

# Brunswick 1

## 4Q/2016 Plant Inspection Findings

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### Initiating Events

**Significance:**  May 31, 2016

Identified By: NRC

Item Type: FIN Finding

#### **Inadequate Procedures to Perform Maintenance on the SAT Non-segregated Bus and the 1B RRP VFD Cables**

A self-revealing finding with two examples was identified for the licensee's failure to have adequate procedures to perform maintenance on the startup auxiliary transformer (SAT) non-segregated bus duct and the 1B Reactor Recirculation Pump (RRP) variable frequency drive (VFD) cables. The first example, from May 1997 to the present, procedure 0PM-NSB001, Inspection and Cleaning Non-Segregated Buses, did not contain sufficient information to ensure that deficiencies that could lead to water intrusion in the SAT non-segregated bus duct were identified and corrected. The second example, from October 2003 to June 20, 2016, procedure 0SPP-CBL011, Splicing of Wires and Cables Without Tape, failed to specify use of a depth-limiting cutting tool for removing semi-conductor insulation on the 1B RRP VFD cables. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 1998726.

The inspectors determined that the failure of the licensee to have adequate procedures to perform maintenance on the SAT non-segregated bus duct and the 1B RRP VFD cables was a performance deficiency. The finding was more than minor because it was associated with the equipment performance attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to perform adequate maintenance on the SAT non-segregated bus duct and the 1B RRP VFD cables resulted in a SAT differential lockout, a Unit 1 manual reactor SCRAM, and a loss of offsite power (LOOP). Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, the inspectors determined the finding screened to a more detailed risk evaluation because the finding caused a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. A detailed risk review was performed by the regional Senior Reactor Analyst. After additional review, it was determined that the two inadequate procedures did not share a direct common cause. Therefore, the risk associated with each condition was analyzed separately in accordance with the SDP. When separate, each finding, given the appropriate conditions, would result in a ground. The high resistance grounding design of the plant's 4kV system limits the phase to ground fault current to a low enough value to limit plant equipment damage and allow time to search for the ground. The very low risk significance associated with these two separate grounds resulted in a Green (very low safety significance) finding. The risk significance of the event was mitigated because the licensee had earlier implemented modifications to the plant that would allow for early backfeed of alternating current power through the auxiliary unit transformer in the event of the failure of the path from the startup transformer. The licensee had also installed a supplemental EDG to provide a backup to the site EDGs that did not share the dependence on external sources of water for cooling. The finding has a cross-cutting aspect in the area of human performance associated with the avoid complacency attribute because individuals failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes, and individuals failed to implement appropriate error reduction tools. Specifically, the licensee failed to plan for the inherent risk associated with water intrusion into the SAT non-segregated bus duct and failed to implement error reduction tools when inspecting and repairing the duct.

Inspection Report# : [2016008](#) (*pdf*)

Inspection Report# : [2016003](#) (*pdf*)

## Mitigating Systems

**Significance:**  Jun 30, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

### **Failure to Identify Broken Auto Start Control Relay on Emergency Diesel Generator 1**

An NRC-identified Green non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, was identified because the licensee failed to promptly identify and correct a condition adverse to quality (CAQ) on emergency diesel generator (EDG) 1. Specifically, from February 7, 2016, until March 5, 2016, the licensee failed to promptly identify and correct a broken auto start control relay (ASCR) which resulted in reduced capacity of EDG 1 due to load oscillations and inoperability of EDG 1 due to oscillating between droop and isochronous mode. The oscillations could cause the EDG to not meet Technical Specification (TS) frequency and load requirements. The licensee replaced the ASCR and entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 2007720.

The licensee's failure to promptly identify and correct the broken ASCR, which resulted in reduced capacity and inoperability of EDG 1 due to load oscillations, was a performance deficiency. The finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to identify and correct the malfunctioning ASCR resulted in reduced capacity of EDG 1 due to load oscillations, and could cause EDG 1 to not meet TS frequency and load requirements. Using IMC 0609, Appendix A, issued June 19, 2012, The Significance Determination Process (SDP) for Findings At-Power, the inspectors determined the finding screened to a more detailed risk evaluation because it represented a loss of system and/or function, and the finding represented an actual loss of a function of a single train for greater than the TS allowed outage time. The regional Senior Reactor Analyst evaluated the finding and determined it to be Green. The risk was low because of the diverse sources of AC power available, and the long duration of some of the sequences allowed a greater potential for recovery of a failed AC power source. The dominant risk sequences contained common cause failure of the diesel generators, with the supplemental EDG aligned to the other unit, and non-recovery of offsite power or of an EDG.

The finding has a cross-cutting aspect in the area of problem identification and resolution associated with the identification attribute because the licensee failed to implement a CAP with a low threshold for identifying issues completely, accurately, and in a timely manner in accordance with the program. Specifically, the licensee failed to write a timely NCR and identify the load oscillations as a CAQ. [P.1]

Inspection Report# : [2016002](#) (*pdf*)

**Significance:**  Jun 30, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

### **Failure to Verify or Check the Adequacy of Design of the EDG 3 Auto-Start Circuitry**

A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion III, Design Control, was identified for the licensee's failure to verify or check the adequacy of design of the EDG 3 emergency auto-start circuitry. Specifically, on October 24, 2011, the licensee failed to verify or check the adequacy of design of the fuse block holder modification to the EDG auto-start circuitry. This resulted in the fuse block holder connection becoming loose, a loss of continuity through the circuit, and the inoperability of EDG 3. The licensee replaced the fuse block holder, performed a continuity check, and plans to implement a design change to install continuity indication for continuous verification of continuity. The licensee entered this issue into the CAP as NCR 2007449.

The licensee's failure to verify or check the adequacy of design of the EDG 3 emergency auto-start circuitry fuse

block holder modification was a performance deficiency. The performance deficiency was more than minor because it was associated with the design control 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. This resulted in the fuse block holder connection becoming loose, a loss of continuity through the circuit, and the inoperability of EDG 3. Using IMC 0609, Appendix A, issued June 19, 2012, The Significance Determination Process (SDP) for Findings At-Power, the inspectors determined the finding screened to a more detailed risk evaluation because it represented a loss of system and/or function, and the finding represented an actual loss of a function of a single train for greater than the TS allowed outage time. The regional SRA performed a detailed risk review for the finding. The finding was determined to be Green. The limited duration of the EDG's failure of the auto start, the ability to manually recover the EDG, and the availability of the other EDGs and of the supplemental EDG contributed to the low risk value. The dominant risk sequences were of low value, and were Station Blackout with failure to recover offsite power or the EDGs.

The finding has a cross-cutting aspect in the area of problem identification and resolution associated with the identification attribute because the licensee failed to implement a CAP with a low threshold for identifying issues completely, accurately, and in a timely manner in accordance with the program. Specifically, the licensee failed to identify EDG 3 was inoperable on February 7, 2016, when the indications were apparent. [P.1]

Inspection Report# : [2016002](#) (*pdf*)

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## Barrier Integrity

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

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## Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

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