Braidwood 2
4Q/2016 Plant Inspection Findings

Initiating Events

Significance: G Mar 31, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
FAILURE TO FOLLOW FIRE PREVENTION FOR HOT WORK PROCEDURE
The inspectors identified a finding of very low safety significance and an associated NCV of License Condition 2.E when licensee personnel failed to follow the requirements of the Fire Prevention for Hot Work procedure on two separate occasions. Specifically, (Issue 1) on February 2, 2016, a very small fire occurred during a planned hot work activity that involved pipe grinding on a small waste gas decay tank pressure line because the licensee failed to recognize the potential for hydrogen within the line. Additionally, (Issue 2) on February 25, 2016, the inspectors identified that a hot work permit was inadequate prior to the licensee performing a piping weld repair activity associated with the Unit 2 main generator stator cooling water system because the permit referenced the wrong work location and did not require appropriate controls. These issues were entered into the licensee's Corrective Action Program (CAP) as Issue Reports (IRs) 2620772 and 2632182. The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown and power operations. Specifically, for Issue 1, the performance deficiency resulted in the occurrence of a small hydrogen fire in the auxiliary building. For Issue 2, the performance deficiency increased the likelihood of a fire occurring during an emergent weld repair in the turbine building. The inspectors determined that this finding was of very low safety significance (Green) because the fire (Issue 1) and increased likelihood of a fire occurring (Issue 2) was limited to equipment which was not important to safety. The inspectors determined that the finding had a Work Management cross cutting aspect in the Human Performance area. Specifically, a significant contributor to the performance deficiency was related to the organization not implementing a process for planning, controlling, and executing work activities such that nuclear safety is the overriding priority.

Inspection Report# : 2016001 *(pdf)*

Significance: G Mar 31, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
FAILURE TO HAVE ADEQUATE WORK INSTRUCTIONS AND PROCEDURES LEADS TO A LOSS OF INVENTORY FROM THE VOLUME CONTROL TANK
. A finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on February 1, 2016, when licensee personnel failed to have appropriate work instructions for performing planned motor-operated valve (MOV) 2SI8807A diagnostic testing. Specifically, the work order (WO) used did not provide appropriate instructions to ensure that the proper equipment line-up for the test was established prior to stroking the valve. Ultimately, this led to an unplanned transfer of about 304 gallons of water from the volume control tank (VCT) to the refueling water storage tank (RWST). This issue was entered into the licensee's CAP as IR 2620523. The inspectors determined that the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Initiating Events cornerstone

and adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical functions during shutdown and power operations. Specifically, the failure to have an appropriate procedure for a maintenance activity led to 304 gallons of inventory being diverted to the RWST. The finding screened as having very low safety significance (Green) because it was determined that the reactor coolant system (RCS) leak rate for a small loss of coolant accident was not exceeded, and it did not result in a loss of a mitigating system's ability to perform an intended safety function. The inspectors determined that the finding had a Work Management cross-cutting aspect in the Human Performance area because the licensee did not implement a process of planning, controlling and executing work activities such that nuclear safety is an overriding priority. Specifically, proper work planning and coordination between maintenance and operations would have ensured that the WO being utilized established the proper system line up prior to the start of the maintenance.

Inspection Report# : 2016001 *(pdf)*

Mitigating Systems

Significance: G Sep 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
FAILURE TO ERECT SCAFFOLDING IN ACCORDANCE WITH STATION PROCEDURES
The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to follow Revision 7 of NES–MS–04.1, "Seismic Prequalified Scaffolds." Specifically, the licensee erected four scaffolds within
3 inches of safety-related equipment and failed to account for seismic movements of safety-related equipment in close proximity to scaffolds in accordance with NES–MS–04.1. As part of their corrective actions, the licensee performed walk downs of installed scaffolds to ensure that they were in compliance with NES–MS–04.1. Additionally, the licensee performed refresher training for all personnel involved in erecting and inspecting scaffolds. This issue was entered into the licensee's CAP as IRs 2703650, 2703895, 2703967, and 2705092. The inspectors determined that the performance deficiency was more than minor because it was associated with the Mitigating Systems cornerstone attribute of Protection Against External Factors and adversely impacted 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, scaffolds built in close proximity to or in contact with safety-related equipment could adversely affect the ability of those systems to perform their intended safety function during a seismic event. The inspectors determined that this finding was of very low safety significance because it did not result in the loss of operability or functionality of a mitigating system. Specifically, an engineering evaluation reasonably determined that the failure to build the scaffolds in accordance with NES–MS–04.1 did not result in a loss of operability to safety-related equipment. The inspectors determined that this finding had a cross cutting aspect in the Human Performance area of Teamwork. Specifically, there were multiple points in the scaffold erection process to engage other workgroups to ensure the seismic qualification of scaffolds, and in every example there was no coordination with other groups to ensure nuclear safety was maintained.

Inspection Report# : 2016003 *(pdf)*

Significance: G Sep 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
FAILURE TO FOLLOW INSERVICE TESTING REQUIREMENTS FOR THE 2A ESSENTIAL SERVICE

WATER PUMP LEADS TO AN INVALID TEST
The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to follow Revision 9 of Procedure 2BwOSR 5.5.8.SX–6A, "Comprehensive Inservice Testing (IST) Requirements for 2A Essential Service Water Pump (2SX01PA)." Specifically, on September 7, 2016, the licensee failed to establish flow as close as possible to the reference point of 24,000 gallons per minute (gpm), as specified in Step 1.17 of the procedure, which ultimately led to an invalid test. The planned corrective actions included re performing the comprehensive test on September 26, 2017, and an action to revise affected procedures to specify that the flow should be established as close as possible to the reference value, and to not throttle flow to below the reference value to obtain acceptable testing results. This issue was entered into the licensee's CAP as IRs 2644532 and 2660824. The inspectors determined that the performance deficiency was more than minor because it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and adversely impacted 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 failure to follow the requirements established by the American Society of Mechanical Engineers (ASME) for comprehensive testing led to an invalid test of the pump on September 7, 2016. The inspectors determined that this finding was of very low safety significance because it did not result in the loss of operability or functionality of a mitigating system. Specifically, when the test was re performed on September 26, 2016, it was confirmed that the 2A essential service water pump was operable. The inspectors determined that this finding had a cross cutting aspect in the Human Performance area of Training. Specifically, licensee staff in Operations and Engineering were under the impression that they did not need to establish flow as close as possible to the reference value of 24,000 gpm. Instead, their belief was that the flow band in the surveillance procedure allowed them to set flow at any point in the band; therefore, when faced with results that fell within the Required Action Range, licensee staff believed that it was acceptable to lower flow to obtain more favorable results provided the system flow remained within the flow band.

Inspection Report# : 2016003 *(pdf)*

Significance: G Jul 29, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
OPERATION OF SX SYSTEM VALVES RESULTS IN CAVITATION DAMAGE AND PIPE LEAKAGE
A finding of very low safety significance and an associated NCV of Title 10 of the Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed when the licensee failed to prescribe essential service water (SX) system operating and/or surveillance procedures appropriate to the circumstances. Specifically, the licensee failed to provide SX operating procedure guidance to limit the closure position of valves 1SX007, 2SX007 and 0SX007, such that cavitation-induced damage/failure of components did not occur or to establish a procedure to monitor and correct cavitation-induced damage prior to component failure associated with the operation of these valves. Consequently, a through-wall leak occurred downstream of valve 1SX007 that was caused by cavitation-induced wall loss at the neck of the pipe flange supporting this valve. The licensee replaced the damaged valve and piping and entered this issue into their CAP as Issue Report (IR) 2697962. The team determined that the performance deficiency 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 availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, continued operation of the SX007 valves without monitoring or correcting 3 cavitation-induced damage could result in a more significant failure resulting in the loss of an SX train and/or an internal flooding event. The team determined that this finding was of very low safety significance because although it was determined to be a deficiency affecting the design or qualification of a mitigating structure, system, and component (SSC), the operability or functionality of the component was not affected. The team did not identify a cross-cutting aspect for this finding because the finding did not reflect current licensee performance.
Inspection Report# : 2016007 *(pdf)*

Significance: G Jun 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Multiple Failure to Follow Procedures Leads to Inadequate Monitoring of Gas Susceptible Locations
The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to follow Revision 3 of procedure ER–AA–2009, "Managing Gas Accumulation." Specifically, 36 gas-susceptible safety-related piping locations were not being monitored in accordance with the procedure. The planned corrective actions included an action to revise the Surveillance Frequency Control Program surveillance frequencies of accessible locations from 18 months to 6 months to align with procedural requirements, and an action to address the monitoring of locations inside the missile barrier (non-accessible locations at power). This issue was entered into the licensee's Corrective Action Program (CAP) as Issue Reports (IRs) 2644532 and 2660824. The inspectors determined the performance deficiency was more than minor because it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and adversely affected 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 adequately monitor for gas accumulation in piping did not ensure the availability and reliability of systems required to perform accident mitigating functions because a potential adverse void would not be detected and assessed for operability impact. The inspectors determined that this finding was of very low safety significance because it did not result in the loss of operability or functionality of mitigating systems. Specifically, an engineering evaluation reasonably determined that the non-conforming condition did not result in a loss of operability. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance because the licensee did not recognize and plan for the possibility of mistakes, latent issues, and inherent risks, even while expecting successful outcomes. Specifically, the licensee had multiple recent opportunities to discover the non-compliance, but failed to do so because the licensee assumed that the surveillance frequencies were established correctly.

Inspection Report# : 2016002 *(pdf)*

Significance: G Jun 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Manage Gas Accumulation in the 2A SI Train
The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to manage gas accumulation in the safety injection (SI) system in accordance with procedure ER–AA–2009, "Managing Gas Accumulation." Specifically, following identification of a void in the 2A SI train, the licensee failed to increase the monitoring frequency and account for the potential for the void to grow due to active gas mechanisms or planned evolutions, as required by the procedure. This ultimately led to a previously identified void growing beyond the pre-established limit by the next scheduled surveillance. Corrective actions for this issue included a planned action to establish an increased monitoring frequency for the affected line, and an action to remove the void in the upcoming Unit 2 Outage (Spring 2017). This issue was entered into the licensee's CAP as IR 2640751. The inspectors determined the performance deficiency was more than minor because, it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and adversely affected 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 monitor the gas accumulation for the 2A train of SI at the appropriate frequency did not ensure the availability and reliability of the SI system to perform its accident mitigating function. Additionally, this failure led to the 2A SI train exceeding the associated operability limits as established by evaluation BW–15–0100M during the next scheduled surveillance. The inspectors determined that this finding was of very low safety significance because it did not result in the loss of operability or functionality of mitigating systems. Specifically, an engineering evaluation reasonably determined that the non-conforming condition did not result in a loss of operability. The inspectors determined that

this finding had a cross-cutting aspect in the area of Human Performance because the licensee did not stop when faced with uncertain conditions. Specifically, the licensee did not reassess the gas accumulation monitoring plan to consider the potential for void growth due to active gas mechanisms or planned evolutions when accepting an unexpected void condition that differed with the initial conditions assumed by the monitoring plan. Ultimately, this led to a monitoring plan not being implemented as required.

Inspection Report# : 2016002 *(pdf)*

Significance: G Mar 31, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
FAILURE TO CORRECT A CONDITION ADVERSE TO QUALITY LEADS TO LOSS OF ONE TRAIN OF SHUTDOWN COOLING IN MODE 6
A finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," was self revealed when the licensee failed to ensure that a condition adverse to quality was promptly identified and corrected. Specifically, on October 8, 2015, valve 2RH606 failed to open and caused a loss of one train of shutdown cooling in Mode 6 and an unplanned orange risk condition. The reason for the failure was improper use of a lower strength carbon steel valve key instead of the specified high strength hardened steel valve key, which had been the subject of a vendor Part 21, "Reports of Defects and Non Compliance," Report. This issue was entered into the licensee's CAP as IR 2567811. The inspectors determined that the performance deficiency 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 availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correct a condition adverse to quality in the form of the improper use of a lower strength carbon steel key instead of the specified high strength hardened steel key in a safety-related valve ultimately led to a loss of one train of shutdown cooling in Mode 6. The inspectors determined that the finding was of very low safety significance based upon a detailed risk evaluation. The inspectors did not identify a cross cutting aspect associated with this finding because the performance deficiency was greater than three years old and therefore was not indicative of current performance.

Inspection Report# : 2016001 *(pdf)*

Significance: G Mar 31, 2016
Identified By: NRC
Item Type: FIN Finding
FAILURE TO ENSURE UNIT 2 STARTUP FEEDWATER PUMP AVAILABILITY
. The inspectors identified a finding of very low safety significance when licensee personnel failed to ensure that the Unit 2 startup feedwater pump (SUFWP) was available during an 18 month operating cycle. Specifically, the licensee had failed to ensure that the pump oil pressure regulator was properly adjusted, and had failed to perform a post-maintenance test following on-line work in a manner to ensure that no new deficiency was introduced. The license entered this issue into their CAP as IR 2565442. Corrective actions consisted of updating the station SUFWP model work orders (WOs) to ensure that interlock continuity checks were performed as a part of the post-maintenance testing when necessary, and to include procedural steps to verify lube oil pressure when starting a SUFWP. The inspectors determined that the performance deficiency was more than minor because the issue was associated with the Procedural Quality 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. Specifically, the Unit 2 SUFWP is a backup method of decay heat removal following a reactor trip, and is utilized in plant startup and shutdown procedures. A detail risk evaluation was performed and the performance deficiency was determined to be of very low safety significance based upon an evaluation bounding the risk to a Delta Core Damage Frequency of 2.9E–7/year. No cross cutting aspect was identified because the cause of the failure were

probable causes and not confirmed to be the actual cause

Inspection Report# : 2016001 *(pdf)*

Significance: G Mar 25, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Verify the Tripping Characteristic of Molded Case Circuit Breakers (MCCBs) Used as Isolation Devices for the 120 Vac Instrument Power System. (Section 1R21.3b (1))
The inspectors identified a finding of very low safety significance and an associated NCV of Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion XI, "Test Control," for the licensee's failure to test the 120 Vac molded case circuit breakers (MCCBs) used as isolation devices on the instrument power system. Specifically, although the licensee had committed to test circuit breakers used as isolation devices in response to Final Safety Analysis Report Question 40.73 in 1982, there was no evidence that these MCCBs had ever been tested. The licensee subsequently entered the issue into its Corrective Action Program.

The finding was more than minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance, and affected the cornerstone objective of ensuring the availability of the safety-related instrument power system. Specifically, the licensee did not assure, by periodically verifying the time-current characteristic of the MCCBs, that the isolation devices would perform their safety function to isolate the nonsafety related instrument bus from the safety-related instrument power bus before the safety bus could be affected by a fault on the nonsafety related load. The inspectors determined that the finding was of very-low safety significance (Green) because it 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 that there was no cross-cutting aspect associated with this finding because the finding was not indicative of the licensee's current performance. (Section 1R21.3.b(1))

Inspection Report# : 2016008 *(pdf)*

Significance: G Mar 25, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Verify Air Intake for Diesel Driven Auxiliary Feedwater Pump was Adequately Protected from a High Energy Line Break. (Section 1R21.3b (2))
The inspectors identified a finding of very low safety significance (Green) and an associated NCV of Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion III, "Design Control," for the failure to verify the adequacy of the diesel driven Auxiliary Feedwater (AFW) pump design. Specifically, the licensee failed to verify the diesel driven AFW pump could perform its safe shutdown function following a high energy line break (HELB) in the Turbine Building. Since the diesel's air intake was located in the Turbine Building, it would be impacted by a HELB. The licensee entered this issue into its Corrective Action Program and took immediate corrective actions by declaring the diesel driven AFW pump inoperable and then implementing a temporary plant modification to relocate the diesel air intake to the Auxiliary Building where it is not susceptible to a HELB to restore operability of the pump. The licensee's planned corrective actions are to complete a permanent plant modification to relocate the air intake to a location that is not susceptible to a HELB.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of design control and adversely affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to verify that the diesel driven AFW pump could perform its safety function

following a HELB event in the Turbine Building did not ensure its availability, reliability, and capability to respond to the initiating event. Since the finding did represent an actual loss of function of at least a single Train for greater than its Technical Specification Allowed Outage Time, a Detailed Risk Evaluation was performed which concluded that the estimated change in core damage frequency was approximately 3.4E-7/yr., which represents a finding of very-low safety significance (Green). The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not indicative of the licensee's current performance. (Section 1R21.3.b(2))

Inspection Report# : 2016008 *(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.

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.

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

Last modified : February 01, 2017