Brunswick 2
3Q/2016 Plant Inspection Findings

Initiating Events

Mitigating Systems

Significance: G Sep 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Implement Risk Management Actions during Elevated Risk
An NRC-identified Green non-cited violation (NCV) of 10 CFR 50.65(a)(4) was identified for the failure of the licensee to implement all necessary prescribed risk management actions (RMAs) during a 2A residual heat removal (RHR) and residual heat removal service water (RHRSW) outage. Specifically, between August 31, 2016, and September 1, 2016, the licensee failed to post protective equipment signs on the 2B RHR/RHRSW motor control centers (MCCs) whose unavailability would have taken Unit 2 into a Yellow risk condition. The licensee took immediate corrective actions to protect the 2B RHR/RHRSW MCCs in the field. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 2059064.

The inspectors determined the failure of the licensee to adequately post protected equipment signs for the 2B RHR/RHRSW system, whose unavailability would have taken the unit into a Yellow risk condition, was a performance deficiency. The finding was more than minor because if left uncorrected, the failure to perform RMAs could result in a loss of a safety-related mitigating function, specifically the RHR low pressure coolant injection (LPCI). Using IMC 0609, Appendix K, issued May19, 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 crosscutting aspect in the area of human performance associated with the procedure adherence attribute because the licensee failed to follow plant procedures to fully protect the 2B RHR/RHRSW loop during the 2A RHR/RHRSW loop outage.

Inspection Report# : 2016003 *(pdf)*

Significance: G Sep 30, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
Inadequate Procedure to Perform Preventive Maintenance on the HPCI Auxiliary Oil Pump Motor Overload Relay
A self-revealing Green NCV of Technical Specification (TS) 5.4.1a, Procedures, was identified for the failure of the licensee to have an adequate procedure for preventive maintenance (PM) on the Unit 2 high pressure coolant injection (HPCI) auxiliary oil pump motor overload relay 2-2XDA-B11-74. Specifically, from May 26, 2015, to July 6, 2016, the licensee failed to incorporate PM task 482688, a 12 year replacement task for the relays, into procedures, resulting in a shorted relay coil, the loss of control power, and the inoperability of the HPCI pump. The licensee replaced the relay and the HPCI pump was returned to operable. The licensee entered this issue into the CAP as NCR 2043067.

The inspectors determined that the failure of the licensee to have an adequate PM procedure to replace the Unit 2 HPCI auxiliary oil pump motor overload relay 2 2XDA B11-74 was a performance deficiency. The finding was more than minor because it was associated with the procedural quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to replace the HPCI auxiliary oil pump motor overload relay resulted in the inoperability of the Unit 2 HPCI pump, and the loss of safety function. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding screened to a more detailed risk evaluation, since the finding represented a loss of HPCI system and/or function. The inspectors used SAPHIRE to conduct a more detailed risk review of the finding. The inspectors determined that the finding was of very low safety significance (Green), because the core damage frequency (CDF) risk was less than 1.0E-6/year. This finding has a cross-cutting aspect in the area of human performance associated with the work management aspect, for failing to implement a process of planning, controlling, and executing work activities such that nuclear safety is an overriding priority. Specifically the licensee failed to effectively plan and coordinate PM strategies associated with operating experience to prevent the failure of the HPCI pump.
Inspection Report# : 2016003 *(pdf)*

Significance:  Sep 30, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
Inadequate Procedure for the 2B RHRSW Subsystem Operability Test
A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, was identified for the failure of the licensee to have an adequate procedure for the 2B RHRSW pump operability test. Specifically, from July 12, 2001, to August 2, 2016, licensee procedure 0PT-08.1.4A(B), RHR Service Water System Operability Test, did not contain sufficient information to maintain plant status control for the Unit 2 RHRSW subsystem "B" pressure switch instrument isolation valves, 2-SW-PS-1176B-3 and 2-SW-PS-1176D-3, resulting in the valves being found mispositioned (closed) and the inoperability of the 2B RHRSW subsystem. This finding resulted in a violation of TS 3.7.1, RHRSW System, since the 2B RHRSW subsystem was inoperable for greater than the TS allowed outage time (AOT). As immediate corrective actions, the licensee opened the 2-SW-PS-1176B(D)-3 valves and ensured the subsystem "A" pressure switch instrument isolation valves were open. Additionally, the licensee revised procedure 0PT-08.1.4A(B) to maintain plant status control by throttling the drain valves versus the pressure switch instrument isolation valves, and included an independent verification step to ensure the valves are returned to the correct position. The licensee entered this issue into the CAP as NCR 2037920.
The inspectors determined the licensee's failure to have an adequate procedure for the 2B RHRSW subsystem operability test to ensure configuration control was a performance deficiency. The finding was more than minor because it was associated with the procedural quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the inadequate procedure resulted in the inoperability of the 2B RHRSW subsystem. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding screened to a more detailed risk evaluation, since the finding represented an actual loss of safety function of a single train for greater than its TS AOT. A regional Senior Risk Analyst (SRA) performed a detailed risk evaluation for the finding by setting the exposure period for 11 days, and assuming recovery actions that could be taken to mitigate the event. In addition, a second later recovery was possible for the dominant sequences because service water, in sufficient quantity, can be pushed through the inoperable pumps to provide adequate cooling in non-loss-of-coolant accident (LOCA) sequences. The dominant contributor involved loss of the heat sink through common cause failure. The risk analysis resulted in a finding that is characterized as very low safety significance (Green). The finding had a cross cutting aspect in the area of human performance associated with the challenge the unknown attribute because the licensee did not stop when faced with uncertain conditions, and risks were not evaluated and managed before

proceeding. Specifically, the licensee continued through the April 2016 2B RHRSW system operability test, even when the procedure was not clear on which valve to manipulate to adjust for flow fluctuations.

Inspection Report# : 2016003 *(pdf)*

Significance: G Jun 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Identity 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: G 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)*

Significance: G Mar 31, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Identify and Correct 2B NSW Pump Strainer Drag
The inspectors identified a Green non-cited (NCV) of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, because the licensee failed to identify and correct a condition adverse to quality associated with the 2B nuclear service water (NSW) pump strainer. Specifically, the licensee did not ensure the spacers/shims were filed down or seated appropriately, which resulted in the 2B NSW pump strainer shear key failures, and the unavailability of the 2B NSW pump on three separate occasions. As corrective actions, the licensee ensured the spacers/shims were filed down and seated appropriately for the 2B NSW pump strainer and changed the procedure to ensure these steps were performed in the future. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 1988423.

The inspectors determined the licensee's failure to ensure the 2B NSW pump strainer spacers/shims were filed down or seated appropriately 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 to ensure the availability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this resulted in the failure of 2B NSW pump strainer shear key, and unavailability of the 2B NSW pump during repairs to the strainer. 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 technical specification (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.

Inspection Report# : 2016001 *(pdf)*

Significance: G Dec 31, 2015

Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
Inadequate Procedure for the 2C RHRSW Booster Pump Motor Bearings
A self-revealing Green non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, was identified for the failure of the licensee to have an adequate procedure for the 2C residual heat removal service water (RHRSW) pump motor bearing maintenance. Specifically, licensee procedure 0CM-M503, Maintenance Instructions for the RHRSW Booster Pump Motors, did not contain information to ensure proper sealing of the 2C RHRSW motor bearings. This finding resulted in a violation of technical specification (TS) 3.0.4, Limiting Condition for Operation (LCO) Applicability, and TS 3.7.1, RHRSW System. As immediate corrective actions, the licensee applied sealant to the motor bearings. Additionally, the licensee revised procedure 0CM-M503 and added a detailed location for applying the sealant to the RHRSW pump motors. The licensee entered this issue into the Corrective Action Program (CAP) as nuclear condition report (NCR) 742643.

The inspectors determined the licensee's failure to have an adequate procedure for the 2C RHRSW pump motor bearing maintenance was a performance deficiency. The finding was more than minor because it was associated with the procedural quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the inadequate procedure resulted in the inoperability of the Loop A RHRSW subsystem, and the loss of safety function while the Loop B RHRSW subsystem was out for maintenance. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding screened to a more detailed risk evaluation, since the finding represented a loss of system and/or function. The regional Senior Reactor Analyst performed a detail risk review of the finding. The at-power model was conservatively used to bound the risk that would happen at the proposed time of failure, which was many days after shutdown due to the time it takes for the oil leak to cause potential bearing failure. Since the licensee had procedures for running the service water (SW) system without the RHRSW pumps energized, and the decay heat loads at the time of failure would be low, a failure rate of only 0.1 for the loss of function was assumed. This was also conservative, since the adverse conditions that would have prevented refill of the oil were LOCA assumptions, and LOCA sequences did not contribute greatly to the risk in the model.

The at-power models solution was more than an order of magnitude below the Green/White threshold for the SDP. Therefore, the finding was determined to be of very low safety significance (Green). The finding has a cross-cutting aspect in the area of human performance associated with the challenge the unknown attribute because the licensee did not stop when faced with uncertain conditions, and risks were not evaluated and managed before proceeding. Specifically, the licensee continued through the 2010 and 2013 2C RHRSW pump maintenance outages, even when the bearings were found without sealant. Additionally, the licensee did not question the procedurally required location for the sealant. H.11
Inspection Report# : 2015004 *(pdf)*

Barrier Integrity

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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