



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

January 28, 2010

Mr. Michael J. Annacone
Vice President
Carolina Power and Light Company
Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461

**SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION
REPORT NOS.: 05000325/2009005 AND 05000324/2009005,
05000325/2009501 AND 05000324/2009501**

Dear Mr. Annacone:

On December 31, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick Unit 1 and 2 facilities. The enclosed integrated inspection report documents the inspection findings, which were discussed on January 11, 2010, with Mr. Ben Waldrep and other members of your staff.

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

The report documents three NRC-identified findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they have been entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Brunswick Steam Electric Plant. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the Brunswick Steam Electric Plant. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000325, 324/2009005, and 05000325, 324/2009501
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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/RA/

Randall A. Musser, Chief
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Division of Reactor Projects

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w/Attachment: Supplemental Information

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Letter to Michael J. Annacone from Randall A. Musser January 28, 2010

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION
REPORT NOS.: 05000325/2009005 AND 05000324/2009005,
05000325/2009501 AND 05000324/2009501

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R. Pascarelli, NRR ((Regulatory Conferences Only))

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-325, 50-324

License Nos.: DPR-71, DPR-62

Report Nos.: 05000325/2009005, 05000324/2009005
05000325/2009501, 05000324/2009501

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: 8470 River Road, SE
Southport, NC 28461

Dates: October 1, 2009 through December 31, 2009

Inspectors: P. O'Bryan, Senior Resident Inspector
G. Kolcum, Resident Inspector
L. Miller, Senior Emergency Preparedness Inspector (1EP2, 1EP3,
1EP4, 1EP5, 4OA1, 4OA6)
M. Bates, Senior Operations Engineer (1R11)

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

Enclosure

SUMMARY OF FINDINGS

IR 05000325/2009005, 05000324/2009005; 05000325/2009501, 05000324/2009501; 10/01/09 – 12/31/09; Brunswick Steam Electric Plant, Units 1 & 2; Fire Protection and Maintenance Effectiveness.

This report covers a three-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Three Green findings were identified by the inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP); the cross-cutting aspect was determined using IMC 0305, "Operating Reactor Assessment Program", and findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green non-cited violation of Brunswick Steam Electric Plant (BSEP) Unit 1 Updated Facility Operating License DPR-71, and the Unit 2 Updated Facility Operating License DPR-62, Condition 2.B.(6), for the licensee's failure to identify and correct degraded fire suppression system sprinklers per the licensee's fire protection program procedures. Procedure, OPT-34.6.4.1, "Sprinkler And Spray System Visual Inspection: RX1, RX2, SW, RW, WT, and DG Buildings," directs the licensee to verify the physical integrity of the spray and sprinkler piping and the absence of sprinkler obstruction or damage for the Unit 1 Reactor Building, Unit 2 Reactor Building, Service Water Building, Radwaste Building, Water Treatment Building, and Diesel Generator Building. After NRC inspectors identified the degraded sprinklers, the licensee re-performed the procedure and identified 40 spray shields to be noncompliant with the procedure's acceptance criteria. Once identified, the licensee initiated compensatory fire watches. Corrective actions also included replacing or repairing the defective spray shields. This finding was entered into the licensee's corrective action program as NCR #357183.

Failure to follow procedure OPT-34.6.4.1, "Sprinkler And Spray System Visual Inspection: RX1, RX2, SW, RW, WT, and DG Buildings" was a performance deficiency. The finding was determined to be more than minor because it affected the Mitigating Systems cornerstone objective of availability, reliability, and capability of the fixed fire suppression systems and was associated with the protection against external factors (fire) attribute. Specifically, this failure could affect the ability of the water sprinkler system to respond to a fire because the affected sprinklers' spray patterns are reduced and less effective. The issue was determined to be of very low safety significance (Green) using Manual Chapter (MC) 0609, Appendix F, Attachment 1, because the category of fixed fire suppression was evaluated as having low degradation. The system had low degradation because the sprinkler system is expected to display nearly the same level of effectiveness and reliability as it would, had the degradation not been present. The finding has a procedural

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compliance cross-cutting aspect in the Work Practices component of the Human Performance cross cutting area, because the licensee failed to ensure procedural instructions (procedure OPT-34.6.4.1) were implemented correctly. H.4(b) (Section 1R05)

- Green. The inspectors identified a Green non-cited violation of BSEP Unit 1 Updated Facility Operating License DPR-71, and the Unit 2 Updated Facility Operating License DPR-62, Condition 2.B.(6), for the licensee's failure to implement adequate design control measures for the fire protection program. Plant drawings which specify the configuration of fire suppression sprinklers are inconsistent and inadequate in that they do not provide complete details for sprinkler spray shields. Dimensions for spray shields on some drawings are incomplete because they don't list all of the necessary critical dimensions. Therefore, some ceiling-level spray shields were incorrectly installed and extended below the sprinklers' fusible links. This would have delayed sprinkler response in a fire. After the identification of this design control issue, the licensee implemented corrective actions which included repairing or replacing the degraded sprinklers. This finding was entered into the licensee's corrective action program as NCR #367339.

The licensee's failure to adequately implement design control measures for the fire protection program as required by the operating license (condition 2.B(6)) was a performance deficiency. The finding was determined to be more than minor because it affected the Mitigating Systems cornerstone objective of availability, reliability, and capability of the fixed fire suppression systems and was associated with the design control and protection against external factors (fire) attribute. Specifically, this failure could affect the ability of the water sprinkler system to respond to a fire because the incorrectly installed spray shields delay the ceiling-level sprinklers' response times. The issue was determined to be of very low safety significance (Green) using MC 0609, Appendix F, Attachment 1, because the category of fixed fire suppression was evaluated as having low degradation. The system had low degradation because the sprinkler system is expected to display nearly the same level of effectiveness and reliability as it would, had the degradation not been present. This finding has no cross-cutting aspect because the design drawing deficiency occurred when the plants were licensed and it is not indicative of current licensee performance. (Section 1R05)

- Green. The inspectors identified a Green NCV of 10 CFR 50.65(a)(1), Requirements for monitoring the effectiveness of maintenance at nuclear power plants, for the licensee's failure to monitor the performance or condition of motor-operated valve (MOV) MS-V28 in a manner sufficient to provide reasonable assurance that it was capable of fulfilling its intended functions. As a result, the licensee did not recognize that the valve was incapable of opening against design differential pressure and failed to take appropriate corrective actions to ensure that the valve could fulfill its emergency operating procedure (EOP) function. After the issue was identified, the licensee altered its operating procedures to compensate for the valve not opening against design differential pressure and entered it into their corrective action program (AR #356800).

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The failure to adequately monitor the performance or condition of MOV MS-V28 in a manner to provide reasonable assurance that the valve was capable of fulfilling its intended function is a performance deficiency. The performance deficiency was more than minor because it is associated with the Mitigating Systems cornerstone attribute of equipment performance, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the performance deficiency affected the reliability of the MOV MS-V-28 and its use in EOPs to restore feed to the reactor. Inspectors evaluated the finding using NRC IMC 0609, Significance Determination Process, Appendix A. Since the finding represents an actual loss of a function of non-Technical Specifications equipment designated as risk-significant for greater than 24 hours, the finding required a phase two significance analysis. The Brunswick phase 2 SDP spreadsheet indicated that the finding was greater than green but did not detail to the cases requiring MS-V28 operation therefore a phase 3 SDP analysis was completed by a regional SRA.

The phase 3 SDP analysis was performed in accordance with NRC Inspection Manual Chapter 0609 appendix A utilizing the NRC SPAR model and output from the licensee's full scope PRA model. The result was a risk increase for the finding of $<1E-6$ for core damage frequency (cdf) and $<1E-7$ for large early release frequency (LERF). The dominant sequences were transient initiators with spurious level instrument generated main steam isolation valve (MSIV) closure and the inability to restore main feedwater due to the performance deficiency coupled with failure to achieve successful depressurization and use of low pressure makeup systems leading to core damage. The risk was mitigated by the low initiating event frequency for transient conditions which would allow MSIV reopening and recovery of main feedwater. The availability of low pressure injection systems was also a factor reducing the risk. The result of the phase 3 analysis was that the finding was characterized as having very low safety significance, a Green finding. The cause of this finding was directly related to the problem evaluation cross-cutting aspect in the corrective action program component of the Problem Identification and Resolution cross-cutting area because the licensee failed to adequately evaluate the failure of MS-V28 in November 2008. (P.1(c)). (Section 1R12)

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period with the reactor critical after re-start on September 30, 2009, and completed power ascension on October 2, 2009. On December 18, 2009 power was reduced to 66 percent due to the loss of an off-site transmission line. The unit returned to rated thermal power on December 19, 2009, and operated at or near full power for the remainder of the inspection period.

Unit 2 began the inspection period with the reactor critical after re-start on September 30, 2009, and began power ascension on October 1, 2009. Unit 2 reached rated thermal power on October 2, 2009. Power was reduced to 44 percent on October 2, 2009, due to a recirculation pump runback signal. Unit 2 returned to rated thermal power on October 4, 2009. Power was reduced on October 23, 2009, to 70 percent for valve testing, control rod scram time testing, and control rod sequence exchange. Unit 2 returned to rated thermal power on October 25, 2009. Power was reduced to 70 percent on November 3, 2009, to perform maintenance on an off-site transmission line, and power was returned to rated thermal power on November 4, 2009. On November 14, 2009, power was reduced to 73 percent for loss of an off-site power transmission line. Unit 2 returned to rated thermal power the same day and for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

1R01 Adverse Weather Protection

.1 Winter Seasonal Readiness Preparations

a. Inspection Scope

The inspectors conducted a review of the licensee's preparations for winter conditions to verify that the plant's design features and implementation of procedures were sufficient to protect mitigating systems from the effects of adverse weather. Documentation for selected risk-significant systems was reviewed to ensure that these systems would remain functional when challenged by inclement weather. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. Cold weather protection, such as heat tracing and area heaters, was verified to be in operation where applicable. The inspectors also reviewed corrective action program items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures.

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Specific documents reviewed during this inspection are listed in the Attachment. The inspectors' reviews focused specifically on the following plant systems due to their risk significance or susceptibility to cold weather issues:

- Unit 1 and 2 heat tracing systems for the condensate storage tanks
- Battery rooms 1A, 1B, 2A, and 2B

b. Findings

No findings of significance were identified.

.2 Readiness For Impending Adverse Weather Condition

a. Inspection Scope

On December 2, 2009, a tornado watch was issued for the plant area and inspectors reviewed the licensee's overall preparations/protection for impending adverse weather conditions. The inspectors walked down areas of the plant susceptible to high winds, including the licensee's emergency alternating current (AC) power systems. The inspectors evaluated the licensee staff's preparations against the site's procedures and determined that the staff's actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the UFSAR and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. The inspectors also reviewed a sample of corrective action program items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the corrective action program in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

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- Emergency Diesel Generators (EDGs) #2, #3 and #4 with EDG #1 out of service for planned maintenance on October 21, 2009
- Unit 2 B loop of the residual heat removal (RHR) system with the A loop of RHR inoperable for maintenance on October 28, 2009
- Unit 2 reactor core isolation cooling (RCIC) system, with the high pressure coolant injection system (HPCI) out of service for maintenance on December 4, 2009

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

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Quarterly Resident Inspector Tours

a. Inspection Scope

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

- Diesel Generator Basement 2' Elevation (0PFP-DG-1)
- Service Water Building -13' 4" and 4' Elevations (0PFP-SW-1b)
- Service Water Building 20' Elevation (0PFP-SW-1a)
- Diesel Supply Air Fan Room 50' Elevation (0PFP-DG-15)
- Control Room 49' Elevation (0PFP-CB-14)

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within

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the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and had implemented adequate compensatory measures for out of service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's corrective action program.

b. Findings

(1) Failure To Identify and Correct Degraded Fire Protection Sprinklers

Introduction: The inspectors identified a Green non-cited violation of the BSEP Unit 1 Updated Facility Operating License DPR-71, and the Unit 2 Updated Facility Operating License DPR-62, Condition 2.B.(6) for the licensee's failure to identify and correct degraded fire suppression system sprinklers per the licensee's fire protection program procedures. Procedure, OPT-34.6.4.1, "Sprinkler And Spray System Visual Inspection: RX1, RX2, SW, RW, WT, and DG Buildings," directs the licensee to verify the physical integrity of the spray and sprinkler piping and the absence of sprinkler obstruction or damage for the Unit 1 Reactor Building, Unit 2 Reactor Building, Service Water Building, Radwaste Building, Water Treatment Building, and Diesel Generator Building. After NRC inspectors identified the degraded sprinklers, the licensee re-performed the procedure and identified 40 spray shields to be noncompliant with the procedure's acceptance criteria.

Description: On September 25, 2009, NRC inspectors conducted a walkdown of safety-related spaces and observed six intermediate level sprinklers with spray shields that extended below the sprinklers' deflectors. The purpose of the licensee's fire protection procedure OPT-34.6.4.1, "Sprinkler And Spray System Visual Inspection: RX1, RX2, SW, RW, WT, and DG Buildings," is to verify the physical integrity of the spray and sprinkler piping and the absence of sprinkler obstruction or damage for the Unit 1 Reactor Building, Unit 2 Reactor Building, Service Water Building, Radwaste Building, Water Treatment Building, and Diesel Generator Building. Section 6.1.4 of OPT-34.6.4.1 is a visual inspection to ensure that spray shields (when present) do not extend below the level of the sprinkler deflector. When the licensee performed procedure OPT-34.6.4.1 in December 2008, and in March, April, and May of 2009, no discrepancies for spray shields extending below the deflectors were identified. After NRC inspectors identified the degraded sprinklers, the licensee re-performed the procedure and identified 40 spray shields to be noncompliant with the procedure's acceptance criteria. Once identified, the

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licensee initiated compensatory fire watches. Corrective actions also included replacing or repairing the defective spray shields.

Analysis: Failure to follow procedure OPT-34.6.4.1, Sprinkler And Spray System Visual Inspection: RX1, RX2, SW, RW, WT, and DG Buildings was a performance deficiency. The finding was determined to be more than minor because it affected the Mitigating Systems cornerstone objective of availability, reliability, and capability of the fixed fire suppression systems and was associated with protection against external factors (fire) attribute. Specifically, this failure could affect the ability of the water sprinkler system to respond to a fire because the affected sprinklers' spray patterns are reduced and less effective. The issue was determined to be of very low safety significance (Green) using MC 0609, Appendix F, Attachment 1, because the category of fixed fire suppression was evaluated as having low degradation. The system had low degradation because the sprinkler system is expected to display nearly the same level of effectiveness and reliability as it would, had the degradation not been present. The finding has a procedural compliance cross-cutting aspect in the Work Practices component of the Human Performance cross cutting area, because the licensee failed to ensure procedural instructions (procedure OPT-34.6.4.1) were implemented correctly. (H.4(b))

Enforcement: 10 CFR Part 50.48 states, in part, that each operating nuclear power plant ". . . must have a fire protection plan that satisfies Criterion 3 of appendix A to this part." The BSEP Unit 1 Updated Facility Operating License DPR-71, and Unit 2 Updated Facility Operating License DPR-62, Condition 2.B.(6), specify, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR and as approved in the Safety Evaluation Report (SER), Section 3.1.11, Fixed Fire Suppression Systems dated November 22, 1977, and subsequent supplements. The licensee established OPT-34.6.4.1, "Sprinkler And Spray System Visual Inspection: RX1, RX2, SW, RW, WT, and DG Buildings," as an implementing procedure for the fire protection program.

Contrary to the above, on September 25, 2009, the licensee failed to correctly implement procedure instructions in OPT-34.6.4.1, Sprinkler And Spray System Visual Inspection: RX1, RX2, SW, RW, WT, and DG Buildings, which is a part of the fire protection program. Once the 40 spray shields were found noncompliant with the procedural acceptance criteria, the licensee initiated compensatory fire watches. Corrective action also included repairing or replacing the defective spray shields. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as NCR #357183, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy (NCV 05000325,324/2009005-01), Failure To Identify and Correct Degraded Fire Protection Sprinklers.

(2) Failure to Adequately Implement Design Control Measures For The Fire Protection Program

Introduction: The inspectors identified a Green non-cited violation of the BSEP Unit 1 Updated Facility Operating License DPR-71, and Unit 2 Updated Facility Operating License DPR-62, Condition 2.B.(6) for the licensee's failure to implement adequate

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design control measures for the fire protection program. Plant drawings which specify the configuration of fire suppression sprinklers are inconsistent and inadequate in that they do not provide complete details for sprinkler spray shields. Dimensions for spray shields on some drawings are incomplete because they do not list all of the necessary critical dimensions. Therefore, some ceiling-level spray shields were incorrectly installed and extended below the sprinklers' fusible links. This would have delayed sprinkler response in a fire.

Description: On September 25, 2009, NRC inspectors noted inconsistencies in the configuration of spray shields on ceiling-level fire protection sprinklers. NRC inspectors also noted that there is industry operating experience that shows that spray shields installed on ceiling-level sprinklers can impede sprinkler performance by altering the melting characteristics of the thermally sensitive element (fusible link), delaying the sprinkler's response to a fire (NRC Information Notice 2002-24, Potential Problems with Heat Collectors on Fire Protection Sprinklers). Specifically, spray shields installed on ceiling-level sprinklers can interrupt the horizontal convective heat flow to the sprinklers and delay actuation of the sprinklers' fusible links. Inspectors found that not only were spray shields installed on ceiling-level sprinklers, but several spray shields extended below the sprinklers' fusible links. Plant drawings which specify the configuration of fire suppression sprinklers are inconsistent in that they do not provide complete details for sprinkler spray shields. Dimensions for spray shields on some drawings are incomplete because they don't list all of the necessary critical dimensions. As a result, sprinkler spray shields were installed inconsistently, and in some cases, incorrectly, because they extended below the fusible links. After the identification of this design control issue, the licensee implemented corrective actions which included repairing or replacing the degraded sprinklers. (NCR #367339).

Analysis: The licensee's failure to adequately implement design control measures for the fire protection program as required by the operating license (condition 2.B(6)) was a performance deficiency. The finding was determined to be more than minor because it affected the Mitigating Systems Cornerstone objective of availability, reliability, and capability of the fixed fire suppression systems and was associated with the design control and protection against external factors (fire) attribute. Specifically, this failure could affect the ability of the water sprinkler system to respond to a fire because the incorrectly installed spray shields delay the ceiling-level sprinklers' response times. The issue was determined to be of very low safety significance (Green) using MC 0609, Appendix F, Attachment 1, because the category of fixed fire suppression was evaluated as having low degradation. The system had low degradation because the sprinkler system is expected to display nearly the same level of effectiveness and reliability as it would, had the degradation not been present. This finding has no cross-cutting aspect because the design drawing deficiency occurred when the plants were licensed and is not indicative of current licensee performance.

Enforcement: 10 CFR Part 50.48 states, in part, that each operating nuclear power plant ". . . must have a fire protection plan that satisfies Criterion 3 of appendix A to this part." The BSEP Unit 1 Updated Facility Operating License DPR-71, and the Unit 2 Updated Facility Operating License DPR-62, Condition 2.B.(6), specify, in part, that the licensee

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implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR and as approved in the SER, Section 3.1.11, Fixed Fire Suppression Systems dated November 22, 1977, and subsequent supplements.

Contrary to the above, original plant drawings which specify the configuration of fire suppression sprinklers are inconsistent in that they do not provide complete details for sprinkler spray shields. Dimensions for spray shields on some drawings are incomplete because they don't list all of the necessary critical dimensions. Therefore, some ceiling-level spray shields were installed that extended below the sprinklers' fusible links and would have delayed sprinkler response in a fire. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as NCR #367339, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy (NCV 05000325,324/2009005-02), Failure To Adequately Implement Design Control Measures For The Fire Protection Program.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors conducted an inspection of work documents associated with underground bunkers/manholes subject to flooding that contain cables whose failure could disable risk-significant equipment. The inspectors reviewed work order completion documents and interviewed engineering personnel present during the licensee's performance of the work. Since the licensee's preventative maintenance schedule for inspection of underground bunkers/manholes did not include any inspections of risk-significant bunkers/manholes after the issuance of the June 25, 2009, revision to inspection procedure 71111.06, and since direct observation of bunkers/manholes would have placed undue burden on the licensee, no bunkers/manholes were directly observed.

Work completion documents were reviewed for risk-significant areas, including manholes MH-1NW and MH-2NW, to verify that cables were not submerged in water, that cables and/or splices appeared intact, and to assess the condition of cable support structures.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program

.1 Quarterly Inspection of Licensed Operator Requalification Exams

a. Inspection Scope

On November 17, 2009, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that

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operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

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

b. Findings

No findings of significance were identified.

2. Annual Review of Licensee Regualification Examination Results

a. Inspection Scope

On December 18, 2009, the licensee completed the comprehensive biennial requalification written examinations and annual requalification operating tests required to be administered to all licensed operators in accordance with 10 CFR 55.59(a)(2). The inspectors performed an in-office review of the overall pass/fail results of the written examinations, individual operating tests and the crew simulator operating tests. These results were compared to the thresholds established in Manual Chapter 609 Appendix I, Operator Requalification Human Performance Significance Determination Process.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following two risk significant systems:

- 2B control rod drive (CRD) pump bearing failure on October 23, 2009
- Unit 1 Main Steam – MS-V28 failure to open on September 20, 2009

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The inspectors reviewed events where ineffective equipment maintenance may have resulted in equipment failure or invalid automatic actuations of Engineered Safeguards Systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2) or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

b. Findings

Introduction: The inspector identified a Green NCV of 10 CFR 50.65(a)(1), Requirements for monitoring the effectiveness of maintenance at nuclear power plants, for the licensee's failure to monitor the performance or condition of motor-operated valve (MOV) MS-V28 in a manner sufficient to provide reasonable assurance that it was capable of fulfilling its intended functions. As a result, the licensee did not recognize that the valve was incapable of opening against design differential pressure and failed to take appropriate corrective actions to ensure that the valve could fulfill its emergency operating procedure (EOP) function.

Description: Valve MS-V28 is a motor-operated valve (MOV) that isolates main steam lines A and B from downstream components including both reactor feed pump turbines and is within the scope of 10 CFR 50.65, Maintenance Rule, because it is used in plant EOPs. MS-V28 has the same design and is functionally identical in both units.

In certain emergency situations after a reactor scram with main steam isolation valves (MSIVs) shut, EOPs require operators to restore feed to the reactor using the reactor feed pumps. OP-25, "Main Steam Operating Procedure," entered from Emergency Operating Procedure EOP-01-LPC, "Level/Power Control," directed operators to reopen MS-V28 in order to provide a steam supply to both feed pump turbines and restore feed. However, the MOV actuator for MS-V28 is of insufficient size to overcome differential pressure across the valve when attempting to open it during normal post-scram conditions.

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On November 27, 2008, after a Unit 1 scram with MSIVs shut, the licensee attempted to restore feed to the reactor using reactor feed pumps per OP-25. During execution of OP-25, MS-V28 failed to open. Although the failure of MS-V28 to open prevented the valve from fulfilling its maintenance rule function of opening to allow steam to the main feed pump turbines, the licensee did not consider the failure to be a maintenance rule functional failure (MRFF) as defined by licensee procedures (ADM-NGGC-0101, "Maintenance Rule Program, and Maintenance Rule Scoping Document for System 3020, Main Steam"), because the performance criteria threshold for this valve's performance monitoring group is at the plant level. However, the plant level events designated as performance criteria for the valve do not adequately monitor the valve's ability to perform its EOP function of opening against design differential pressure. Since the valve's performance was not being adequately monitored, the licensee failed to recognize the significance of the valve failure, did not determine the cause of the failure, and did not take effective corrective actions for the failure in November 2008.

On September 20, 2009, while attempting to recover feed after a Unit 1 plant shutdown, MS-V28 again failed to open. On September 24, 2009, due to concerns about the reliability of MS-V28 and the repeated inability to open the valve against design differential pressure, the licensee revised OP-25 such that MS-V28 would remain open during MSIV isolation and subsequent re-opening during scram recoveries. This revision eliminated the procedural requirement to operate MS-V28. In October 2009 the licensee performed analyses and determined that the MOV actuator for MS-V28 is not properly sized to open the valve against differential pressures expected during post-scram conditions. After the issue was identified, the licensee altered its operating procedures to compensate for the valve not opening against design differential pressure and entered it into their corrective action program (AR #356800).

Analysis: The failure to adequately monitor the performance or condition of MOV MS-V28 in a manner to provide reasonable assurance that the valve was capable of fulfilling its intended function is a performance deficiency. The performance deficiency was more than minor because it is associated with the Mitigating Systems cornerstone attribute of equipment performance, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the performance deficiency affected the reliability of the MOV MS-V-28 and its use in EOPs to restore feed to the reactor. Inspectors evaluated the finding using IMC 0609, "Significance Determination Process," Appendix A. Since the finding represents an actual loss of a function of non-Technical Specifications equipment designated as risk-significant for greater than 24 hours, the finding required a phase two significance analysis. The Brunswick phase 2 SDP spreadsheet indicated that the finding was greater than green but did not detail to the cases requiring MS-V28 operation therefore a phase 3 SDP analysis was completed by a regional SRA.

The phase 3 SDP analysis was performed in accordance with NRC Inspection Manual Chapter 0609 appendix A utilizing the NRC SPAR model and output from the licensee's full scope PRA model. The result was a risk increase for the finding of $<1E-6$ for core damage frequency (cdf) and $<1E-7$ for large early release frequency (LERF). The

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dominant sequences were transient initiators with spurious level instrument generated main steam isolation valve (MSIV) closure and the inability to restore main feedwater due to the performance deficiency coupled with failure to achieve successful depressurization and use of low pressure makeup systems leading to core damage. The risk was mitigated by the low initiating event frequency for transient conditions which would allow MSIV reopening and recovery of main feedwater. The availability of low pressure injection systems was also a factor reducing the risk. The result of the phase 3 analysis was that the finding was characterized as having very low safety significance, a Green finding. The cause of this finding was directly related to the problem evaluation cross-cutting aspect in the corrective action program component of the Problem Identification and Resolution cross-cutting area because the licensee failed to adequately evaluate the failure of MS-V28 in November 2008. (P.1(c)).

Enforcement: 10 CFR 50.65(a)(1) states, in part, that licensees shall monitor the performance or condition of structures, systems, and components, against licensee-established goals, in a manner sufficient to provide reasonable assurance that such structures, systems, and components, as defined in paragraph 50.65(b), are capable of fulfilling their intended functions.

Contrary to the above, the licensee did not establish goals for the performance of MOV MS-V28 that were sufficient to ensure that it was capable of fulfilling its intended function. Therefore, the licensee failed to adequately investigate and correct the cause of the valve's failure on November 27, 2008, and the valve remained incapable of fulfilling its intended function until it failed again on September 20, 2009. Because this violation of 10 CFR 50.65 is of very low safety significance and has been entered into the licensee's corrective action program (AR #356800), it is being treated as an NCV, consistent with the NRC Enforcement Policy (NCV 0500325,324/2009005-03), Inadequately Monitored Maintenance Rule MOV (MS-V28).

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

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

- Unit 1 in Yellow risk for RHR loop B maintenance on October 27, 2009
- Unit 2 in Yellow risk for RHR and core spray (CS) channel calibration on November 20, 2009
- Maintenance on EDG #4 after failure of output breaker on December 7, 2009
- Unit 1 elevated Green risk for the 1B Nuclear Service Water (NSW) pump and 1B CRD pump out of service on December 16, 2009.
- Unit 2 in Yellow risk for RHR loop B channel calibration on December 22, 2009

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

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- AR 359361: Operability of Unit 1 steam jet air injector radiation monitor due to low sample flow, on October 15, 2009
- AR 313566: Operability of EDG #1 for corrosion of coupling on pipe from 7-day tank to 4-day tank on October 19, 2009
- AR 361974: Operability of EDG #1 after diesel trip during maintenance run due to air in the fuel oil system on October 21, 2009.
- AR 368028: Operability of diesel basement 2' elevation sprinkler system due to spray shield configuration
- AR 369409: Degraded voltage relay control power specification outside design values

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

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b. Findings

No findings of significance were identified.

1R18 Plant Modificationsa. Inspection Scope

The following two engineering design packages were reviewed and selected aspects were discussed with engineering personnel:

Temporary Plant Modifications

- 2A control building air conditioning compressor (temporary modification EC 72525)
- Relay 2-DG 2-43/B mounting in EDG #2 control panel (temporary modification EC 73636)

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

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testinga. Inspection Scope

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

- OPT-12.2D, No. 4 Diesel Generator Monthly Load Test on October 22, 2009 after maintenance
- OPT-12.2B, No. 2 Diesel Generator Monthly Load Test on November 24, 2009 after maintenance
- OPT-12.2D, No. 4 Diesel Generator Monthly Load Test on December 8, 2009 after replacement of diesel output breaker

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following: the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational

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readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing, and test documentation was properly evaluated. The inspectors evaluated the activities against TS and the UFSAR to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the corrective action program and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R20 Outage Activities

a. Inspection Scope

Unit 1 and Unit 2 were in power ascension after re-start of both units on September 30, 2009. The inspectors reviewed activities to ensure that the licensee considered risk in developing, planning and implementing power ascension schedule. During the power ascension, the inspectors observed and monitored licensee controls over the activities listed below. Documents reviewed during the inspection are listed in the attachment.

- Licensee configuration management, including maintenance of defense-in-depth for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Controls over activities that could affect reactivity.
- Ascension to full power operation
- Licensee identification and resolution of problems related to power ascension activities.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

.1 Routine Surveillance Testing

a. Inspection Scope

The inspectors either observed surveillance tests or reviewed the test results for the following five activities to verify the tests met TS surveillance requirements, UFSAR commitments, in-service testing requirements, and licensee procedural requirements.

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The inspectors assessed the effectiveness of the tests in demonstrating that the SSCs were operationally capable of performing their intended safety functions.

- 1PT-01.11, Core Performance Parameter Check on October 27, 2009;
- 0PT 13.1, Reactor Recirculation Jet Pump Operability on October 27, 2009;
- 0PT-13.5, Reactor Recirculation Pump Differential Speed and Loop Flow Check on October 27, 2009
- 2MST-RHR27R, RHR and CS Time Delay Relays Channel Calibration and Function Test on November 17, 2009
- 0PT-08.1.4b, RHR Service Water System Operability Test – Loop B, on December 21, 2009

b. Findings

No findings of significance were identified.

.2 In-service Testing (IST) Surveillance

a. Inspection Scope

The inspectors reviewed the performance of 0PT-09.7, HPCI System Valve Operability Test on December 3, 2009, to evaluate the effectiveness of the licensee's American Society of Mechanical Engineers (ASME) Section XI testing program for determining equipment availability and reliability. The inspectors evaluated selected portions of the following areas: 1) testing procedures, 2) acceptance criteria, 3) testing methods, 4) compliance with the licensee's IST program, TS, selected licensee commitments, and code requirements, 5) range and accuracy of test instruments, and 6) required corrective actions.

b. Findings

No findings of significance were identified.

1EP2 Alert and Notification System Testing

a. Inspection Scope

The inspector evaluated the adequacy of licensee's methods for testing the alert and notification system in accordance with NRC Inspection Procedure 71114, Attachment 02, "Alert and Notification System Evaluation". The applicable planning standard 10 CFR Part 50.47(b)(5) and its related 10 CFR Part 50, Appendix E, Section IV.D requirements were used as reference criteria. The criteria contained in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, was also used as a reference.

The inspector reviewed various documents which are listed in the Attachment. This inspection activity satisfied one inspection sample for the alert and notification system on a biennial basis.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization Augmentation

a. Inspection Scope

The inspector reviewed the licensee's Emergency Response Organization (ERO) augmentation staffing requirements and process for notifying the ERO to ensure the readiness of key staff for responding to an event and timely facility activation. The qualification records of key position ERO personnel were reviewed to ensure all ERO qualifications were current. A sample of problems identified from augmentation drills or system tests performed since the last inspection were reviewed to assess the effectiveness of corrective actions.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 03, "Emergency Response Organization Staffing and Augmentation System." The applicable planning standard, 10 CFR 50.47(b)(2) and its related 10 CFR 50, Appendix E requirements were used as reference criteria.

The inspector reviewed various documents which are listed in the Attachment to this report. This inspection activity satisfied one inspection sample for the ERO staffing and augmentation system on a biennial basis.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

Since the last NRC inspection of this program area, revisions 71 and 72 of the Radiological Emergency Response Plan were implemented based on the licensee's determination, in accordance with 10 CFR 50.54(q), that the changes resulted in no decrease in the effectiveness of the Plan, and that the revised Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The inspector conducted a sampling review of the Plan changes and implementing procedure changes made between November 1, 2008, and October 31, 2009, to evaluate for potential decreases in effectiveness of the Plan. However, this review was not documented in a Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety.

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The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 04, "Emergency Action Level and Emergency Plan Changes." The applicable planning standard (PS), 10 CFR 50.47(b)(4) and its related 10 CFR 50, Appendix E requirements were used as reference criteria.

The inspector reviewed various documents which are listed in the Attachment. This inspection activity satisfied one inspection sample for the emergency action level and emergency plan changes on an annual basis.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies

a. Inspection Scope

The inspector reviewed the corrective actions identified through the Emergency Preparedness program to determine the significance of the issues and to determine if repeat problems were occurring. The facility's self-assessments and audits were reviewed to assess the licensee's ability to be self-critical, thus avoiding complacency and degradation of their emergency preparedness program. In addition, inspector reviewed licensee's self-assessments and audits to assess the completeness and effectiveness of all emergency preparedness related corrective actions.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 05, "Correction of Emergency Preparedness Weaknesses." The applicable planning standard, 10 CFR 50.47(b)(14) and its related 10 CFR 50, Appendix E requirements were used as reference criteria.

The inspector reviewed various documents which are listed in the Attachment. This inspection activity satisfied one inspection sample for the correction of emergency preparedness weaknesses on a biennial basis.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

To verify the accuracy of the PI data reported to the NRC, the inspectors compared the licensee's basis in reporting each data element to the PI definitions and guidance

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contained in Nuclear Energy Institute (NEI) Document 99-02, Regulatory Assessment Indicator Guideline.

Mitigating Systems Cornerstone

- Mitigating Systems Performance Index, Heat Removal System (RCIC), Units 1 and 2
- Mitigating Systems Performance Index, High Pressure Injection Systems (HPCI), Units 1 and 2

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index performance indicators listed above for the period from the fourth quarter of 2008 through the third quarter of 2009. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC Integrated Inspection reports for the period to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the Appendix to this report.

Emergency Preparedness Cornerstone

- Emergency Response Organization Drill/Exercise Performance (DEP)
- Emergency Response Organization Readiness (ERO)
- Alert and Notification System Reliability (ANS)

For the above specified review period, the inspector examined data reported to the NRC, procedural guidance for reporting PI information, and records used by the licensee to identify potential PI occurrences. The inspector verified the accuracy of the DEP through review of a sample of drill and event records. The inspector reviewed selected training records to verify the accuracy of the ERO PI for personnel assigned to key positions in the ERO. The inspector verified the accuracy of the PI for ANS reliability through review of a sample of the licensee's records of periodic system tests. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the Attachment.

b. Findings

No findings of significance were identified.

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4OA2 Identification and Resolution of Problems

.1 Routine Review of Items Entered Into the Corrective Action Program

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.1 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the six month period of July 2009 through December 2009, although some examples expanded beyond those dates where the scope of the trend warranted.

Inspectors also reviewed major equipment problem lists, repetitive and rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

b. Assessments and Observations

No findings of significance were identified. The inspectors noted an adverse trend in human performance related events, culminating in two human performance-related, risk significant events on July 8, 2009, (see NRC report 05000325, 324/2009004 for details). These events led to a significant change in the station's Human Performance Plan, creating a focus area for the improvement of site supervision. Inspectors observed that past Human Performance Plans have failed to produce the desired effects on the human performance culture of the site, and have not proven effective at preventing human performance-related events such as those that occurred on July 8, 2009. Based on daily observations, Resident Inspectors believe that some first-line and second-line

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supervisors lacked clear focus on ensuring that station human performance standards were consistently upheld, inhibiting the station's progress toward eliminating risk-significant human performance-related events.

However, the licensee has taken corrective actions to ensure that the station's workforce, including site leadership, maintains a sustained focus on the human performance aspect of nuclear safety. In the short term (July 8, 2009, through December 31, 2009), NRC inspectors have noted a substantial improvement in the licensee's approach to operation and maintenance of the station. This improvement is reflected in a significant decrease in operations and maintenance error rates.

.3 Selected Issue Follow-up Inspection: Steam Jet Air Ejector Radiation Monitors Inoperable

a. Inspection Scope

The inspectors selected AR 359361, Steam Jet Air Ejector Radiation Monitors Inoperable, for detailed review. This AR was associated with regulatory commitments for the radiation monitoring system. The inspectors reviewed this report to verify that the licensee identified the full extent of the issue, performed an appropriate evaluation, and specified and prioritized appropriate corrective actions. The inspectors evaluated the report against the requirements of the licensee's corrective action program as delineated in corporate procedure CAP-NGGC-0200, Corrective Action Program, and 10 CFR 50, Appendix B.

b. Findings

No findings of significance were identified.

4OA3 Follow-up of Events

.1 (Closed) LER 05000325, 324/2008-06, including revision 1, EDG Failure to Start from Local Control Panel

On August 18, 2008, during performance of surveillance testing, EDG #4 failed to start from the local control panel. Troubleshooting determined that the lockout control relay, installed in a plant modification in 2007, was wired such that power was lost when the associated alternate safe shutdown switch was in the "LOCAL" position, preventing EDG #4 from being reset so that it could be started locally. The plant modification was installed on all 4 EDGs, and the modification has a similar affect on all of the EDGs. This condition was the subject of an NRC Special Inspection (inspection report 05000325, 324/2008010) and resulted in violation of low to moderate safety significance, which is documented in inspection report 05000325, 324/2009010. This LER and revision 1 to this LER are closed.

.2 (Closed) LER 05000325/2009-03, High Pressure Coolant Injection (HPCI) Inoperable due to Automatic Closure of Inboard Isolation Valve

On August 14, 2009, the Unit 1 HPCI system inboard isolation valve automatically isolated, disabling the HPCI system safety function. The automatic isolation was caused by an erroneous high temperature signal from the HPCI steam leak detection circuitry. The erroneous signal was determined to be due to a failed ceramic capacitor in the high temperature circuitry. The failed circuit board was replaced and the HPCI system returned to operable on August 15, 2009. The licensee documented the problem in Condition Report 312335. The inspectors reviewed the licensee's assessment and corrective actions for the event, and determined they were appropriate. This LER was reviewed and no findings of significance were identified and no violation of NRC requirements occurred. This LER is closed.

.3 (Closed) LER 05000325, 324/2009-04, Technical Specification Required Shutdown due to Emergency Diesel Generator #4 Inoperability

On September 13, 2009, EDG #4 was removed from service for routine maintenance and both units entered Technical Specification (TS) 3.8.1 required action D.4 to restore the EDG #4 to operable status in 7 days or shut down both units. On September 19, 2009, during post-maintenance testing, EDG #4 failed to start. As a result, it was evident that EDG #4 would not be restored to service prior to the completion time of TS 3.8.1 and Unit 1 was shutdown on September 20, 2009, and Unit 2 was shutdown on September 21, 2009. As a result of these events, an NRC Special Inspection was conducted (inspection report 05000325, 324/2009011) and resulted in a NCV of very low safety significance (NCV 05000325, 324/2009011-01). This LER is closed.

.4 (Closed) LER 05000325/2009-05, Reactor Protection System (RPS) Actuation When Placing HPCI in Pressure Control

On September 21, 2009, Unit 1 received valid actuations of the RPS and the Primary Containment Isolation System (PCIS). Unit 1 was in mode 3 (hot shutdown) and operators were placing the HPCI system in service for reactor pressure control, when a water level shrink caused level in the reactor pressure vessel to drop to Low Level 1, causing the RPS and PCIS actuations. After the level transient stabilized, operators restored the reactor pressure vessel level to the normal shutdown band and reset the RPS and PCIS actuations. The licensee documented the problem in Condition Report 3563254. The inspectors reviewed the licensee's assessment and corrective actions for the event, and determined they were appropriate. This LER was reviewed and no findings of significance were identified and no violation of NRC requirements occurred. This LER is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

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

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status reviews and inspection activities.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On November 20, 2009, the lead emergency preparedness inspector presented the inspection results for Sections 1EP2, 1EP3, 1EP4, 1EP5 and 4OA6 to Mr. Ben Waldrep and other members of his staff. On January 11, 2010, the senior resident inspector presented the inspection results for the other sections of the report to Mr. Ben Waldrep and other members of his staff. The inspectors confirmed that any proprietary information provided during the inspection was returned.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Annacone, Site Vice President
L. Beller, Superintendent, Operations Training
W. Brewer, Manager – Maintenance
A. Brittain, Manager – Security
K. Crocker, Supervisor Licensing/Regulatory Programs
B. Davis, Manager – Engineering
P. Dubrouillet, Supervisor - Operations Support
L. Grzeck, Lead Engineer - Technical Support
S. Howard, Manager – Outage and Scheduling
R. Ivey, Manager – Nuclear Oversight
J. Johnson, Manager – Environmental and Radiological Controls
P. Mentel, Manager - Support Services
W. Murray, Licensing Specialist
A. Pope, Supervisor – Licensing and Regulatory Affairs
E. Rochelle, Supervisor - Radiological Controls Supervisor
T. Sherrill, Engineer - Technical Support
J. Titlington, Superintendent – Design Engineering
M. Turkal, Lead Engineer - Technical Support
J. Vincelli, Superintendent - Environmental and Radiological Controls
B. Waldrep, Site Vice President
M. Williams, Manager - Training Manager
E. Wills, Plant General Manager

NRC Personnel

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

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000325,324/2009005-01	NCV	Failure To Identify and Correct Degraded Fire Protection Sprinklers (Section 1R05)
05000325,324/2009005-02	NCV	Failure To Adequately Implement Design Control Measures For The Fire Protection Program (Section 1R05)
05000325,324/2009005-03	NCV	Inadequately Monitored Maintenance Rule MOV (MS-V28) (Section 1R12)

Closed

05000325, 324/2008-06	LER	EDG Failure to Start from Local Control Panel
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05000325/2009-03	LER	High Pressure Coolant Injection (HPCI) Inoperable due to Automatic Closure of Inboard Isolation Valve
05000325, 324/2009-04	LER	Technical Specification Required Shutdown due to Emergency Diesel Generator 4 Inoperability
05000325/2009-05	LER	Reactor Protection System (RPS) Actuation When Placing HPCI in Pressure Control

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

0AOP-13.0, Operation during Hurricane, Flood Conditions, Tornado, or Earthquake
 0A1-68, Brunswick Nuclear Plant Response to Severe Weather Warnings
 0PEP-02.1, Initial Emergency Actions
 0PEP-02.6, Severe Weather
 0O1-01.03, Non-Routine Activities
 0PM-HT001, Preventative Maintenance on Plant Freeze Protection and Heat Tracing System

Section 1R04: Equipment Alignment

0OP-50.1, Diesel Generator Emergency Power System Operating Procedure
 Drawing D-02265, sheets 1A and 1B, drawing D-02266, sheets 2A and 2B, Piping Diagram for Diesel Generators Starting Air System Units 1 and 2
 Drawing D-02268, sheets 1A and 1B, drawing D-02269, sheets 2A and 2B, Piping Diagram for Diesel Generators Fuel Oil System Units 1 and 2
 Drawing D-02270, sheets 1A and 1B, drawing D-02271, sheets 2A and 2B, Piping Diagram for Diesel Generators Lube Oil to Lube Oil System Units 1 and 2
 Drawing D-02272, sheets 1A and 1B, drawing D-02273, sheets 2A and 2B, Piping Diagram for Diesel Generators Jacket Water System Units 1 and 2
 Drawing D-02272, sheets 1A and 1B, drawing D-02273, sheets 2A and 2B, Piping Diagram for Diesel Generators Jacket Water System Units 1 and 2
 Drawing D-02274, sheets 1 and 2, Piping Diagram for Diesel Generators Service and Demineralized Water System Units 1 and 2
 2OP-16, Reactor Core Isolation Cooling System Operating Procedure
 2OP-17, Residual Heat Removal System Operating Procedure

Section 1R05: Fire Protection

0PFP-CB, Control Building Prefire Plans
 0PFP-DG, Diesel Generator Building Prefire Plans
 0PFP-PBAA, Power Block Auxiliary Areas Prefire Plans SW, RW, AOG, TY, EY
 0PFP-013, General Fire Plan

0OP-41, Fire Protection and Well Water System
 0PT-34.11.2.0, Portable Fire Extinguisher Inspection

Section 1R06: Flood Protection

WO 1137982 Perform Manhole Inspections
 WO 770466 Perform Manhole Inspections
 EGR-NGGC-0351 Condition Monitoring of Structures

Section 1R11: Licensed Operator Regualification

OTPP, Licensed Operator Continuing Training Program
 TRN-NGGC-0014, NRC Initial Licensed Operator Exam Development and Administration
 1EOP-01-LPC, Level/Power Control
 0PEP-2.1.1, Emergency Control – Notification of Unusual Event, Alert, Site Area Emergency, or
 General Emergency
 0PEP-02.1, Initial Emergency Actions

Section 1R12: Maintenance Effectiveness

ADM-NGGC-0101, Maintenance Rule Program
 NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear
 Power Plants
 ADM-NGGC-0203, Preventive Maintenance and Surveillance Testing
 Administration
 EGR-NGGC-0351, Condition Monitoring of Structures
 ADM-NGGC-0203, Preventive Maintenance and Surveillance test Administration

Section 1R13: Maintenance Risk Assessment and Emergent Work Control

ADM-NGCC-0104, Work Management Process
 0AI-144, Risk Management
 ADM-NGGC-0006, Online EOOS Model

Section 1R15: Operability Evaluations

OPS-NGGC-1305, Operability Determinations
 OPS-NGGC-1307, Operational Decision making

Section 1R18: Plant Modifications

EGR-NGGC-0005, Engineering Change
 EGR-NGGC-0011, Engineering Product Quality

Section 1R19: Post Maintenance Testing

0PLP-20, Post Maintenance Testing Program

Section 1R20: Outage Activities

1OP17, Residual Heat Removal System Operating Procedure
 0GP-01, Prestartup Checklist
 0GP-02, Approach to Criticality and Pressurization of the Reactor
 0GP-03, Unit Startup and Synchronization
 0GP-12, Power Changes

Section 1EP2: Alert and Notification System Testing Procedures

0EPM-600, Brunswick Siren System User Guide, Rev. 2
 Siren System FEMA Approval, February 28, 2008
 WPS-2900 Series High Power Voice & Siren System, 2005

Records and Data

Equipment Repair Log
 Weekly Silent Tests, January 1, 2008 to September 30, 2009
 Quarterly Growl Tests, January 1, 2008 to September 30, 2009
 2008 Annual Siren Full Volume Test, November 13, 2008

Section 1EP3: Emergency Response Organization (ERO) Augmentation Procedures

EMG-NGGC-005, Activation of the Emergency Response Organization Notification System,
 Rev. 0
 EMG-NGGC-004, Maintenance of the Emergency Response Organization Notification System,
 Rev. 0
 0EPM-400, Brunswick Emergency Notification User Guide, Rev. 5

Records and Data

Quarterly Pager Tests, 4th Quarter 2008 - 3rd Quarter 2009
 Monthly Communications Tests, 4th Quarter 2008 – 3rd Quarter 2009
 Thirteen individual position qualifications were verified
 Augmentation Drill Critique Report, May 26, 2009

Problem Evaluation Reports (PER)

307182, Adverse trend in EP drill/exercise performance PI
 318280, Inoperable selective signaling phone lines

Section 1EP4: Emergency Action Level (EAL) and Emergency Plan Changes Procedures

REG-NGGC-0010, 10 CFR 50.59 and Selected Regulatory Reviews, Rev. 12

Change Packages

0ERP, Radiological Emergency Response Plan, Rev. 71 and 72
 0PEP-02.1.1, Emergency Control – Notification of Unusual Event, Alert, Site Area Emergency,
 and General Emergency, Rev. 12

OPEP-02.6.12, Activation and Operation of the Operational Support Center (OSC), Rev. 31 and 32

OPEP-02.6.20, Dose Projection Coordinator, Rev. 23

OPEP-02.6.21, Emergency Communicator, Rev. 49, 50 and 51

Section 1EP5: Correction of Emergency Preparedness Weaknesses and Deficiencies

Procedures

ADM-NGGC-0113, Performance Planning and Monitoring, Rev. 0

0EPM-210, Emergency Preparedness Drill/Exercise Program, Rev. 13

EPQ-001, Emergency Response Organization Qualification Checklists Brunswick, Rev. 7

Records and Data

Team 4 Drill, November 8, 2007

Team 4 Drill, July 29, 2008

Team 2 Drill, June 10, 2008

Team 3 Drill, July 22, 2008

Team 5 Drill, January 25, 2009

Team 1 Drill, July 28, 2009

Audits and Self-Assessments

BNOS 09-067, Brunswick NOS Emergency Preparedness Mid-Cycle Review (B-EP-09-01), September 30, 2009

BNAS-08-078, BNP Emergency Preparedness Assessment, December 18, 2009

Brunswick Nuclear Plant Emergency Preparedness Unit Report, September 2009

259361, Siren Project Implementation, September 12, 2008

217627, Environment Radiation Monitoring Program, December 12, 2007

Problem Evaluation Reports (PER)

238802, NAS Assessment of Emergency Preparedness

259432, Training for Environmental Monitoring team members not in compliance

296954, Radio Licenses not acquired for 2 sirens' sites and 3 field interrogation units

304918, Siren NH03 components failed yearly PM

307116, Attention to detail in filling out ENFs

337693, Individual signed in log as ERO position PB-04 not qualified

Section 4OA1: Performance Indicator Verification

Procedures

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

Records and Data

Monthly PI Reports, September 2008 – August 2009

Section 4OA3: Event Follow-up

0GP-01, Prestartup Checklist

0GP-02, Approach to Criticality and Pressurization of the Reactor

0GP-03, Unit Startup and Synchronization

0GP-12, Power Changes