hours and Mode 4 within 36 hours. Since the two control room AC units were inoperable greater than 72 hours, and Units 1 and 2 were not shutdown, this issue was a violation of TS 3.7.4. Also, with two of the three control room AC units inoperable, the issue was also reportable, as discussed in the LER, in accordance with 10 CFR 50.73(a)(2)(v)(D) for an event or condition that could have prevented the fulfillment of a safety function.

The licensee performed an apparent cause evaluation in NCR 2095663, and determined the corroded support channels on the 1D control room AC unit were first identified on May 9, 2006, after being installed for eight years. A design issue was identified that allowed condensation to collect and become trapped in the support channels. The paint in that location, that was constantly submerged, broke down and the bare metal underneath started to corrode. The corrective action from 2006 was to paint and repair the coatings and develop a plan to repair/replace/coat the supports and provide for proper drainage. Work request (WR) 10254942 to repair/replace the support channels on the 1D control room AC unit was rescheduled eight times since 2006. Two additional

condition reports, NCR 508912 on January 12, 2012, and 685383 on May 3, 2014, were written to bring awareness to the need for increased attention on the control room AC units; however, the NCRs did not result in improvement to the system.

The inspectors reviewed the cause evaluation and noted that the six-month periodic inspection of the 1D control room AC unit was completed on December 1, 2016, in WO 20052455. The step to "inspect the base frames of the condensing units [1D] for corrosion and loss of structural integrity," was marked satisfactory. Since corrosion is a slow moving process, and the corrosion found during the January 30, 2017, included corrosion completely through the supports, the inspectors determined the extent of corrosion had to exist during the December 1, 2016, inspection. The inspectors determined the 1D control room AC unit should have been declared inoperable on December 1, 2016, instead of when it was inspected as part of the extent of condition inspection for 2D on January 30, 2017. The failure to identify the 1D control room AC unit was inoperable on December 1, 2016, was not discussed in the cause evaluation, the LER, or the reportability review. The licensee entered this issue into the CAP as NCRs 2113799 and 2113800. The licensee plans to revise LER 05000325/324;1-2016-006 with this information.

Analysis. The inspectors determined the licensee's failure to declare the 1D control room AC unit inoperable on December 1, 2016, and enter TS 3.7.4 was a performance deficiency. The finding was more than minor because it was associated with the SSCs attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, this resulted in the 1D control room AC unit being inoperable from December 1, 2016, to January 30, 2017. 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 (Green) because the finding did not only represent a degradation of the radiological barrier function for the control room and the finding did not represent a degradation of the barrier function of the control room against smoke or toxic atmosphere. This finding had a cross cutting aspect in the area of problem identification and resolution associated with the resolution aspect because the licensee failed to take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, the licensee did not correct the degradation of the 1D control room AC unit until the unit was inoperable. [P.3]

Enforcement. Technical Specification 3.7.4, Control Room Air Conditioning System, requires three control room AC subsystems to be operable. Condition A states, that with one control room AC subsystem inoperable, restore the control room AC subsystem to operable within 30 days. Condition B states, that with two control room AC subsystems inoperable, restore one inoperable control room AC subsystem to operable status within 72 hours. Contrary to the above, on December 1, 2016, the licensee failed to declare the 1D control room AC unit inoperable and enter TS 3.7.4, Condition A. Consequently, on December 13, 2016, with both the 1D and the 2D control room AC units inoperable, the licensee failed to enter TS 3.7.4, Condition B. As corrective actions, the licensee replaced the supports of the 1D and 2D control room AC units and inspected the 2E control room AC unit for corrosion. Because this finding is of very low safety significance and was entered into the licensee's CAP as NCRs 2113799 and 2113800, consistent with Section 2.3.2.a of the NRC's Enforcement Policy, this violation is being treated as an NCV: NCV 05000325;324/2017001-04, Failure to Enter the Technical Specification for an Inoperable 1D Control Room Air Conditioning Unit.

.2 Seismic Concerns Regarding Unrestrained Scaffold and Unchocked Cart Wheels

No findings were identified.

The inspectors identified a trend for the failure of the licensee to ensure safety-related equipment would not be impacted during a seismic event. The first example, from January 23-27, 2017, the licensee failed to follow licensee procedure AD-MN-ALL-0015, Nuclear Station Scaffold Erection, Tracking, and Dismantling, when a scaffold was built unrestrained in proximity to the Unit 2 "B" train of SBT. The second example, during January 2017, the licensee failed to follow licensee procedure 0AI-114, Housekeeping/Material Condition Program, which requires items on wheels to be chocked, locked, or otherwise restrained from rolling when not in use to protect plant equipment from the potential effects of an earthquake. The inspectors found five other carts which were unrestrained that had the potential to impact safety-related equipment during a seismic event. The inspectors determined these issues were minor because no equipment was affected by these deficiencies. The licensee's corrective actions included rebuilding the scaffolding and chocking the wheels on the carts. This issue was entered into the licensee's CAP as NCRs 2095357, 2095320, 2095356, 209452, 2099289, 2096803, and 2099750.

.3 Safety Conscious Work Environment

a. Inspection Scope

NRC inspectors conducted an assessment of the Safety Conscious Work Environment (SCWE) for the licensee's security department. NRC inspectors conducted a review of available NCRs, documentation, procedures, guidelines and instructions. Additionally, inspectors used both a written survey and interviews with licensee staff, supervisors, and management. During the inspection, inspectors were sensitive to areas and issues that would represent challenges to the free flow of information, such as areas where employees may be reluctant to raise concerns or report issues to supervisors, managers, employee concerns program (ECP), human resources (HR) department, and/or the NRC. The inspectors also discussed the corrective action and fitness for duty programs. The inspectors surveyed and interviewed a sampling of 38 people assigned to the Security department. Documents reviewed are listed in the Attachment.

b. Assessment

Inspectors found that personnel were knowledgeable of SCWE and the associated processes for implementation. Additionally, personnel stated that they did use the processes to report nuclear safety and other safety concerns, and that their safety concerns were appropriately addressed. Personnel in the field utilized the CAP by reporting issues to their supervisors. All other personnel were comfortable using the CAP. The inspectors found that personnel were not reluctant to raise concerns or report issues to supervisors, managers, ECP, HR department, and/or the NRC.

Based on inspection insights obtained from interviews, written survey results, and documents reviewed, the inspectors determined that at this time, there were no SCWE issues related to the Security department.

c. Findings

No findings were identified.

4OA3 Follow-up of Events (71153 – 3 samples)

.1 (Closed) LER 05000325;324/2017-001-00, Speed and Frequency Oscillations Result in Inoperable EDG

a. Inspection Scope

On February 7, 2016, an event occurred which resulted in a LOOP on Unit 1. EDG 1 and EDG 2 started and tied to their respective Unit 1 emergency buses. During diesel operation, EDG 1 exhibited oscillations in engine speed and bus frequency. EDG 1 was determined to be inoperable due to the excessive load and frequency oscillations. NRC Inspection Report 05000324;325/2016004, dated February 9, 2017, (ADAMS accession number ML17041A010), includes a Severity Level IV NCV (05000325;324/2016004-01) for failure to submit an LER due to the inoperability of EDG 1. The licensee entered this issue into the CAP as NCR 2012039. The corrective action was to submit an LER to fulfill the requirement of 10 CFR 50.73(a)(1) pertaining to that violation. Documents reviewed are listed in the Attachment.

b. Findings

Two NRC-identified NCVs were documented in NRC Integrated Inspection Reports 05000324/2016002, Section R15, and 05000324/2016004, Section 4OA3. No additional findings were identified during the review of this LER. This LER is closed.

.2 (Closed) LER 05000325;324/2016-005-00, Drywell High Radiation Monitors Inoperable due to Thermally Induced Current Phenomenon

a. Inspection Scope

On October 3, 2017, an engineering review of NRC Information Notice 97-45 Supplement 1, identified the signals cables for the drywell high range radiation monitors (DWHRRMs) are susceptible to thermally induced currents which can degrade the accuracy of DWHRRMs. The licensee declared the DWHRRMs as inoperable for both units and entered TS 3.3.3.1, to submit a special report within 60 days. The special report was issued via this LER. The licensee entered this issue into the CAP as NCR 2066681. The corrective actions will include replacing these cables on the schedule to be developed. Documents reviewed are listed in the Attachment.

b. Findings

A licensee-identified NCV is documented in Section 4OA7 of this report. This LER is closed.

.3 (Closed) LER 05000325;324/2016-006-00, Control Room AC Units Inoperable Due to Corroded Supports

a. Inspection Scope

On December 14, 2016, the 2D control room AC unit was declared inoperable due to

corrosion on the support channels, and Units 1 and 2 entered TS 3.7.4, Condition A. On January 30, 2017, the 1D control room AC unit was declared inoperable for corrosion on the support channels. The corrosion was due to trapped moisture in contact with steel supports exposed to a local marine environment. The corrosion degraded the supports to the point that the safety function of the AC unit would be lost during a seismic event. Since the degradation was due to corrosion, both units were determined to be inoperable at the same time. The conditions were determined to have existed longer than the TS 3.7.4 allowed outage time. The licensee entered this issue into the CAP as NCR 2095663. As corrective actions, the licensee replaced both AC units' supports, declared the units operable, and inspected the 2E AC unit for corrosion.

b. Findings

An NRC-identified NCV is documented in Section 4OA2. This LER is closed.

.4 Temporary Instruction 2515/192, "Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems"

a. Inspection Scope

The objective of this performance-based temporary instruction is to verify implementation of interim compensatory measures associated with an open phase condition design vulnerability in electric power systems for operating reactors. The inspectors conducted an inspection to determine if Brunswick had implemented the following interim compensatory measures. These compensatory measures are to remain in place until permanent automatic detection and protection schemes are installed and declared operable for open phase condition design vulnerability. The inspectors verified the following:

- Brunswick identified and discussed with plant staff the lessons-learned from the open phase condition events at US operating plants, including the Byron Station open phase condition and its consequences. This included conducting operator training for promptly diagnosing, recognizing consequences, and responding to an open phase condition.
- Brunswick updated plant operating procedures to help operators promptly diagnose and respond to open phase conditions on off-site power sources credited for safe shutdown of the plant.
- Brunswick established and implemented periodic walkdown activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits to detect a visible open phase condition.
- Brunswick ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained. As part of the maintenance and testing activities, the licensee assessed and managed plant risk in accordance with 10 CFR 50.65(a) (4) requirements.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On April 20, 2017, the resident inspectors presented the inspection results to Mr. Gideon and other members of the licensee's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and was a violation of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as an NCV.

- TS limiting condition for operation (LCO) 3.3.3.1, Condition F, Post Accident Monitoring (PAM) Instrumentation, states in part, with the DWHRRMs inoperable, a Special Report shall be submitted to the Commission within the next 14 days.

Contrary to the above, the licensee failed to identify the inoperability of the DWHRRMs after the NRC Information Notice 97-45 Supplement 1 was issued. In particular, the DWHRRMs signals cables are susceptible to thermally induced currents which can degrade the accuracy of DWHRRMs. The required action of LCO 3.3.3.1, action F, was not performed from 1998 until December 5, 2016. Using IMC 0609, Appendix B, Emergency Preparedness Significance Determination Process, inspectors determined that this violation was of very low safety significance (Green) because the finding is related to Emergency Preparedness Requirements that are not associated with a planning standard function (e.g., 10 CFR 50.54(q), 10 CFR 50.54(t), and requirements in Appendix E to 10 CFR Part 50 that do not support a planning standard function). Other parameters could be used to validate the indications from the DWHRRMs. The corrective action is to restore the monitors to operable. This issue was documented in the licensee's CAP as NCR 2066681.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

K. Allen	Director, Design Engineering
B. Bagwell	Environmental & Chemistry
A. Baker	Supervisor, Environmental & Chemistry
J. Berry	Supervisor, LOCT Training
A. Brittain	Director, Nuclear Plant Security
P. Brown	Manager, Nuclear Performance Improvement
B. Bryant	Manager, Nuclear Oversight
J. Bryant	Regulatory Affairs
R. Carpenter	Radiation Monitor Engineer
P. Dubrouillet	Director, Nuclear Engineering, Mechanical Systems
C. Dunsmore	Manager, Nuclear Outage
W. Gideon	Vice President
L. Grzeck	Manager, Nuclear Regulatory Affairs
J. Hicks	Manager, Nuclear Training
B. Houston	Manager, Nuclear Maintenance
J. Johnson	Manager, Nuclear Chemistry
K. Krueger	Manager, Nuclear Operations
J. McAdoo	Manager, Nuclear Rad Protection
M. McPherson	Director, Nuclear Organizational Effectiveness
K. Moser	Plant Manager
B. Murray	Licensing
J. Nolin	General Manager, Nuclear Engineering
W. Orlando	Superintendent, E/I&C
O. Paladiy	Welding Engineer/Repair & Replacement Engineer
A. Padleckas	Assistant Ops Manager, Training
D. Petrusic	Superintendent, Environmental & Chemistry
J. Pierce	Manager, Nuclear Work Management
E. Rau	Operations Training
M. Regan	Project Manager, Major Projects
L. Rohrbaugh	Operator Training
M. Smiley	Manager, Nuclear Ops Training
L. Spencer	Operator Training
R. Wiemann	Director, Nuclear Engineering, Electrical Reactor Systems
E. Williams	Operations Manager
S. Williams	BWRVIP Program Engineer
C. Winslow	ISI Program Engineer

State of North Carolina

P. Cox	Department of Health and Human Services
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NRC Personnel

S. Rose	Chief, Reactor Projects Branch 4
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LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000325;324/2017001-01	NCV	Nonfunctional Sprinklers in the Service Water Building Without Compensatory Measures (Section 1R05)
05000324/2017001-02	NCV	Failure to Control a Temporary Fire Ignition Source Near the Unit 2 Standby Liquid Control Pump Motor and Cables (Section 1R05)
05000325;324/2017001-03	NCV	Failure to Install Flood Barrier Seals Around the EDG 2 Four-Day Fuel Oil Tank Vents (Section 1R18)
05000325;324/2017001-04	NCV	Failure to Enter the Technical Specification for an Inoperable 1D Control Room Air Conditioning Unit (Section 4OA2)

Closed

05000325;324/2017-001-00	LER	Speed and Frequency Result in Inoperable Emergency Diesel Generator (Section 4OA3.1)
05000325;324/2016-005-00	LER	Drywell High Radiation Monitors Inoperable due to Thermally Induced Current Phenomenon (Section 4OA3.2)
05000325;324/2016-006-00	LER	Control Room AC Units Inoperable Due to Corroded Supports (Section 4OA3.3)
Temporary Instruction 2515/192	TI	Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (Section 4OA5)

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 1R01: Adverse Weather Protection

Procedures

0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses, Rev. 70
0OI-01.03, Non-Routine Activities, Rev. 66

Work Orders

20059345 20059343

Miscellaneous

NRC Generic Letter 2006-02

Section 1R04: Equipment Alignment

Procedures

0OP-39, Diesel Generator Operating Procedure, Rev. 175
0OP-39, Diesel Generator Operating Procedure, Rev. 175
2OP-17, Residual Heat Removal System Operating Procedure, Rev. 175
2OP-10, Standby Gas Treatment System Operating Procedure, Rev. 81
0OP-41, Fire Protection System Operating Procedure, Rev. 137

Condition Reports

2053116 2059064 2064465 2071690 2075488 2091805
2111076 2111332

Drawings

D-02269, Fuel Oil to Diesel Generator Piping Diagram, Rev. 30
D-02271 Piping Diagram Diesel Generator Lube Oil System, Rev. 22
D-02526, Reactor Building Residual Heat Removal System Piping Diagram Sht 2B, Rev. 81
D-02526, Reactor Building Residual Heat Removal System Piping Diagram Sht 2A, Rev. 56
F-04073, Reactor Building Standby Gas Treatment Piping Diagram Sht 3, Rev. 15
D-04106, Plant Fire Protection System Piping Diagram, Rev. 26
0-FP-20576, Unit 1 & 2 Fire Protection Piping Isometric D.G. Cell 1, Rev. C

Miscellaneous

SD-10 Standby Gas Treatment System, Rev. 7
SD-39, Emergency Diesel Generator, Rev. 20
SD-41, Fire Suppression Systems, Rev. 11
EC 407310

Section 1R05: Fire ProtectionProcedures

1PFP-RB, Reactor Building PreFire Plans, Rev. 20
 2PFP-RB, Reactor Building PreFire Plans, Rev. 21
 0PFP-013, General Fire Plan, Rev. 49
 0PFP-PBAA, Power Block Auxiliary Areas Pre-Fire Plans, Rev. 32
 0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements, Rev. 50
 AD-EG-ALL-1523, Temporary Ignition Source Control, Rev. 0
 AD-MN-ALL-0015, Nuclear Station Scaffold Erection, Tracking, and Dismantling, Rev. 9

Condition Reports

2091795 2091736

Miscellaneous

Sisco Fire & Safety monthly report

Section 1R07: Heat Sink PerformanceProcedures

0ENP-2704, Administrative Control of NRC Generic Letter 89-13 Requirements, Rev. 24

Work Orders

20106593 20086942

Miscellaneous

EPRI NP-7552, Heat Exchanger Performance Monitoring Guidelines

Section 1R08: Inservice Inspection ActivitiesProcedures:

54-ISI-859-03, AREVA Phased Array Examination of Core Shroud Assembly Welds, Rev. 03
 54-ISI-880-003, AREVA Phase Array Ultrasonic Examination of Dissimilar Metal Piping Welds, Rev. 003
 54-ISI-884-000, AREVA Automated Phased Array Ultrasonic Examination of Core Shroud Assembly Welds, Rev. 000
 AREVA Remote Underwater In-Vessel Visual Inspection of Reactor Pressure Vessel Internals, Components, and Associated Repairs in Boiling Water Reactors, Rev. 008
 WLD-EG-ALL-1620, General Welding, Rev. 0

Work Orders/Work Requests:

20077955-07, EC-403764 Contingency to Reweld Flanges for 2-SW-V10, dated 03/29/17

Condition Reports:

021112313, Relevant Indication Identified in Weld 2B11N9-RPV-FW2CRD2
 2003832, "Crack-like Indication in an Alloy 182 Designed Weld Overlay (Industry OE)," dated 02/23/2016
 02111213, Relevant Condition on Restraint 2-SW-101PG501, dated 3/24/2017
 02111332, RHR System Piping Corrosion, dated 3/25/2017
 02111532, Relevant Indication in Core Shroud H4 Upper Weld, dated 3/26/2017

NDE Examiner Quals:

AREVA Certificate of Calibration: Digital Thermometer (SN Vh-14977), dated 02/02/2017
 AREVA Certificate of Personnel Qualification: UT LII, Automated (Breiholtz), dated February 23, 2017

AREVA Certificate of Personnel Qualification: UT LII, Automated (Breza), dated January 25, 2017
 AREVA Certificate of Personnel Qualification: UT LII, Automated (Key), dated February 8, 2017
 AREVA Certificate of Personnel Qualification: UT LIII (Bauman), dated January 17, 2017
 AREVA Certificate of Personnel Qualification: VT LIII (Briggs), dated November 15, 2016
 AREVA Certificate of Vision Examination (Bauman), dated December 12, 2016
 AREVA Certificate of Vision Examination (Breiholtz), dated January 12, 2017
 AREVA Certificate of Vision Examination (Breza), dated June 29, 2017
 AREVA Certificate of Vision Examination (Briggs), dated 8/9/16
 AREVA Certificate of Vision Examination (Key), dated January 18, 2017
 Curtiss-Wright Certification of Visual Acuity and Color Vision per LMT Procedure PVE-1 (Thomas), dated 6/3/2016
 Curtiss-Wright Personnel Certification Statement: UT LIII (Thomas), dated 01/21/2017

Miscellaneous Documents:

08 2 01, Weld Procedure Specification, dated 5/26/94
 6, Procedure Qualification Record, dated 7/10/76
 6a, Procedure Qualification Record, dated 4/21/80
 6b, Procedure Qualification Record, dated 2/11/81
 6c, Procedure Qualification Record, dated 7/5/84
 AREVA Brunswick 2 Nuclear Plant (B223R1) Core Shroud Ultrasonic Examinations Indication Notification Report, dated March 28, 2017
 AREVA Core Shroud Examination Summary Sheet: H4 Weld, dated 04/06/2017
 BNP2-DM-2017-9, AREVA Automated Phased Array Indication Report (N9), dated 3/29/2017
 BSEP 97-0104, Letter from Keith R. Jury to U.S. Nuclear Regulatory Commission: "NUREG-0313 Inspection of Category E Welds," dated May 1, 1997
 INR-BNP2-17-020, AREVA Indication Notification Report (Jet Pump C Riser, Weld JPCRS-1), dated 03-29-2017
 Record of Welder Performance Qualification Test (Graham, GTAW-Manual), dated 02/29/2012
 Record of Welder Performance Qualification Test (Johnson, GTAW/SMAW-Manual), dated 1/19/2015
 Record of Welder Performance Qualification Test (Johnson, GTAW-Manual), dated 06/25/2014
 Record of Welder Performance Qualification Test (Sholar, GTAW-Manual), dated 02/05/2015
 Weldstar Certificate of Compliance (PO# 00607509 Rev. 001), dated February 16, 2012
 Weldstar Certificate of Compliance (PO# 00607509 Rev. 001), dated February 29, 2012
 Zetec Certificate of Compliance: Phased Array UT equipment (SN 5135Z101 & 5135Z102), dated September 11, 2013

Section 1R11: Licensed Operator Regualification Program and Licensed Operator Performance

Procedures

0PT-20.3C, Personnel AirLock Interior and Exterior Doors Leak Rate Test, Rev. 11
 0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses, Rev. 71
 2AOP-04.0, Low Core Flow, Rev. 39
 0EOP-01-SBO, Blacked Out Unit Initial Actions, Rev. 02
 0OI-01.07, Notifications, Rev. 38
 2EOP-01-RSP, Reactor Scram Procedure, Rev. 16
 0EOP-01-FSG-01, FLEX Initial Assessment and Equipment Staging, Rev. 01
 0EOP-01-FSG-04, FLEX Diesel Generator Alignment, Rev. 01
 0PEP-02.1, Initial Emergency Actions, Rev. 53
 0PEP-02.1.1, Emergency Control – Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency, Rev. 28

Condition Reports

2093639 2093557

Work Orders

20058945

Section 1R12: Maintenance EffectivenessProcedures

1AOP-04.0, Low Core Flow, Rev. 40
 0GP-14, Extended Single Recirculation Loop Operation, Rev. 18
 0PM-FAN502, Joy Manufacturing Adjustable Fans, Rev. 6
 AD-EG-ALL-1210, Maintenance Rule Program, Rev. 01

Condition Reports

2098251 2100885

Work Orders

20060809 20098504 20145325

Drawings

0-FP-04321. Control Building Equipment Locations Sheet 4, Rev. J

Miscellaneous

FP-4190, Fan Vendor Manual

Section 1R13: Maintenance Risk Assessment and Emergent Work ControlProcedures

AD-OP-ALL-0201, Protected Equipment, Rev. 03
 0AP-022, BNP Outage Risk Management, Rev. 56
 AD-WC-ALL-0250, Work Implementation and Completion, Rev. 03
 AD-WC-ALL-0410, Work Activity Integrated Risk Management, Rev. 02
 AD-WC-ALL-0200, Online Work Management, Rev. 07
 AD-OP-ALL-0201, Protected Equipment, Rev. 03
 AD-WC-ALL-0430, Outage Risk Review, Rev. 02
 0AP-025, BNP Integrated Scheduling, Rev. 56

Condition Reports

2100891 2111151 2111152

Miscellaneous

BNP U2 223R1 Outage Risk Assessment
 BNP U2 Key Safety Function Daily Risk Assessment
 EOOS Risk Assessments
 BNP-PSA-041, BNP On-Line Equipment Out of Service Probabilistic Safety Assessment Model

Section 1R15: Operability Determinations and Functionality AssessmentsProcedures

0PT-14.1, Control Rod Operability Test, Rev. 68
 AD-OP-ALL-0105, Operability Determinations and Functionality Assessments, Rev. 03

Condition Reports

2093639 2104151 2090488 2090164 2090488 2112304

Work Orders

20063155

Section 1R18: Plant ModificationsCondition Reports

2093563

Work Orders

11458005-2

Drawings

LL-08304, Grout Pad Details for the Four-Day Storage Tank Vent Pipes Tornado Missile Protection, Sheet 760-1 & 2

FSP-02214, Diesel Building EDG Four-Day Storage Tank No 2 Emergency Vent Line, Rev. C

BP-27938, Diesel Generator Fuel Oil Drain and Level Switch, Rev. 1

F-1681, Diesel Fuel Oil Tank Chamber Units 1 & 2 Concrete, Rev. 6

Miscellaneous

EC 400606, National Fire Protection Association 805 Modification – four-day diesel fuel oil storage tank vent for EDG 2

Section 1R19: Post Maintenance TestingProcedures

OPT-12.26, Supplemental Diesel Generator Load Test, Rev.

OPT-08.2.2B, LPCI/RHR System Operability Test - Loop B, Rev. 102

OPT-08.1.4B, RHR Service Water System Operability Test - Loop B, Rev. 74

OSP-EC70989, DG4 Data Acquisition Following Voltage Regulator, Jet Assist, and Timing Relay Engineering Changes Special Procedure, Rev. 0

OPT-34.5.5.0

Condition Reports

2099151	2109415	2109364	2090488	2088331	2088329
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Work Orders

20097659	20144536	13500159	12224416	20122888	20123556
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20054126

Miscellaneous

EC 70989

EC 297232

EC 407310

Section 1R20: Refueling and Other Outage ActivitiesProcedures

0GP-05, Unit Shutdown, Rev. 182

0GP-06, Cold Shutdown to Refueling (Head Unbolted), Rev. 44

0GP-07, Preparations for Core Alterations, Rev. 63

0GP-08, Refueling to Cold Shutdown, Rev. 51

0GP-10, Rod Sequence Check-off Sheets, Rev. 43

0GP-12, Power Changes, Rev. 78

1PT-01.7, Heatup/Cooldown monitoring, Rev. 9

Unit 2 EGM 11-03 Operation with the Potential for Draining the Reactor Core Activities

0OI-01.01, BNP Conduct of Operations Supplement, Rev. 81

0OI-01.06, Post Trip Review, Rev. 46
 0MMM-015, Operation and Inspection of Cranes and Material Handling Equipment, Rev. 67
 0SMP-RPV501, Reactor Vessel Disassembly, Rev. 31
 0ENP-54, Building Ventilation Pressure Control Program, Rev. 35
 2SP-15-101, Unit 2 Enforcement Guidance Memorandum 11-003 Operations with the Potential
 for Draining the Reactor Vessel Activities, Expires 12-31-15, Rev. 01
 0ENP-24.0, Reactor Engineering Guidelines, Rev. 66
 0AP-022, BNP Outage Risk Management, Rev. 56
 0OI-01.07, Notifications, Rev. 38

Condition Reports

2109110	2109091	2108800	2108718	2111148	2111542
2111474	2115107	2115089	2115088	2115035	2114985
2114833					

Work Orders

20074532	11904847	2158321
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Miscellaneous

U2 Key Safety Function Status Sheets
 U2 Outage Clearances
 U2 Outage Heat Exchanger Inspection Schedule
 U2 Outage Local Leak Rate Test Schedule

Section 1R22: Surveillance Testing

Procedures

0PT-08.1.3B, LPCI/RHR System Component Test - Loop B, Rev. 17
 0PT-12.2B, No. 2 Diesel Generator Monthly Load Test, Rev. 108
 0PT-16.1.1, Containment Atmosphere Control System Valve Operability, Rev. 56
 0PT-20.3A.5, MSIV Leak Test, Rev. 11
 0MST-RCIC26Q, Reactor Hi Water Level Trip Unit Chan Cal, Rev. 3
 0PT-46.6, Control Room Inleakage Tracer Gas Test, Rev. 5
 0PEP-03.7.6, Emergency Exposure Controls, Rev. 4
 2PT-24,1-2, Service Water Pump and Discharge Valve Operability Test, Rev. 84

Condition Reports

2112836	2097378	395270
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Work Orders

20077091	13417560
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Drawings

F-39031, Trip Calibration Cabinet "AQ6" ECCS Division I CB-XU-63 Control Wiring Diagram,
 Rev. 20

Section 1EP6: Drill Evaluation

Procedures

0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses, Rev. 71
 2AOP-04.0, Low Core Flow, Rev. 39
 0EOP-01-SBO, Blacked Out Unit Initial Actions, Rev. 02
 0OI-01.07, Notifications, Rev. 38
 2EOP-01-RSP, Reactor Scram Procedure, Rev. 16
 0EOP-01-FSG-01, FLEX Initial Assessment and Equipment Staging, Rev. 01

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