

Brunswick 2

3Q/2013 Plant Inspection Findings

Initiating Events

Significance: G Mar 31, 2013

Identified By: NRC

Item Type: FIN Finding

Failure to Follow Procedure for Variable Frequency Drive Reactor Recirculation Pump Design Modification.

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

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

Inspection Report# : [2013002](#) (*pdf*)

Significance: G Dec 31, 2012

Identified By: NRC

Item Type: FIN Finding

Inadequate Maintenance Procedure for Fluorescent Lights over Safety-related Equipment

•Green. The inspectors identified a Green finding for the licensee not having an adequate procedure for maintenance on fluorescent lights over safety-related equipment. Specifically, between plant startup and August 29, 2012, the licensee did not have instructions for closing S-hooks on fluorescent lights over safety related equipment during maintenance on the fluorescent lights. This resulted in over 40 S-hooks open in safety-related buildings which could result in fluorescent lights falling and impacting safety-related equipment during a seismic event. The licensee's

corrective actions included closing the open S-hooks and adding instructions for closing S-hooks to work order (WO) 431558. The licensee entered this issue into the CAP as NCR 551646.

The performance deficiency associated with this finding was the failure of the licensee to have an adequate procedure for maintenance on fluorescent lights over safety-related equipment. The finding was more than minor because if left uncorrected, the deficiencies could lead to a more significant safety concern. If left uncorrected, the failure to provide procedural guidance to close the S-hooks on fluorescent lights over safety-related equipment could lead to fluorescent lights falling on safety-related instruments during a seismic event resulting in a reactor trip. This finding is also associated with the design control attribute of the Initiating Events Systems Cornerstone. Using IMC 0609, Appendix A, issued June 19, 2012, The Significance Determination Process (SDP) for Findings At-Power, the inspectors determined the finding was of very low safety significance because the finding did not affect the design or qualification of a mitigating SSC, the finding did not represent a loss of system and/or function, the finding did not represent an actual loss of a function of a single train for greater than the TS allowed outage time, the finding did not represent an actual loss of a function of one or more non-TS trains of equipment, and did not screen as potentially risk-significant due to a seismic event since both S-hooks on one fluorescent light were not considered to be completely failed or unavailable, and the finding did not involve the total loss of any safety function. The finding has a cross-cutting aspect in the area of problem identification and resolution associated with the CAP attribute because the licensee did not identify the open S-hook issue completely, accurately, and in a timely manner commensurate with their safety significance during the Fukushima walkdowns. [P.1(a)] (Section 40A5)

Inspection Report# : [2012005](#) (*pdf*)

Mitigating Systems

Significance:  Sep 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to identify and correct nuclear service water pump shaft degradation

An NRC identified Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, was identified for the failure of the licensee to identify and correct a condition adverse to quality (CAQ) on the 1B nuclear service water pump (NSWP). Specifically, between June 26, 2012, and January 12, 2013, the licensee failed to identify or correct the pump shaft degradation on the 1B Nuclear Service Water Pump (NSWP) pump. This resulted in the shaft bearing delaminating and bearing material becoming dislodged and trapped in the pump strainer which caused the 1B NSWP to become inoperable. The licensee replaced the pump shaft and returned the pump to operable. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 582584.

The inspectors determined that the failure of the licensee to identify and correct the 1B NSWP shaft degradation before the pump failed 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 affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the shaft degradation resulted in the 1B NSWP being inoperable. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, the inspectors determined the finding was of very low safety significance (Green) because the finding did not affect the design or qualification of a mitigating structure, system and component (SSC), the finding did not represent a loss of system and/or function, the finding did not represent an actual loss of a function of a single train for greater than the technical specifications (TS) allowed outage time, the finding did not represent an actual loss of a function of one or more non-TS trains of equipment, and did not

screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. The finding has a cross-cutting aspect in the area of problem identification and resolution associated with the CAP attribute because the licensee failed to implement a CAP with a low threshold for identifying issues, specifically the licensee did not enter this issue into the CAP in June 2012. [P.1(a)] (Section 1R15)

Inspection Report# : [2013004](#) (*pdf*)

Significance:  Jun 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Have Adequate Installation and Testing Instructions for the EDG Overspeed Boost Cylinder.

An NRC-identified Green NCV of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, was identified for the failure of the licensee to have adequate installation and testing instructions for the EDG control oil system overspeed boost cylinder and accomplish the installation and testing in accordance with these instructions. The licensee replaced the boost cylinder and returned the EDG to operable. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 567016.

The inspectors determined that the failure to properly install the EDG 3 overspeed boost cylinder and properly test the boost cylinder, to ensure the boost cylinder can perform its design basis function, was a performance deficiency. The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affects the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correctly install and test the EDG 3 overspeed boost cylinder resulted in the failure of EDG 3 to start and EDG 3 being declared inoperable on October 14, 2012. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, the inspectors determined the finding was of very low safety significance (Green) because the finding did not affect the design or qualification of a mitigating SSC, the finding did not represent a loss of system and/or function, the finding did not represent an actual loss of a function of a single train for greater than the TS allowed outage time, the finding did not represent an actual loss of a function of one or more non-TS trains of equipment, and did not screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. The finding has a cross-cutting aspect in the area of human performance associated with the resources attribute because the licensee did not have complete, accurate and up-to-date design documentation, procedures, and work packages to install and test the EDG 3 overspeed boost cylinder. H.2(c)

Inspection Report# : [2013003](#) (*pdf*)

Significance:  Jun 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Risk Management Actions during Elevated Risk

- An NRC-identified Green NCV of 10 CFR 50.65(a)(4) was identified for the failure of the licensee to manage the increase in risk that resulted from the E6 bus outage. Specifically, between May 19, 2013 and May 21, 2013, the licensee did not manage the increase in risk on Unit 2 during the E6 bus outage by use of appropriate risk management actions (RMAs). Operations personnel took immediate actions to protect the equipment in the control room and in the field. The licensee entered this issue into the CAP as NCR 607741.

The inspectors determined that the failure of the licensee to manage risk during the E6 outage by performing RMAs for the protected 2A RHR and RHRSW loops, the 2A and 2B core spray and the hardened vent was a performance deficiency. The finding was more than minor because if left uncorrected, the failure to perform RMAs when required could result in safety-related mitigating equipment being unavailable during already elevated plant risk, specifically

the 2A RHR and RHRSW loops, the 2A and 2B core spray and the hardened vent. This finding was associated with the human performance attribute of the Mitigating Systems Cornerstone. Using IMC 0609, Appendix K, issued May 19, 2005, Maintenance Risk Assessment and Risk Management Significance Determination Process, Flowchart 2, Assessment of RMAs, the inspectors determined the finding screened as very low safety significance (Green) since the incremental core damage probability was less than 1E-6. The finding has a cross-cutting aspect in the area of human performance associated with the work control attribute because the licensee did not appropriately plan work activities by incorporating risk insights during the E6 bus outage. H.3(a)

Inspection Report# : [2013003](#) (pdf)

Significance:  Jun 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Design Control for Allowable Jacket Water Leak Rate

An NRC-identified Green NCV of 10 CFR 50, Appendix B, Criterion III, Design Control, was identified for the failure of the licensee to verify the adequacy of the design acceptance criteria for jacket water leakage to ensure EDG 3 could meet the design basis mission time of seven days. The licensee's corrective actions include developing a plan to fill the EDG jacket water system to ensure operation of the EDG for seven days. The licensee entered this issue into the CAP as NCR 615491.

The inspectors determined that the failure to ensure sufficient jacket water to the EDGs, with a jacket water leak, for the seven-day mission time, was a performance deficiency. The violation is more than minor because it is associated with the design control attribute of the Mitigating Systems Cornerstone and affects the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the calculational error assuming a four-day mission time versus a seven-day mission time results in a condition where there was reasonable doubt on the capability of an EDG when a jacket water leak exists. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, the inspectors determined the finding screened to a detailed risk evaluation because the finding represented an actual loss of function of at least a single Train of EDG for greater than the TS Allowed Outage time. The regional SRA performed a Phase 3 analysis on the finding. The time to failure of the EDG due to the leak precluded any internal risk impact, since it exceeded 24 hours to failure. A screening calculation was performed to estimate the impact the finding would have on an extended loss of offsite power from seismic or external flooding. The low likelihood of the seismic or external flood event occurring, combined with the short time the deficiency existed, resulted in a finding of very low safety significance (Green). The finding does not have a cross-cutting aspect since the performance deficiency is not indicative of current plant performance. Engineering evaluation was performed on July 7, 2004.

Inspection Report# : [2013003](#) (pdf)

Significance:  Dec 31, 2012

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inadequate Maintenance Procedure for the EDG Jacket Water Pump Wear Ring Tolerances

•Green. A self-revealing Green NCV of Technical Specification (TS) 5.4.1a, Procedures, was identified because the licensee did not have an adequate maintenance procedure to perform work on the emergency diesel generator (EDG) 3 engine-driven jacket water pump (JWP). Specifically, between July 25, 1992 and November 15, 2012, Procedure OCM ENG528, Gould Engine Driven Jacket Water Pump Model 3736, did not provide the correct tolerances for the EDG JWP wear rings, resulting in the JWP seizure. The licensee's corrective actions included replacing the casing wear rings with wear rings with the correct tolerance and revising Procedure OCM-ENG528. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 572546.

The performance deficiency associated with this finding was the failure of the licensee to have an adequate procedure for maintenance on the EDG 3 engine-driven JWP. The finding was more than minor because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and affects the cornerstone objective of ensuring the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the inadequate procedure resulted in reduced availability of EDG 3 to repair the engine-driven JWP and reduced reliability of the jacket water system during operation. Using IMC 0609, Appendix A, issued June 19, 2012, The Significance Determination Process (SDP) for Findings At-Power, the inspectors determined the finding was of very low safety significance because the finding did not affect the design or qualification of a mitigating structure, system and component (SSC), the finding did not represent a loss of system and/or function, the finding did not represent an actual loss of a function of a single train for greater than the TS allowed outage time, the finding did not represent an actual loss of a function of one or more non-TS trains of equipment, and did not screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. The finding does not have a cross-cutting aspect since the performance deficiency is not indicative of current plant performance. Procedure 0CM-ENG528 included the incorrect tolerances since July 25, 1992. (Section 1R19)

Inspection Report# : [2012005](#) (pdf)

Significance:  Dec 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Design of EDG 2 ASSD Switch A1

•Green. The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion III, Design Control, for failure to assure that the design basis for EDG 2 Alternate Safe Shutdown (ASSD) Switch A1 was correctly translated into specifications and drawings. Specifically, between original EDG 2 installation and September 1, 2012, a wiring discrepancy existed associated with EDG 2 ASSD Switch A1 which resulted in an induced fault that could have impacted the ability to locally control EDG 2 during certain fire scenarios. The licensee's corrective actions included correcting the EDG 2 control circuit wiring to ensure it was in accordance with the existing approved design and returning EDG 2 to operable status. The licensee entered this issue into the CAP as NCR 557897.

The performance deficiency associated with this finding was the failure to assure that the design basis for EDG 2 ASSD Switch A1 was correctly translated into specifications and drawings. The finding was more than minor because it was associated with the protection against external factors (i.e. fire) 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. Specifically, an induced fault could have impacted the ability to locally control EDG 2 during certain fire scenarios. Using IMC 0609, Attachment 4, issued June 19, 2012, Initial Characterization of Findings, and IMC 0609, Appendix F, Attachment 1, Part 1: Application of Fire Protection SDP Phase 1 Worksheet, the results of this evaluation required further significance evaluation. A phase 3 analysis was performed by a regional SRA in accordance with NRC IMC 0609 Appendix F. The finding affected the capability to achieve alternate safe shutdown for Unit 1. The result of the analysis was an increase in core damage frequency of $<1E-6$ /year a GREEN finding of very low safety significance. The finding does not have a cross-cutting aspect since the performance deficiency is not indicative of current plant performance. The EDG 2 ASSD Switch A1 wiring discrepancy has existed since original EDG installation. (Section 4OA3)

Inspection Report# : [2012005](#) (pdf)

Barrier Integrity

Significance: G Jun 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Work Order to Perform a Modification to the Control Room Emergency Ventilation System

An NRC-identified Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, was identified, for the licensee's failure to have an adequate instruction or procedure to perform a modification to the control room emergency ventilation system. The licensee took immediate action to return CREV to service and entered this issue into the CAP as NCR 578363.

The inspectors determined that the failure of the licensee to have an adequate procedure for installing a jumper on the 2A CREV system was a performance deficiency. The finding was more than minor because it was associated with the configuration control attribute of the Barrier Integrity Cornerstone and affects the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to have an adequate procedure to install a jumper on the 2A CREV system resulted in the safety system functional failure of CREV. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, the inspectors determined the finding screened to a detailed risk evaluation because the finding represented a degradation of the radiological barrier function and smoke or toxic atmosphere function of the control room barrier. The regional SRA performed a Phase 3 analysis on the finding. A screening calculation was performed to estimate the impact the finding would have on the facility for conditions that would lead to plant shutdown, or failure of the filtering function of the ventilation system. The low likelihood of failure to recover the system, combined with the short time the deficiency existed, resulted in a finding of very low safety significance (Green). The finding has a cross-cutting aspect in the area of human performance associated with the work control attribute because the licensee did not appropriately coordinate work activities by incorporating the impact of changes to the work scope or activity on the plant when installing a ring lug jumper on the 2A CREV subsystem. H.3(b)

Inspection Report# : [2013003](#) (*pdf*)

Significance: G Jun 30, 2013

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Have an Adequate Procedure for Preventative Maintenance on a SCRAM Contactor Coil

A self-revealing Green NCV of TS 5.4.1a, Procedures, was identified for the failure of the licensee to have an adequate procedure incorporating a preventative maintenance schedule which specifies inspection or replacement of the RPS coil contactor 2-C72B-K1A that had a specific recommended lifetime. The licensee took action to manually open valve 2-E11-F009 and entered this issue into the CAP as NCR 599641.

The inspectors determined that the failure of the licensee to have an adequate procedure incorporating a preventative maintenance schedule which specifies inspection or replacement of contactor 2-C72B-K1A was a performance deficiency. The finding was more than minor because if left uncorrected, the failure of the GE CR105 contactors could result in the failure of the Unit 1 and Unit 2 A and B RPS buses. The finding was also associated with the configuration control attribute of the Barrier Integrity Cornerstone. Specifically, the failure to perform a PM on contactor coil 2-C72B-K1A resulted in a loss of decay heat removal to the SFP on April 5, 2013. Using IMC 0609, Attachment 4, issued June 19, 2012, Initial Characterization of Findings, the inspectors determined that since this issue occurred during a refueling outage, that the finding should be processed in accordance with IMC 0609, Appendix G, issued February 28, 2005, Shutdown Operations Significance Determination Process. Using IMC 0609, Appendix G, Table 1, Losses of Control, the inspectors determined that the finding was of very low safety

significance (Green) because the inadvertent change in RCS temperature due to loss of RHR divided by the change in temperature that would cause boiling was less than 0.2 (temperature margin to boil). The finding does not have a cross-cutting aspect since the performance deficiency is not indicative of current plant performance. The PM was not implemented per vendor recommendations in 1990.

Inspection Report# : [2013003](#) (*pdf*)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

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.

Miscellaneous

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