

# Brunswick 1

## 4Q/2011 Plant Inspection Findings

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### Initiating Events

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### Mitigating Systems

**Significance:** **W** Nov 21, 2011

Identified By: NRC

Item Type: VIO Violation

#### **Failure to Identify and Correct a Degraded Flood Barrier for the Emergency Diesel Generator Fuel Oil Tank Rooms**

(TBD) The inspectors identified an Apparent Violation (AV) of 10 CFR Part 50 Appendix B Criterion XVI, Corrective Action, for failure to identify and correct a condition adverse to quality associated with the entrance enclosures for the Emergency Diesel Generator (EDG) fuel oil tank rooms. Specifically, the enclosures contained openings which would adversely impact their ability to mitigate external flooding of the EDG fuel oil tank rooms in the event of a design basis external event (hurricane). These openings were not identified or corrected by the licensee prior to the inspectors identifying the issue. The licensee corrected this condition by installing new sealant material to close the openings and entered the issue into their corrective action program. The licensee entered this issue into their corrective action program as AR 466253.

The licensee's failure to identify and correct the degradation of the access enclosures to the EDG fuel oil tank rooms was a performance deficiency. The finding is more than minor because it affects the Mitigating Systems cornerstone attribute of protection against external events and affects 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 water entry pathways into the EDG fuel oil tank rooms increased the likelihood of EDG failure during an external weather event (hurricane). The significance of this finding was evaluated using Inspection Manual Chapter 0609, Significance Determination Process. Using the phase 1 worksheet tables 4a and 4b, the finding was evaluated to be potentially greater than green because it screens as potentially risk significant due to a seismic, flooding, or severe weather initiating event which would degrade two or more trains of a multi-train system or function. Table 4a of the phase 1 worksheet requires a phase 3 significance determination evaluation. Following the initial review of this matter using preliminary quantitative analysis, Appendix M was used considering the uncertainties in the bounding analysis and the insights from the qualitative review (See Appendix M in Enclosure 2 and Phase 3 in Enclosure 3 of this report). There is a lack of quantitative data and probabilistic risk assessment tools to accurately assess the risk significance of this performance deficiency in a timely manner. The NRC preliminarily concluded that, although licensee performance is outside the bounds of nominal performance, cornerstone objectives were met with minimal reduction in safety margin. The Agency concluded that the finding likely did not represent a decline in licensee performance with a significant reduction in safety margin. Based on the available information from the quantitative and qualitative analyses, and the guidance of Appendix M, the NRC concluded that this performance deficiency is preliminarily characterized as a low to moderate safety significance finding (White). This finding has a cross-cutting aspect in the Corrective Action Program component of the Problem Identification and Resolution area because the licensee did not identify the issue completely, accurately, and in a timely manner commensurate with its safety significance, [P.1(a)].

Final Determination Letter: 2011-014

During an NRC inspection conducted on April 20, 2011 a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR Part 50 Appendix B Criterion XVI, Corrective Action states, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected.

Contrary to the above, as of April 20, 2011, the licensee failed to identify and promptly correct a condition adverse to quality involving the external flood barrier for the EDG fuel oil tank rooms. Specifically, the entrance enclosures which house the EDG fuel oil tanks had several openings, unsealed pin holes, and a narrow gap along the perimeter of the base walls, which would allow water intrusion into the EDG fuel oil tank rooms during a design basis external event (hurricane).

Inspection Report# : [2011012](#) (pdf)

Inspection Report# : [2011014](#) (pdf)

**Significance:**  Sep 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Corrective Actions for Control Building Air Conditioning Failures**

The inspectors identified a Green non-cited violation of 10 CFR 50 Appendix B, Criteria XVI, Corrective Action, for the licensee's failure to promptly identify and correct a condition adverse to quality related to the Control Room Air Conditioning (AC) system. Specifically, the licensee failed to identify and correct repetitive failures of nonconforming low ambient temperature damper actuators for the 2D control building air cooled condenser unit. This resulted in multiple control building AC refrigerant circuit failures. Upon discovery of the issue, the licensee placed the control building AC system in a safe condition for summer operation and initiated actions to procure acceptable damper actuators prior to the onset of low seasonal temperatures. The condition was entered into the licensee's CAP as AR #462873.

The inspectors determined that the licensee's failure to promptly identify and correct the failures of the 2D control room AC system low ambient temperature damper actuators was a performance deficiency. This finding is more than minor because it is associated with the Equipment Performance attribute of the Mitigating Systems Cornerstone, and 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 finding reduced the reliability of the control building AC system and its ability to maintain control building equipment within specified temperature limits. The significance of the finding was evaluated using Phase 1 of the significance determination process in accordance with the Inspection Manual Chapter 0609 Attachment 4. The finding was determined to be of very low safety significance (Green) because the finding was a design or qualification deficiency that was confirmed not to affect equipment operability. The cause of this finding was directly related to the cross cutting aspect of thorough evaluation of problems in the Corrective Action Program component of the Problem Identification and Resolution area, because the licensee failed to promptly evaluate the failures of the low ambient temperature damper actuators and eliminate the adverse condition. [P.1(c)]

Inspection Report# : [2011004](#) (pdf)

**Significance:**  Jun 30, 2011

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Failure To Adequately Evaluate And Correct A Condition Adverse To Quality Involving A Manufacturing Defect Of Barton Model 199 Dual Dampener Differential Pressure Units**

•Green. A self revealing non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" was identified for failure to promptly correct a condition adverse to quality regarding a manufacturing defect of a Barton Model 199 dual dampener differential pressure unit (DPU) used in the 1B residual heat removal (RHR) loop. Specifically, the licensee failed to replace the DPU after the vendor determined that the manufacturing process was incorrect and could lead to a slow response of the component in safety-related applications. This led to a failure of the RHR system 1B loop minimum flow bypass valve, 1-E11-F007B, to operate on February 18, 2011. The failure of the defective DPU was tracked as NCR 448471 in the corrective action program, and the licensee replaced the defective DPU.

The inspectors determined that the licensee's failure to promptly correct a condition adverse to quality regarding a

manufacturing defect for Barton Model 199 dual dampener DPUs was a performance deficiency. The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely 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 corrosion buildup in the DPU used in the control of the position of the minimum flow bypass valve for the 1B RHR loop had degraded, such that the availability and reliability of the 1B RHR loop was adversely affected. This finding was evaluated using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet for mitigating systems. The finding required phase two and phase three SDP analyses by a regional Senior Reactor Analyst (SRA) because the 1B loop of RHR was assumed to be inoperable for longer than its Technical Specifications (TS) allowed outage time. The SRA performed a phase three analysis using the NRC's site-specific risk model. Common cause factors were not propagated to the other loop of RHR during the modeling because of the prior instrument changes in the other loop. Operator recovery for the impact of the failed instrument was deemed to be credible, because the valve's hand switch remained functional, and was evaluated using the SPAR-H methodology. The short duration of non-functionality since the last known proper functioning of the instrument, combined with the high likelihood of operator recovery, and the lack of an increase in common cause failures resulted in a finding that is characterized as Green. This finding does not have a cross-cutting aspect because the performance deficiency occurred greater than three years ago and does not reflect current licensee performance.

Inspection Report# : [2011003](#) (pdf)

**Significance:**  Jan 21, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Analyze MOV Operation with Transient Voltages**

Green. The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to use conservative motor control center (MCC) voltage inputs when calculating motor actuator output torque and control circuit voltages for safety-related motor operator valve (MOV) motors that would be required to operate during design bases events. Specifically, the licensee used steady state MCC voltages instead of more limiting transient voltages that would occur during design bases load sequencing.

The licensee entered these issues into their corrective action program as NCRs 427745 and 429541 and performed additional analyses to demonstrate operability of the MOVs.

The licensee's failure to evaluate MOV motor actuator output torque using transient MCC voltages, and the failure to evaluate whether those MOVs would have adequate control power voltage was a performance deficiency. The performance deficiency was more than minor because it is associated with the mitigating systems cornerstone attribute of design control 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 use of non-conservative voltage inputs for MOV calculations could result in the failure of the components to perform their design bases functions during an event. The inspectors conducted a Phase 1 SDP in accordance with IMC 0609.04, "Initial Screening and Characterization of Findings," and determined the finding to be of very low safety significance (Green) because it was a design deficiency confirmed not to result in the loss of operability or functionality, did not represent the loss of a system function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The finding directly involved the cross-cutting aspect of procedural compliance and personnel follow procedures within the Work Practices component of the Human Resources area [H.4(b)].

Inspection Report# : [2010008](#) (pdf)

**Significance:**  Jan 21, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Promptly Identify and Correct Isolation Override Circuitry Testing Deficiencies**

Green. The team identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to assure that conditions adverse to quality, such as deficiencies, were promptly identified and corrected. Specifically, after identifying that the Unit 1 and 2 isolation override switches associated with the hardened wet well (Torus) vents should have been scoped in the maintenance rule, the licensee failed to ensure the circuitry was monitored for functionality. Because the circuitry was not monitored, a relay in the Unit 1 circuitry degraded

unacceptably without the licensee's knowledge. This finding does not present an immediate safety concern because as an immediate corrective action the failed relay in the Unit 1 control circuitry was replaced. The licensee entered the issue into their corrective action program as NCR 428054.

The licensee's failure to identify that the isolation override control switches were not being tested in the manner that they would be operated in the EOPs was a performance deficiency. The performance deficiency was more than minor because it is associated with the mitigating systems cornerstone attribute of equipment performance 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, not testing the isolation override circuitry resulted in a failed component going undetected that adversely impacted the ability to mitigate an event with the hardened wet well vent.

Using Manual Chapter Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined the finding required a Phase 2 analysis because the finding represented an actual loss of safety function of non-Technical Specification equipment designated as risk significant for greater than 24 hours. The Phase 2 analysis determined that this finding was potentially greater than green; therefore, a Phase 3 analysis was performed by a regional senior reactor analyst (SRA). The SRA determined the change in risk through use of the plant specific risk model. The function of the wet well vents was modeled, but the model did not include the ability to supply air manually to the air operated valve as a backup to the control room switches. A human reliability analysis was performed, and model adjustments were made so the performance deficiency's impact could be analyzed, given the backup method was available. This backup method's availability resulted in the findings risk increase to be low enough to be considered a Green SDP item. A cross-cutting aspect was not identified because the finding does not represent current performance.

Inspection Report# : [2010008](#) (pdf)

**Significance:**  Jan 21, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Perform Appropriate Corrective Actions for Deficiencies with Opening a Service Water Valve**

Green. The team identified a non-cited violation of Technical Specification (TS) 5.4.1, Procedures, for the licensee's failure to maintain adequate abnormal operating procedures (AOP) for opening a service water cross-tie valve during a loss of offsite power (LOOP) event. The valve would not open against system differential pressure (dp) and the licensee's corrective actions did not address the valve's manipulation in AOPs. The licensee entered the issue into their corrective action program as NCR 428809.

After discovering the difficulty of opening the service water cross-tie valves against a maximum differential pressure, the licensee's failure to provide appropriate procedural guidance to assure the operation of the valves during a LOOP event was a performance deficiency. The performance deficiency was more than minor because it is associated with the mitigating systems cornerstone attribute of equipment performance and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences because the SW-V146 valve would not open against a system pressure of 75 psid; and, if this condition was left uncorrected, the ability to complete required operator actions in procedures 0AOP18.0 and 0AOP36.1 during a LOOP would be adversely affected. Using Manual Chapter Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined the finding required a Phase 2 analysis because the finding represented an actual loss of safety function of non-Technical Specification equipment designated as risk significant for greater than 24 hours. The Phase 2 analysis determined that this finding was potentially greater than green; therefore, a Phase 3 analysis was performed by a regional senior reactor analyst (SRA). The SRA determined the combined risk associated with the valve's function to provide alternate flow to safety-related heat exchangers was very low. In addition, there was a good chance of operator recovery due to the long time period that was available before manipulation of the valve was required. These factors resulted in a risk value corresponding to a Green finding. The finding directly involved the cross-cutting aspect of thoroughness of evaluation within the Corrective Action Program component of the Problem Identification and Resolution area [P.1(c)].

Inspection Report# : [2010008](#) (pdf)

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# Barrier Integrity

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## Emergency Preparedness

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## Occupational Radiation Safety

**Significance:**  Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to follow procedures for analyzing radiological air samples for the presence of alpha emitters**

The inspectors identified a non-cited violation (NCV) of Technical Specification (TS) 5.4.1, Procedures, for the failure of the licensee to perform initial alpha activity analysis of air samples indicating greater than 0.3 Derived Air Concentration (DAC) beta-gamma activity on an approved alpha counter. Section 9.5.12.h of procedure HPS-NGGC-0024, Alpha Monitoring Guidelines, Rev. 3, states that if gamma scan results indicate the airborne activity is equal to or greater than the beta-gamma DAC-Fraction Action level of 0.3 DAC; (1) perform an initial alpha count on the air sample using a counter approved for air samples; and (2) assess and document the results per site-specific procedures. Contrary to this requirement, on March 10, 11, and 21, 2011, the licensee did not perform an initial alpha count on air samples using a counter approved for air samples and assess and document the results for gamma scan results that exceeded 0.3 DAC. Specifically, air samples for those selected work activities identified DAC concentrations of 0.6589, 0.3152 and 1.45. Licensee corrective actions included instructions to workers to ensure procedural adherence for sample analysis and changes to the software program to prompt the workers to do the sample analysis when the threshold limits were met or exceeded. The licensee entered the issue into its corrective action program as NCR 455307.

This finding is greater than minor because it was associated with the Occupational Radiation Safety Cornerstone attribute of Program and Process (Monitoring and Radiation Protection Controls) and adversely affects the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation from airborne radioactive material during routine civilian nuclear reactor operation. Failure to identify potentially significant contributors to internal dose could lead to unmonitored occupational exposures. The finding was evaluated using IMC 0609, Appendix C, "Occupational Radiation SDP" and was determined to be of very low safety significance (Green) because it was not related to As Low As Reasonably Achievable (ALARA) Planning and the ability to assess dose was not compromised during these instances. In addition, it did not involve overexposure or substantial potential for overexposure because of the relatively low alpha source term in the areas where the surveys were performed. This conclusion was drawn from the results of beta/gamma and alpha smear surveys performed at those selected work locations. However, if left uncorrected, unmonitored internal exposure could have occurred. The cause of this finding was directly related to the cross-cutting aspect of maintaining effective interfaces between work groups in the Work Control component of the Human Performance area. [H.3(b)]. (Section 2RS1)

Inspection Report# : [2011002](#) (*pdf*)

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## Public Radiation Safety

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## Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not

provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

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