



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

May 7, 2018

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2—NRC DESIGN BASES ASSURANCE
INSPECTION (TEAMS) INSPECTION REPORT 05000454/2018010;
05000455/2018010

Dear Mr. Hanson:

On February 8, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed a Triennial Baseline Design Bases Assurance Inspection (Teams) at your Byron Station, Units 1 and 2. On April 12, 2018, the NRC inspectors discussed the results of this inspection with Mr. Kanavos, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

Based on the results of this inspection, the NRC has identified three issues that were evaluated under the risk significance determination process as having very-low safety significance (Green). The NRC has also determined that three violations are associated with these issues. Because the licensee initiated condition reports to address these issues, these violations are being treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the Enforcement Policy. These NCVs are described in the subject inspection report.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspector at the Byron Station.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; and the NRC resident inspector at Byron Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations*, Part 2.390, "Public Inspections, Exemptions, and Requests for Withholding."

Sincerely,

/RA/

Mark Jeffers, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-454; 50-455
License Nos. NPF-37; NPF-66

Enclosure:
IR 05000454/2018010; 05000455/2018010

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Letter to Bryan C. Hanson from Mark Jeffers dated May 7, 2018

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Numbers: 50-454; 50-455; 72-68

License Numbers: NPF-37; NPF-66

Report Numbers: 05000454/2018010; 05000455/2018010

Enterprise Identifier: I-2018-010-0005

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: January 22, 2018, through February 8, 2018

Inspectors: N. Féliz-Adorno, Senior Reactor Inspector, Lead
J. Benjamin, Senior Reactor Inspector, Operations
J. Robbins, Reactor Inspector, Electrical
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S. Kobylarz, Electrical Contractor
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Observers: V. Petrella, Reactor Inspector
J. Corujo, Reactor Inspector

Approved by: Mark Jeffers, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee’s performance by conducting a Design Bases Assurance Team Inspection at Byron Station, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC’s program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. NRC-identified findings, violations, and additional items are summarized in the table below.

List of Findings and Violations

Failure to Prescribe Motor Driven Auxiliary Feedwater Pump Test Procedures that Accounted for the Allowed Emergency Diesel Generator Frequency Variation			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000454/2018010-01; 05000455/2018010-01 Closed	[P.2] – Problem Identification and Resolution, Evaluation	IP71111.21M
<p>The inspectors identified a Green finding and an associated Non-Cited Violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (CFR), Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” for the failure to prescribe motor driven auxiliary feedwater pump test procedures that accounted for the allowed emergency diesel generator frequency variation. Specifically, the motor driven auxiliary feedwater pump surveillance procedures would allow a pump with degraded and unacceptable performance to meet the test acceptance criteria based upon the test being performed at nominal frequency and not accounting for potentially lower, allowable, emergency diesel generator frequency.</p>			

Failure to Periodically Test Instrument Air Check Valves Associated with Air-Operated Containment Isolation Valves			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000454/2018010-02; 05000455/2018010-02 Closed	None	IP71111.21M
<p>The inspectors identified a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XI, “Test Control,” for the failure to periodically test instrument air check valves associated with air-operated containment isolation valves. Specifically, the licensee was not periodically testing the check valves designed to close and maintain sufficient pneumatic pressure in the accumulator tanks installed to closed air-operated containment isolation valves 1(2)RF026 and 1(2)RF027 in response to a containment isolation signal.</p>			

Failure to Verify the Adequacy of the Air Pressure Regulator Setpoint Value for Containment Isolation Valves 1(2)RF026			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000454/2018010-03; 05000455/2018010-03 Closed	None	IP71111.21M
<p>The inspectors identified a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to verify the adequacy of the air pressure regulator setpoint value for air-operated containment isolation valves 1(2)RF026. Specifically, these safety-related valves were located inside containment but the licensee did not verify that their air pressure regulator setpoint value was adequate to provide the motive force necessary to close them against containment accident pressure and within their allowable stroke times.</p>			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000454/2018010-04; 05000455/2018010-04	Use of 10 CFR 50.54(x) for Unit AFW Cross-Tie	IP71111.21M	Open

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter 2515, "Light-Water Reactor Inspection Program—Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.21M—Design Bases Assurance Inspection (Teams)

The inspectors selected the components listed below based, primarily, on the system approach. The inspectors evaluated the following components and listed applicable attributes; permanent modifications; operating experience; and previously identified inspection issues:

Component (4 Samples)

(1) Unit 1 Motor Driven Auxiliary Feedwater (MDAFW) Pump (1AF01PA)

- a) Material condition and configuration (i.e., visual inspection during a walkdown)
- b) Operating procedures
- c) Protection against flooding
- d) Protection against seismic events
- e) Maintenance effectiveness
- f) Component health, corrective maintenance, and corrective action history
- g) Consistency between station documentation (e.g., procedures) and vendor specifications
- h) Pump performance/capability calculations
- i) Runout and minimum flow
- j) Submergence (e.g., net positive suction head)
- k) Water supply availability
- l) Gas intrusion and hydraulic transients
- m) Surveillance and in-service testing (IST) procedures, acceptance criteria, and results
- n) Voltage available at motor during degraded voltage conditions
- o) Motor circuit breaker protective relay settings and calibration results
- p) Pump break horsepower load on motor

(2) Unit 1 Diesel-Driven Auxiliary Feedwater Pump (1AF01PB)

- a) Material condition and configuration (i.e., visual inspection during a walkdown)
- b) Operating procedures
- c) Protection against flooding
- d) Protection against seismic events
- e) Protection against high energy line breaks
- f) Maintenance effectiveness
- g) Component health, corrective maintenance, and corrective action history

- h) Consistency between station documentation (e.g., procedures) and vendor specifications
- i) Pump performance/capability calculations
- j) Runout and minimum flow
- k) Submergence (e.g., net positive suction head)
- l) Water supply availability
- m) Gas intrusion and hydraulic transients
- n) Room heat up and ventilation calculations
- o) Fuel oil volume consumption/capacity
- p) Surveillance and IST procedures, acceptance criteria, and results

(3) Unit 1 Diesel-Driven Auxiliary Feedwater Pump Battery (1AF01EA-A) and Charger (1AF01EA-1)

- a) Material condition and configuration (i.e., visual inspection during a walkdown)
- b) Operating procedures
- c) Maintenance effectiveness
- d) Component health, corrective maintenance, and corrective action history
- e) Consistency between station documentation (e.g., procedures) and vendor specifications
- f) Performance and discharge testing
- g) Battery sizing
- h) Duty Cycle
- i) Float and equalize voltages
- j) Battery loading
- k) Voltage drop calculation
- l) Minimum voltage
- m) Maximum allowed room temperature during normal operations
- n) Hydrogen concentration evaluation
- o) Battery life
- p) Battery charger sizing
- q) Cable ampacity
- r) Protective relays/breakers

(4) 120V Alternating Current Instrument Bus (1IP01J)

- a) Material condition and configuration (i.e., visual inspection during a walkdown)
- b) Operating procedures
- c) Protection against flooding
- d) Protection against a seismic event
- e) Maintenance effectiveness
- f) Component health, corrective maintenance, and corrective action history
- g) Consistency between station documentation (e.g., procedures) and vendor specifications
- h) Bus loading and voltage
- i) Inverter and bus capacity
- j) Overcurrent protection and coordination
- k) Inverter and constant voltage transformer overcurrent capability
- l) Protective device selection and settings
- m) Inverter operation and alarm response procedure
- n) Load and Technical Specifications surveillance testing

Component Large Early Release Frequency (1 Sample)

- (1) Containment Floor Drain Discharge Isolation Valves (1/2RF026/27)
 - a) Material condition and configuration (i.e., visual inspection during a walkdown)
 - b) Operating procedures
 - c) Protection against flooding
 - d) Protection against seismic events
 - e) Maintenance effectiveness
 - f) Component health, corrective maintenance, and corrective action history
 - g) Consistency between station documentation (e.g., procedures) and vendor specifications
 - h) Valve performance evaluations (e.g., weak link)
 - i) Instrument air supply and accumulator design
 - j) Air supply pressure control setpoint
 - k) Leakage test procedure and results
 - l) Surveillance and IST procedures, acceptance criteria, and results
 - m) Control logic design

Permanent Modification (5 Samples)

- (1) Engineering Change (EC) 389241, "Degraded Voltage 5 Minute Timer Resolution (Unit 1);"
- (2) EC 386525, "Design Change to AFW Suction Pressure Logic (Unit 2);"
- (3) EC 382146, "Replacement of Instrument Power Inverter 111 (1IP05E) and Connection to Division 11 constant voltage transformer (CVT) (1IP01E);"
- (4) EC 362858, "Installation of Unit 1 Portion of 1A and 2A MDAFW Pumps Unit 1 and 2 Cross-tie Line;" and EC 362168, "Second Phase Final Tie-in to Unit 2 for the Unit 1 and 2 MDAFW Pumps Cross-tie;" and
- (5) EC 406221, "Reroute AFW Diesel Combustion Air Intake to 364' General Area."

Operating Experience (2 Samples)

- (1) U.S. Nuclear Regulatory Commission Information Notice 2005-30, "Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design;" and
- (2) U.S. Nuclear Regulatory Commission Information Notice 84-06, "Steam Binding of Auxiliary Feedwater Pumps."

Review of Previously Identified Inspection Issues

- (1) Non-Cited Violation 05000454/2012007-04; 05000455/2012007-04, "Design Analyses Did Not Adequately Address Potential Flooding of the Auxiliary Building;" and
- (2) Non-Cited Violation 05000454/2015008-08; 05000455/2015008-08, "Failure to Provide Proper Direction for Low Level Isolation of the Refueling Water Storage Tank in Emergency Operating Procedures."

INSPECTION RESULTS

71111.21M—Design Bases Assurance Inspection (Teams)

Failure to Prescribe Motor Driven Auxiliary Feedwater Pump Test Procedures that Accounted for the Allowed Emergency Diesel Generator Frequency Variation			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000454/2018010-01; 05000455/2018010-01 Closed	[P.2] – Problem Identification and Resolution, Evaluation	IP71111.21M
<p>The inspectors identified a Green finding and an associated Non-Cited Violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (CFR), Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” for the failure to prescribe motor driven auxiliary feedwater (MDAFW) pump test procedures that accounted for the allowed emergency diesel generator (EDG) frequency variation. Specifically, the MDAFW pump surveillance procedures would allow a pump with degraded and unacceptable performance to meet the test acceptance criteria based upon the test being performed at nominal frequency and not accounting for potentially lower, allowable, EDG frequency.</p> <p><u>Description:</u> Technical Specification 3.8.1, “AC Sources-Operating,” included surveillance requirements that allowed a steady-state EDG frequency variation range of 58.8 to 61.2 hertz. On February 26, 2008, the licensee initiated AR 00741054 to document that this EDG frequency variation was not addressed in calculations. At the time of this inspection, the licensee was still in the process of implementing their long-term corrective actions to restore compliance.</p> <p>However, on February 7, 2018, the inspectors noted that the MDAFW pump surveillance test procedures included an acceptance criteria that did not account for the minimum frequency limit value and the test was conducted at the nominal frequency value. Lower frequency conditions reduce pump performance. The licensee subsequently determined that they should have included an administrative limit on the steady state lower frequency band in the MDAFW procedures while they resolve the problem identified in 2008.</p> <p><u>Corrective Actions:</u> The licensee was still evaluating its planned corrective actions at the time of the inspection. However, the inspectors determined that the continued non-compliance does not present an immediate safety concern because the licensee reviewed recent MDAFW pump surveillance results and determined that there was sufficient margin to account for the frequency variations observed during recent EDG surveillances. In addition, the licensee initiated an extent of condition and preliminarily determined that similar conditions were applicable to other safety-related rotating equipment.</p> <p>Corrective Action Reference: AR 04101772</p>			

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to prescribe MDAFW pump test procedures that accounted for the allowed EDG frequency variation was contrary to 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and was a performance deficiency.

Screening: The performance deficiency 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, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the MDAFW pump surveillance procedures did not ensure that the pump would be capable of providing its minimum required flow rate under lower EDG frequency conditions.

Significance: The finding was evaluated using the Significance Determination Process (SDP) in accordance with Inspection Manual Chapter (IMC) 0609 Appendix A, "The Significance Determination Process for Findings At-Power," using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee evaluated the most recent data and reasonably determined that the rotating equipment driven by the EDGs were operable.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Evaluation component of the Problem Identification and Resolution cross-cutting area, which states that the licensee will thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the licensee was still in the process of implementing their long-term corrective actions to restore compliance for the issue identified in 2008 and did not thoroughly evaluate it to ensure that interim resolutions address the impact of the allowed EDG frequency variation to rotating equipment. (P.2)

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances. The licensee established 1(2)BOSR 5.5.8.AF.5-1c, "Comprehensive IST requirements for the MDAFW pump 1(2)AF01PA," Revisions 8 (Unit 1) and 7 (Unit 2), as the implementing procedure for MDAFW pump surveillance testing, an activity affecting quality.

Contrary to the above, as of February 7, 2018, the licensee failed to have a procedure for conducting MDAFW pump surveillance testing of a type appropriate to the circumstances. Specifically, procedure 1(2)BOSR 5.5.8.AF.5-1c did not account for the allowed EDG frequency variation, which would allow a pump with unacceptable performance to pass the established acceptance criteria and therefore, go undetected when operating at a lower allowable EDG frequency during an actual event.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Periodically Test Check Valves Associated with Air-Operated Containment Isolation Valves

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000454/2018010-02; 05000455/2018010-02 Closed	None	IP71111.21M

The inspectors identified a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the failure to periodically test instrument air check valves associated with air-operated containment isolation valves. Specifically, the licensee was not periodically testing the check valves designed to close and maintain sufficient pneumatic pressure in the accumulator tanks installed to close air-operated containment isolation valves 1(2)RF026 and 1(2)RF027 in response to a containment isolation signal.

Description: The containment isolation valves 1(2)RF026 and 1(2)RF027 are air-operated valves and their actuators were designed to "fail-as-is" in the event of a loss of air. To ensure they would close, as required, in response to a containment isolation signal, they were provided with air accumulator tanks to preserve sufficient pneumatic pressure in the event of a loss of instrument air. The air accumulator tanks were isolated from the non-safety related air supply by check valves and these check valves needed to close in order to preserve sufficient pneumatic pressure to close the 1(2)RF026 and 1(2)RF027 valves. However, on January 23, 2018, the inspectors noted that these check valves were not subject to periodic testing in the closed direction.

Corrective Actions: As an immediate corrective action, the licensee developed a test instruction, tested the check valves, and determined that they were operable. The proposed plan to restore compliance at the time of the inspection included implementing periodic testing of the instrument air check valves in the closed direction.

Corrective Action References: AR 04096766 and AR 04098736

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to periodically test the check valves associated with air-operated containment isolation valves 1(2)RF026 and 1(2)RF027 was contrary to 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," and was a performance deficiency.

Screening: The performance deficiency was more-than-minor because, if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the failure to periodically test the check valves associated with air-operated containment isolation valves 1(2)RF026 and 1(2)RF027 would have the potential to allow an inoperable containment isolation condition to go undetected.

Significance: The finding was evaluated using the SDP in accordance with IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," using Exhibit 3, "Barrier Integrity Screening Questions." The finding screened as of very-low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, and heat removal components, and did not involve an actual reduction in function of hydrogen igniters in the reactor containment. The licensee evaluated equipment condition through testing and reasonably determined that the containment isolation valves were operable.

Cross-cutting Aspect: No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.

Contrary to the above, as of January 23, 2018, the licensee failed to assure that testing required to demonstrate that the safety-related containment isolation valves 1(2)RF026 and 1(2)RF027 would perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporated the requirements and acceptance limits contained in applicable design documents. Specifically, the licensee was not periodically testing the check valves designed to close and maintain sufficient pneumatic pressure in the accumulator tanks installed to closed air-operated containment isolation valves 1(2)RF026 and 1(2)RF027 in response to a containment isolation signal.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Verify the Adequacy of the Air Pressure Regulator Setpoint Value for Containment Isolation Valves 1(2)RF026

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000454/2018010-03; 05000455/2018010-03 Closed	None	IP71111.21M

The inspectors identified a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to verify the adequacy of the air pressure regulator setpoint value for air-operated containment isolation valves 1(2)RF026. Specifically, these safety-related valves were located inside containment but the licensee did not verify that their air pressure regulator setpoint value was adequate to provide the motive force necessary to close them against containment accident pressure and within their allowable stroke times.

Description: The air-operated containment isolation valves 1(2)RF026 were located inside containment and relied on air accumulators to supply the motive force necessary to close. Their pressure regulators were set to a value of 60 psig. However, during this inspection, the licensee was unable to retrieve an analysis or vendor document that established the basis for this setpoint value. Upon further review, the inspectors challenged the setpoint value capability to close the valves against containment pressure under accident conditions. As a result, on February 6, 2018, the licensee completed an informal analysis that determined that the 60 psig setpoint value was insufficient to provide the necessary motive force to close the valves against containment accident pressure if the valves degrade to their maximum allowable in-service testing and technical specification stroke time values.

Corrective Actions: As an immediate corrective action, the licensee performed an informal analysis and reasonably determined that the valves would close during an accident based on an estimated containment pressure value determined using recent actual valve stroke times. The proposed plan to restore compliance at the time of the inspection included performing a formal calculation to establish an appropriate air regulator setting for valves 1(2)RF026.

Corrective Action Reference: AR 04101416

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to verify the adequacy of the air pressure regulator setpoint value for air-operated containment isolation valves 1(2)RF026 was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency.

Screening: The performance deficiency was more than minor because it adversely affected the structure, system, or component (SSC) and Barrier Performance attribute of the Barrier Integrity cornerstone objective of ensuring that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to verify the adequacy of the air pressure regulator setpoint value for containment isolation valves 1(2)RF026 does not ensure that the valves would close on a containment isolation signal to protect the public from radionuclide releases caused by accidents or events.

Significance: The finding was evaluated using the SDP in accordance with IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," using Exhibit 3, "Barrier Integrity Screening Questions." The finding screened as of very low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, and heat removal components, and did not involve an actual reduction in function of hydrogen igniters in the reactor containment. The licensee performed an informal analysis and reasonably determined that the containment isolation valves were operable in their current condition (i.e., not degraded to their maximum allowable in-service testing and technical specifications stroke time values).

Cross-cutting Aspect: No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that the licensee provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of February 6, 2018, the licensee failed to verify the adequacy of design. Specifically, air-operated containment isolation valves 1(2)RF026 were located inside containment but the licensee did not verify that their air pressure regulator setpoint value was adequate to provide the motive force necessary to close the safety-related valves against containment accident pressure and within their allowable stroke times.

Disposition: This violation is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Unresolved Item	Use of 10 CFR 50.54(x) for Unit AFW Cross-Tie 05000454/2018010-004; 05000455/2018010-004 Opened	IP 71111.21M
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Description: In 2008, the licensee added steps to Emergency Operating Procedure (EOP) 1/2BFR-H.1, "Response to Loss of Secondary Heat Sink," to use the MDAFW train of a non-accident unit to combat a loss of all feedwater event in the opposite unit by using a recently installed unit cross-tie. The EOPs also directed operators to enter the technical specification LCO action statement for the unit donating the MDAFW train because the MDAFW trains were not designed and licensed to be shared between the reactor units.

In 2011, the resident inspectors noted that the EOP change resulted in more than a minimal increase in the likelihood of occurrence of a malfunction of a SSC important to safety previously evaluated in the Updated Final Safety Analysis Report because the Updated Final Safety Analysis Report described the MDAFW trains as non-shared systems. However, the licensee implemented this change without prior NRC approval. As a result, the inspectors documented a Severity Level IV NCV of 10 CFR 50.59 in Inspection Report 05000454/2011004; 05000455/2011004 as NCV 05000454/2011004-02; 05000455/2011004-02, "Modification of the Auxiliary Feedwater System Without Prior NRC Approval" (REF: Accession No. ML 113070678).

As corrective actions to this NCV, the licensee removed the steps in the EOPs that directed the unit cross-tie to be used and removed credit for the cross-tie in the station's Probabilistic Risk Assessment model. However, on August 8, 2017, the licensee added direction in EOP 1/2BFR-H.1 to use the Unit Auxillary Feedwater cross-tie by invoking 10 CFR 50.54(x). Specifically, the change added a "note" and a "caution" that provided direction to initiate the MDAFW unit cross-tie before bleed and feed.

The note stated: "If at any time it has been determined that restoration of feed flow to any SG is untimely or may be ineffective in heat sink restoration, then the AF crosstie should be implemented per Step 5 (Page 8)." The caution stated: "The AF crosstie should be implemented per Step 5 if other attempts to restore feed flow to the SG(s) will not prevent the initiation of feed and bleed." Step 5 provided instructions on how to perform the cross-tie and did not include instructions on when to initiate it. The caution also stated "Use of the AF crosstie requires invoking 50.54(x)."

During this inspection period, the inspectors challenged the use of 10 CFR 50.54(x) to implement this permanent change. In addition, the inspectors noted that the licensee's 10 CFR 50.59 screening for the procedure change did not include in its review the added note and caution statements. Because the added note and caution were the only procedure provisions that provided direction on when to use the MDAFW cross-tie, the 10 CFR 50.59 screening did not review the instructions about when to use the MDAFW cross-tie. As a result, the screening failed to determine that the change may have required a technical specification change and, thus, a license amendment as originally planned.

At the end of the inspection, the NRC continued to evaluate if a performance deficiency and or violation occurred. This Unresolved Item will remain open pending the outcome of this ongoing review.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure. No proprietary information was documented in this report.

- On February 23, 2018, the inspectors presented the interim inspection results to Mr. Kanavos, Site Vice President, and other members of the licensee staff.
- On April 5, 2018, the inspectors presented the final inspection results during the exit meeting to Mr. Kanavos, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

71111.21M—Design Bases Assurance Inspection (Teams)

- Data File; ELMS-AC Block Motor Start Reports; Revision 1A
- 19-AN-28; Second-Level and Third-Level Undervoltage Relay Setpoint; Revision 1C
- PSA-B-98-05; Analysis of AFWS Pump Suction Transients using SX Water Supply for Byron and Braidwood Stations; Revision 0A
- BYR01-086; Motor Operated Valves Actuator Terminal Voltage and Thermal Overload Sizing Calculation – Auxiliary Feedwater System; Revision 1A
- BAR 2-21-C7; Alarm: BUS 242 Overload or Voltage Low; Revision 11
- BAR 2-22-C7; Alarm: BUS 242 Overload or Voltage Low; Revision 11
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- BOP SX-1; Essential Service Water Pump Startup; Revision 31
- BOP CC-1; Component Cooling Water System Startup; Revision 12
- 1BEP 0; Reactor Trip or Safety Injection; Revision 301
- 1BEP 1; Loss of Reactor or Secondary Coolant; Revision 300
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- 1BEP 3; Steam Generator Tube Rupture; Revision 301
- 1BEP ES-0.1; Reactor Trip Response; Revision 300
- 1BEP ES-1.2; Post LOCA Cooldown and Depressurization; Revision 300
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- 1BCA 0.0; Loss of All AC Power Unit 1; Revision 300
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- 1BOA ELEC-5; Local Emergency Control of Safe Shutdown Equipment; Revision 106
- 1BOA SEC-7; Auxiliary Feedwater Check Valve Leakage; Revision 104
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- 1BOA ELEC-2; Loss of Instrument Bus Unit 1; Revision 109
- 1BOA ELEC-4; Loss of Offsite Power Unit 1; Revision 113
- 1BOA ELEC-7; Loss of Annunciators Unit 1; Revision 3
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- BAR 2-22-C7; Bus 242 Overload or Volt Low; Revision 1
- BAR 1-21-C7; Bus 141 Overload or Volt Low; Revision 12
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- BOP DO-13; Filling the Unit 1 Diesel Auxiliary Feedwater Pump Day Tank; Revision 15
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- BOP IP-7; Operation of the Constant Voltage Transformer with the Instrument Inverter Supplying the Respective Bus; Revision 3
- BOP IP-8; Startup of the Constant Voltage Transformer to Power the Instrument Bus with the Associated Inverter unavailable; Revision 3
- BAR 1-4-A5; Alarm No. 1-4-A5 Bus 111 Inverter Trouble; Revision 2
- 1BOSR IP-R1; Instructions to Cycle Instrument Bus 111 Distribution Panel Molded Circuit Breakers; Revision 3
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- 2BOSR SX-M1; 2A AFW Pump SX Suction Line Monthly Flushing Surveillance; Revision 11
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- 2BOSR 0.5-3.AF.1-2; ASME Surveillance Requirements for the B Train Auxiliary Feedwater SX Supply Valves; Revision 19
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- 1BEP-1; Loss of Reactor or Secondary Coolant; Revision 300
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- 6E-1-4030IP01, Sheet 3; Schematic Diagram 10 KVA Inverter for Instrument Bus 11 (1IP05E) Part 3; Revision A
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- M-37; Diagram of Auxiliary Feedwater; Revision BF
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- EC 386525; Design Change to AFW Suction Pressure Logic (Unit 2); Revision 4
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- EC 378684; Installation of Drain on Shell Side of Jacket Water Cooler (2SX01K) and Installation of Continuous Vent on the Thermostats for 2B AFW Diesel (2AF01PB-K); Revision 2
- 6E-15-118/BRW-S-2015-139; 50.59 Screening - Provide Clarification for the Start Time of Passive Leakage Post-LOCA; Revision 0

Corrective Action Documents Generated as a Result of the Inspection

- AR 04096381; DBAI NRC Identified – AF Proc's Call Out Removed Petcocks; 01/23/2018
- AR 04096346; DBAI Housekeeping Issue Identified by NRC; 01/23/2018
- AR 04097122; DBAI NRC Identified Clarification to 1/2 BFR H.1; 01/25/2018
- AR 04099722; 2018 NRC DBAI: Nickel Cadmium Battery Float Voltage Range; 02/01/2018
- AR 04101248; 2018 NRC DBAI: AFW Nickel Cadmium Battery Sizing; 02/06/2018
- AR 04096403; NRC identified oil leak on oil reservoir cover of 1AF01PA; 01/23/2018
- AR 04102086; 2018 DBAI: Fault on NSR Loads Supplied by Instrument Inverter; 02/08/2018
- AR 04096326; NRC Identified Loose Latch on Cabinet Door; 01/23/2018
- AR 04096766; DBAI Identified – Check Valve Testing on 1(2)RF026/27; 01/24/2018
- AR 04096407; DBIA Housekeeping – 1HS-AF152 Panel Has Loose Clamps; 01/23/2018
- AR 04096409; DBIA Housekeeping – Panel For 2HS-AF134 Needs Clamps Tightened; 01/23/2018
- AR 04101772; NRC DBAI – EDG Steady State Lower Frequency Admin Limit; 02/07/2018
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- AR 04097360; DBAI; NRC Identified Housekeeping Issue; 01/23/2018
- AR 04101795; NRC Question on 50.59 Screening for BFR H.1; 02/07/2018