UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
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LISLE, IL 60532-4352

November 8, 2016

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

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION REPORT 05000456/2016003 AND 05000457/2016003

Dear Mr. Hanson:

On September 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Braidwood Station, Units 1 and 2. On October 12, 2016, the NRC inspectors discussed the results of this inspection Ms. M. Marchionda, Site Vice President, and other members of your staff. The inspectors documented the results of this inspection in the enclosed inspection report.

Based on the results of this inspection, the NRC identified two issues that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC also determined that violations are associated with these issues. Because issue reports were initiated 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: (1) the Regional Administrator, Region III; (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001; and (3) the NRC Resident Inspector at the Braidwood Station.

In addition, if you disagree with the cross-cutting aspect assignment to any finding 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 Regional Administrator, Region III, and the NRC Resident Inspector at the Braidwood Station.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC’s Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Eric R. Duncan, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50–456 and 50–457
License Nos. NPF–72 and NPF–77

Enclosure:
IR 05000456/2016003, 05000457/2016003

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50–456; 50–457
License Nos:	NPF–72; NPF–77
Report No:	05000456/2016003; 05000457/2016003
Licensee:	Exelon Generation Company, LLC
Facility:	Braidwood Station, Units 1 and 2
Location:	Braceville, IL
Dates:	July 1, 2016 through September 30, 2016
Inspectors:	D. Betancourt, Acting Senior Resident Inspector E. Sanchez-Santiago, Acting Senior Resident Inspector D. Sargis, Acting Resident Inspector T. Go, Health Physicist M. Holmberg, Senior Reactor Inspector
Approved by:	E. Duncan, Chief Branch 3 Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report 05000456/2016003; 05000457/2016003; 07/01/2016 – 09/30/2016; Braidwood Station, Units 1 and 2; Operability Determinations and Functional Assessments, Surveillance Testing.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors. The findings were considered Non-Cited Violations (NCVs) of U.S. Nuclear Regulatory Commission (NRC) regulations. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated August 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG–1649, "Reactor Oversight Process," dated July 2016.

NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. 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 (H.4). (Section 1R15.1)

- Green. 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 (H.9). (Section 1R22.1)

Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power for the entire inspection period with one exception. On September 26, 2016, the unit was shut down for a planned refueling outage. The unit remained shut down at the conclusion of the inspection period.

Unit 2 operated at or near full power for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- Unit 1 Train A (1A) residual heat removal (RHR) during 1B RHR maintenance;
- Unit 2 Train B (2B) containment spray following maintenance;
- 1A AF with 1B Auxiliary Feedwater (AF) out-of-service; and
- Unit 2 Train A (2A) containment spray following maintenance.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, the Updated Final Safety Analysis Report (UFSAR), Technical Specification (TS) requirements, outstanding work orders (WOs), issue reports (IRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

These activities constituted four partial system walkdown samples as defined in Inspection Procedure (IP) 71111.04–05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on the availability, accessibility, and condition of firefighting equipment in the following risk-significant plant areas:

- 1A diesel oil storage tank room – Fire Zone 10.2–1;
- Lake Screenhouse – Fire Zone 18.12–0;
- Unit 2 cable spreading room – Fire Zone 3.2D–2;
- 1B/2B Essential Service Water (SX) pump room – Fire Zone 11.1B–0; and
- Fuel Handling Building – Fire Zone 12.1–0.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan.
The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment.

These activities constituted five quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On August 17, 2016, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and that training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment.

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation During Periods of Heightened Activity or Risk (71111.11Q)

a. Inspection Scope

On September 25, 2016, the inspectors observed power reduction evolutions in the control room that were associated with a planned Unit 1 shut down for a refueling outage (A1R19). This was an activity that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas:

- licensed operator performance;
- clarity and formality of communications;
- prioritization, interpretation, and verification of annunciator alarms);
- correct use and implementation of procedures; and
- oversight and direction from supervisors; and

The performance in these areas was compared to pre-established operator action expectations, procedural compliance and task completion requirements. Documents reviewed are listed in the Attachment.

This inspection constituted one quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- Unit 2 SX pumps; and
- Unit 2 containment chillers.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for systems, structures, and components (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12–05.

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Planned Yellow Risk - RHR 1B system outage window (SOW);

- Planned Yellow Risk - Unit 2 fuel pool cooling SOW;
- Planned Yellow Risk – 1A SX water strainer differential pressure switch and 1A AF suction press calibration;
- Unplanned Yellow Risk – adverse weather; and
- Planned Yellow Risk – main auxiliary building vent SOW.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

Documents reviewed during this inspection are listed in the Attachment. These maintenance risk assessments and emergent work control activities constituted five samples as defined in IP 71111.13–05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- IR 2691451 – gas void in AF pump suction;
- IR 2700162 – high energy line break door found ajar;
- IR 2701421 – scaffolds erected in proximity to safety-related equipment;
- IR 2692376 – seismic concern with open panel doors; and
- IRs 2710872 and 2718553 – 2A SX pump operability.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to the licensee’s evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the

evaluations. Additionally, the inspectors reviewed a sample of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment.

This operability inspection constituted five samples as defined in IP 71111.15–05.

b. Findings

(1) Failure to Erect Scaffolding in Accordance with Station Procedures

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to account for seismic movements of safety-related equipment in close proximity to scaffolds in accordance with NES–MS–04.1, "Seismic Prequalified Scaffolds." Specifically, the licensee erected four scaffolds within 3 inches of safety-related equipment without engineering approval for less than minimum clearances, including one scaffold that was in contact with a safety-related valve.

Description: On August 5, 2016, an NRC inspector identified a scaffold in close proximity to the 2B AF pump. The inspector questioned the seismic qualification of the scaffold since it was in close proximity to the pump, and portions of the scaffold were above the pump. Station Procedure MA–AA–716–025, "Scaffold Installation, Modification, and Removal Request Process," includes a request form entitled, "Non-Permanent Scaffold Request Form," which was required to be completed prior to erecting scaffolds. The inspectors reviewed this form for the scaffold in the 2B AF pump room and noted that Section B.1 of the Form asks the requester if the scaffold can be erected per Station Seismic Scaffold Criteria and Safety-Related Spacing criteria. The requester answered "Yes" to this question.

In response to the inspector's questions, the licensee referred to Table 2 of NES–MS–04.1, "Seismic Prequalified Scaffolds," Revision 7, which provided the horizontal clearance requirements to safety-related equipment for seismic scaffolds. The table was modified by three notes. Note 1 stated that "if the scaffold is tied-off, the above clearance requirements do not apply. (However, the movement of in-place systems/components as identified in Note 3 must be considered.)" Note 3 stated that for Braidwood, a 3 inch clearance shall be provided to account for movement of in-place systems/components, unless otherwise approved by Engineering.

The inspectors determined that the smallest clearance from the scaffold to the 2B AF pump was less than 1 inch. Therefore, the scaffold was required to be approved by engineering in accordance with NES–MS–04.1, Note 3, since it was within 3 inches of safety-related components. This scaffold had not been approved by engineering since the scaffold request form incorrectly stated that the scaffold could be erected in accordance with station seismic scaffold criteria. Subsequently, engineering performed an evaluation and determined that the scaffold would not have an impact on the 2B AF pump during a seismic event.

On August 12, 2016, the inspectors identified a scaffold that was in contact with the bonnet of valve 2CC9458, "Component Cooling Pump 2A and 2B Discharge Crosstie." Station Procedure MA–AA–796–024, "Scaffold Installation, Inspection, and Removal,"

Attachment 1, “Scaffold Inspection Checklist,” Item 16, required that scaffolds not be in contact with safety-related equipment. The inspectors notified the licensee who changed the configuration so that the scaffold pole was no longer in contact with the valve. An engineering review determined that the valve had remained operable. A review of the scaffold request form for this scaffold revealed that this scaffold also did not have engineering approval despite being within 3 inches of safety-related equipment.

The licensee captured the inspectors’ concerns into their CAP as IRs 2703650, 2703895, 2703967, and 2705092. Additionally, the licensee performed an extent of condition review and walked down all scaffolds to determine if they were built in accordance with station seismic criteria. The licensee identified two additional examples of scaffolds that were erected within 3 inches of safety-related components that did not have engineering approval. All of the above scaffolds were later reviewed by engineering and were determined to not impact the operability of safety-related components.

Analysis: The inspectors determined that the failure to account for seismic movements of safety-related equipment in close proximity to scaffolds in accordance with NES–MS–04.1, “Seismic Prequalified Scaffold,” was contrary to 10 CFR Part 50, Appendix B, Criterion V, and was a performance deficiency. Specifically, the licensee built four scaffolds within 3 inches of safety-related equipment without engineering approval for less than minimum clearances, including one scaffold that was in contact with a safety-related valve.

The inspectors determined that the performance deficiency was more than minor in accordance with IMC 0612, Appendix B, “Issue Screening,” dated September 7, 2012, 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 safety function during a seismic event. Additionally, the inspectors used IMC 0612, Appendix E, “Examples of Minor Issues,” dated August 11, 2009, and determined the performance deficiency was similar to Example 4.a and was more than minor because the licensee routinely failed to perform engineering evaluations on seismic scaffolds.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, “Significance Determination Process,” Attachment 0609.04, “Initial Characterization of Findings,” issued on October 7, 2016. Because the finding impacted the Mitigating Systems cornerstone, the inspectors screened the finding through IMC 0609, Appendix A, “The SDP for Findings At-Power,” issued on June 19, 2012, using Exhibit 2, “Mitigating System Screening Questions.” The finding screened as having very low safety significance (Green) because it did not result in the loss of operability or functionality of a Mitigating System. Specifically, an engineering evaluation reasonably determined that the configuration of the scaffold did not result in a loss of operability.

The inspectors determined that this finding had a cross-cutting aspect in the Human Performance area of Teamwork because individuals and work groups failed to communicate and coordinate their activities within and across organizational boundaries

to ensure nuclear safety was maintained. Specifically, there were multiple points in the scaffold erection process to engage other workgroups to ensure seismic qualification of scaffolds and in every example the coordination with other groups was insufficient to ensure nuclear safety was maintained. (H.4)

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, "Instruction, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures. The licensee established NES–MS–04.1, "Seismic Prequalified Scaffolds," Revision 7, as the implementing procedure that established the Station's Seismic Scaffold Criteria and Safety-Related Spacing criteria for the construction of seismically qualified scaffold, an activity affecting quality.

Procedure NES–MS–04.1, Section 7.0, "General Scaffold Requirements," Item 6 states, in part, that adequate horizontal and vertical clearances between scaffolds and operable, safety-related equipment and components shall be maintained at all times. Thermal and seismic movements of safety-related piping/equipment are not included in the clearance table and shall be considered.

Note 3 of Table 2 states, in part, that for Braidwood, a 3 inch clearance shall be provided to account for movement of in-place systems/components, unless otherwise approved by Engineering.

Contrary to the above, from July 25, 2016 to August 12, 2016, the licensee failed to follow Section 7, Item 6 of Procedure NES–MS–04.1 as modified by Note 3 of Table 2.

Specifically, personnel that erected scaffolds failed to obtain approval from engineering for scaffolds built within 3 inches of safety-related equipment.

Corrective actions for this issue included performing walkdowns of installed scaffolds to ensure that they were in compliance with NES–MS–04.1, and the licensee performed refresher training for all personnel involved in the building and inspection of scaffolds. Because this violation was of very low safety significance and it was entered into the licensee's CAP as IR 2703650, IR 2703895, IR 2703967, and IR 2705092 this violation is being treated as a NCV, consistent with Section 2.3.2.a of the Enforcement Policy. **(NCV 05000456/2016003–01; 05000457/2016003–01, Failure to Erect Scaffolding in Accordance with Station Procedures)**.

1R18 Plant Modifications (71111.18)

.1 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following modifications:

- Unit 1 reactor vessel head cavitation peening review (partial sample); and
- Unit 1 and Unit 2 diesel driven AF pump air intake modifications.

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TSs, as applicable,

to verify that the modifications did not affect the operability or availability of the affected systems. The inspectors, as applicable, observed ongoing and completed work activities to ensure that the modifications were installed as directed and consistent with the design control documents; the modifications operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. As applicable, the inspectors verified that relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant modifications with operations, engineering, and training personnel to ensure that the individuals were aware of how the operation with the plant modificatiosn in place could impact overall plant performance. Documents reviewed are listed in the Attachment.

This inspection constituted one complete and one partial plant modification samples as defined in IP 71111.18–05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- 2RF027 containment isolation valve functional test following maintenance;
- 1B residual heat removal pump functional test following maintenance;
- 1RH619 valve functional test following maintenance;
- 1CC9412B valve functional test following maintenance;
- 2B AF pump test following air intake modification; and
- Unit 2 steam generator power operated relief valves functional test following maintenance.

These activities were selected based upon the SSC's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the

equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment.

This inspection constituted six post-maintenance testing samples as defined in IP 71111.19–05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Other Outage Activities

a. Inspection Scope

The inspectors evaluated outage activities for a planned refueling outage that began on September 25, 2016, and that was still in progress at the end of the inspection period. The inspectors reviewed activities to ensure that the licensee considered risk in developing, planning, and implementing the outage schedule.

The inspectors observed or reviewed the reactor shutdown and cooldown, outage equipment configuration and risk management, electrical lineups, selected clearances, control and monitoring of decay heat removal, control of containment activities, and identification and resolution of problems associated with the outage.

Documents reviewed are listed in the Attachment.

This inspection constituted a partial outage sample as defined in IP 71111.20–05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- 1A containment spray quarterly surveillance (Routine);
- 2B SX pump comprehensive test (Routine);
- 1B diesel generator monthly surveillance (Routine);
- 1B SX pump surveillance (Routine);
- Unit 1 main steam safety valve Trevi-testing (Routine);

- Unit 1 emergency core cooling system full flow test (Routine);
- Unit 2 SX valves stroke tests (IST); and
- local leak rate testing of 1VQ016 (CIV).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, sufficient to demonstrate operational readiness, and consistent with the system design basis;
- was plant equipment calibration correct, accurate, and properly documented;
- were as-left setpoints within required ranges; and was the calibration frequency in accordance with TSs, the UFSAR, plant procedures, and applicable commitments;
- was measuring and test equipment calibration current;
- was the test equipment used within the required range and accuracy, and were applicable prerequisites described in the test procedures satisfied;
- did test frequencies meet TS requirements to demonstrate operability and reliability;
- were tests performed in accordance with the test procedures and other applicable procedures;
- were jumpers and lifted leads controlled and restored where used;
- were test data and results accurate, complete, within limits, and valid;
- was test equipment removed following testing;
- where applicable for IST activities, was testing performed in accordance with the applicable version of Section XI of the ASME Code and were reference values consistent with the system design basis;
- was the unavailability of the tested equipment appropriately considered in the performance indicator data;
- where applicable, were test results not meeting acceptance criteria addressed with an adequate operability evaluation or was the system or component declared inoperable;
- where applicable for safety-related instrument control surveillance tests, was the reference setting data accurately incorporated into the test procedure;
- was equipment returned to a position or status required to support the performance of its safety functions following testing;
- were problems identified during the testing appropriately documented and dispositioned in the licensee's CAP;
- where applicable, were annunciators and other alarms demonstrated to be functional and were setpoints consistent with design requirements; and
- where applicable, were alarm response procedure entry points and actions consistent with the plant design and licensing documents.

Documents reviewed are listed in the Attachment.

This inspection constituted six routine surveillance testing samples, one IST sample, and one containment isolation valve (CIV) sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

(1) Failure to Follow Inservice Testing Requirements for the 2A Essential Service Water Pump Leads to an Invalid Test

Introduction: The inspectors identified a finding of very low safety significance (Green) 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 gpm as specified in Step 1.17 of the procedure, which ultimately resulted in an invalid test.

Description: On September 7, 2016, the licensee performed a comprehensive IST pump test of the 2A SX pump in accordance with procedure 2BwOSR 5.5.8.SX–6A, "Comprehensive Inservice Testing Requirements for 2A Essential Service Water Pump (2SX01PA)." Step 1.17 stated in part, "Throttle the following Component Cooling Heat Exchanger Outlet Valves….to establish flow rate (Qm) as close as possible to 24,000 gpm on the ultrasonic flowmeter." Step 1.19.a-c directed the licensee to record the pump differential pressure (dP) and determine whether the value was in the acceptable, alert or required action range and subsequently Step 1.19.d directed the licensee to record the flow rate read from the ultrasonic flowmeter. Step 1.19.d also identified an acceptable flow rate range of 23,520 gpm – 24,480 gpm, which represented +/- 2 percent of the 24,000 gpm reference point. During the performance of the test, the inspector observed that for a flow that was within the specified band in the procedure the licensee obtained data that was below 66.6 psid, which would fall within the Required Action range for dP. Based on the results obtained, the operators proceeded to lower the flow and performed various iterations of establishing the flow and taking the dP measurements until they were able to establish a flow low enough within the established band that the dP was within the Alert range with a value of 67.0 psid and an associated flow of 23,670 gpm.

Based on these observations, the inspectors were concerned with the licensee adjusting the valve position to establish flow in the lower end of the band in order to obtain an acceptable dP measurement, rather than establishing flow as close as possible to the reference point as required by the procedure. The inspectors shared their concerns with the licensee who stated that their belief was that although the reference point was 24,000 gpm, as long as they established flow within the +/-2 percent band they met the intent of the ASME Code. The licensee indicated that they established this acceptance band in accordance with NUREG–1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, and that it reflected the recommended allowed tolerance of +/-2 percent for flow. Additionally, regarding the practice of throttling flow to the lower end of the band, the licensee stated that it is not a usual or customary practice to re-read gauges during the testing with a purposeful intent to throttle lower in the acceptable band until a more favorable dP result was achieved.

The inspectors contacted the Office of Nuclear Reactor Regulation (NRR) staff and Region III IST experts to further understand Code requirements with regard to establishing flow during the test and the purpose of the +/-2 percent flow band. In particular, the inspectors wanted to understand if the Code required the flow rate to be established as close as possible to the reference point, or if, as stated by the licensee,

as long as the established flow was within the +/-2 percent band the intent of the Code was met. The following summarizes the requirements that were identified:

- ISTB–5123(b), "Comprehensive Test Procedure," stated that, "for centrifugal and vertical line shaft pumps, the resistance of the system shall be varied until the flow rate equals the reference point. The differential pressure shall then be determined and compared to its reference value."

- Section 5.3 of NUREG–1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, described the NRC's recommendations regarding an allowable variance from reference points and fixed-resistance systems and the basis for those recommendations. The NRC recommendation stated, in part, that, "if the design does not allow for establishing and maintaining flow at an exact value, achieving a steady flow rate…at approximately the set value does not require relief for establishing pump curves. It also stated, "The intent is that the variance in the reference value…[be] +/-2 percent for flow without requiring relief."

  In the basis for the recommendations the NUREG stated, "When the Code specifies that the system resistance must be varied until either the flow or differential pressure equals the corresponding reference value, it does not intend the set value to have an acceptable range as stated in the ISTB test acceptance criteria, including ISTB–5121–1 and ISTB–5221–1." In particular, the intent of this section is to establish that the Code requires the fixed reference point to be constant, and does not allow any band for setting the reference point (in Braidwood's case the flow). The +/- 2 percent band is intended to address the likelihood that it may not be possible to control flow rate to achieve an exact value.

  The NUREG also stated that, "Licensees may set the repeatable parameter as close as possible to the reference value during each test, rather than treating any variance in the value with a pump curve. If, upon establishing trends in data, the licensee determines that the parameter varies such that the readings are outside the accuracy of the instrument, the licensee may need to establish pump curves and propose an alternative to the Code requirements for the applicable pumps." The intent of this section was to establish that if the licensee determined they could not obtain stable values, and could not ensure the continued accuracy of the instrumentation that would maintain the reading within the 2 percent band, then they would be required to take additional actions. Actions could include establishing pump curves and proposing alternatives to the Code requirements.

Based on the information described above, the inspectors concluded that the licensee was not in compliance with procedural requirements with regard to not establishing flow as close as possible to the reference point when performing their ASME Code required pump tests. Additionally, the inspectors concluded that the September 7, 2016, test constituted an invalid test because it was not performed in accordance with procedural requirements. This conclusion was communicated to licensee management on September 21, 2016. On September 23, 2016, the comprehensive test was re-performed and the results of this second test placed the 2A SX pump in the Alert Range with a value of 66.9 psid and an associated flow of 23,769 gpm.

The licensee entered this issue into their CAP as IRs 2644532, and 2660824. Additionally, the licensee determined that there was a need to address knowledge deficiencies with regard to how their in-service testing surveillances were being performed. For this reason the licensee instituted a Standing Order which specified that for all in-service testing where flow is throttled to a reference point, that the flow should be established as close as possible to the reference point, and to not throttle flow down from the reference point to obtain more favorable results.

Analysis: The inspectors determined that the failure to establish a flow rate as close as possible to the reference point of 24,000 gpm, as specified in Step 1.17 of procedure 2BwOSR 5.5.8.SX–6A,"Comprehensive Inservice Testing Requirements for 2A Essential Service Water Pump," was contrary to 10 CFR Part 50, Appendix B, Criterion V, and was a performance deficiency.

The performance deficiency was determined to be 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 for ASME comprehensive testing led to an invalid test of the 2A SX pump on September 7, 2016.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on October 7, 2016. Because the finding impacted the Mitigating Systems cornerstone, the inspectors screened the finding through IMC 0609, Appendix A, "The SDP for Findings At-Power," issued on June 19, 2012 using Exhibit 2, "Mitigating System Screening Questions." The finding screened as having very low safety significance (Green) 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 SX pump remained operable.

The inspectors determined that this finding had a cross-cutting aspect in the Human Performance area of Training because the licensee did not provide training that ensured knowledge transfer to maintain a knowledgeable, technically competent workforce that stops when faced with uncertain conditions. Specifically, licensee staff in Operations and Engineering were under the impression that they did not need to establish flow as close as possible to 24,000 gpm. Instead they believed that the flow band allowed them to establish flow at any point within the band; therefore, when faced with results in the Required Action range, licensee staff incorrectly believed that they could lower flow to obtain a more favorable value provided flow was within the pre-established +/- 2 percent band. (H.9)

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instruction, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures. The licensee established procedure 2BwOSR 5.5.8.SX–6A, "Comprehensive Inservice Testing Requirements for 2A Essential Service Water Pump," Revision 9, as the implementing procedure for performing IST testing of the 2A SX pump, an activity affecting quality.

Procedure 2BwOSR 5.5.8.SX–6A, Step 1.17, stated, in part, to "throttle Component Cooling Water Heat Exchanger Outlet Valve(s) for the Component Cooling Water Heat Exchanger(s) to which the Unit 2 Essential Service Water is aligned to establish flow rate (Qm) as close as possible to 24,000 gpm on the ultrasonic flowmeter."

Contrary to the above, on September 7, 2016, the licensee failed to follow Step 1.17 of procedure 2BwOSR 5.5.8 SX–6A.

Specifically, during the performance of the test, the resident inspectors observed that the licensee did not established flow as close as possible to 24,000 gpm in order to obtain a dP value. Instead, based on the results obtained, which were in the Required Action band, operators proceeded to lower the flow and performed various iterations of establishing the flow and taking the dP measurements until they were able to establish a flow low enough in the band that the dP was within the Alert range.

The licensee's corrective action was to perform the IST comprehensive pump test in accordance with the procedure, which yielded satisfactory results. Additionally, the licensee instituted a Standing Order that specified that for all in-service testing where flow is throttled to a reference point, the flow should be established as close as possible to the reference point, and to not throttle flow down from the reference value to obtain more favorable results. Because this violation was of very low safety significance and it was entered into the licensee's CAP as IRs 2644532 and 2660824, this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy**. (NCV 05000456/2016003–02; 05000457/2016003–02, Failure to Follow Inservice Testing Requirements for the 2A Essential Service Water Pump Leads to an Invalid Test)**.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on August 31, 2016, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the control room simulator to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment.

This emergency preparedness drill inspection constituted one sample as defined in IP 71114.06–06.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Public Radiation Safety, and Occupational Radiation Safety

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

.1 Engineering Controls

a. Inspection Scope

The inspectors reviewed procedural guidance for use of ventilation systems, and assessed whether the systems were used, to the extent practicable, during high-risk activities to control airborne radioactivity and minimize the use of respiratory protection. The inspectors assessed whether installed ventilation airflow capacity, flow path, and filter/charcoal unit efficiencies for selected systems were consistent with maintaining concentrations of airborne radioactivity in work areas below the concentrations of an airborne area to the extent practicable. The inspectors also evaluated whether selected temporary ventilation systems used to support work in contaminated areas were consistent with licensee procedural guidance and as-low-as-reasonably-achievable.

The inspectors reviewed select airborne monitoring protocols to assess whether alarms and set points were sufficient to prompt worker action. The inspectors assessed whether the licensee established trigger points for evaluating levels of airborne beta-emitting and alpha-emitting radionuclides.

These inspection activities constituted one complete sample as defined in IP 71124.03–05.

b. Findings

No findings were identified.

.2 Use of Respiratory Protection Devices

a. Inspection Scope

The inspectors assessed whether the licensee provided respiratory protection devices for those situations where it was impractical to employ engineering controls such that occupational doses were as-low-as-reasonably-achievable. For select instances where respiratory protection devices were used, the inspectors assessed whether the licensee concluded that further engineering controls were not practical. The inspectors also assessed whether the licensee had established means to verify that the level of protection provided by the respiratory protection devices was at least as good as that assumed in the work controls and dose assessment.

The inspectors assessed whether the respiratory protection devices used to limit the intake of radioactive materials were certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration or have been approved by the NRC. The inspectors evaluated whether the devices were used consistent with their National Institute for Occupational Safety and Health/Mine Safety and Health Administration certification or any conditions of their NRC-approval.

The inspectors reviewed records of air testing for supplied-air devices and self-contained breathing apparatus (SCBA) bottles to assess whether the air used met or exceeded Grade D quality. The inspectors evaluated whether plant breathing air supply systems satisfied the minimum pressure and airflow requirements for the devices.

The inspectors evaluated whether selected individuals qualified to use respiratory protection devices had been deemed fit to use the devices by a physician.

The inspectors observed selected individuals donning, doffing, and functionally checking respiratory protection devices as appropriate and assessed whether these individuals knew how to safely use the device and how to properly respond to any device malfunction or unusual occurrence.

The inspectors observed the physical condition of respiratory protection devices ready for issuance and reviewed records of routine inspection for selected devices. The inspectors reviewed records of maintenance on the vital components for selected devices and assessed whether onsite personnel assigned to repair vital components received vendor-provided training.

These inspection activities constituted one complete sample as defined in IP 71124.03–05.

b. Findings

No findings were identified.

.3 Self-Contained Breathing Apparatus for Emergency Use

a. Inspection Scope

The inspectors reviewed the status and surveillance records for select SCBAs. The inspectors evaluated the licensee's capability for refilling and transporting SCBA air bottles to and from the control room and operations support center during emergency conditions.

The inspectors assessed whether control room operators and other emergency response and radiation protection personnel were trained and qualified in the use of SCBAs and evaluated whether personnel assigned to refill bottles were trained and qualified for that task.

The inspectors assessed whether appropriate mask sizes and types were available for use. The inspectors evaluated whether on-shift operators had no facial hair that would interfere with the sealing of the mask and that appropriate vision correction was available.

The inspectors reviewed the past 2 years of maintenance records for selected inservice SCBA units used to support operator activities during accident conditions. The inspectors assessed whether maintenance or repairs on an SCBA unit's vital components were performed by an individual certified by the manufacturer of the device to perform the work.

The inspectors evaluated the onsite maintenance procedures governing vital component work to determine whether there was any inconsistencies with the SCBA manufacturer's recommended practices. The inspectors evaluated whether SCBA cylinders satisfied the hydrostatic testing required by the U.S. Department of Transportation.

These inspection activities constituted one complete sample as defined in IP 71124.03–05.

b. Findings

No findings were identified.

.4 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors assessed whether problems associated with the control and mitigation of in-plant airborne radioactivity were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. Additionally, the inspectors evaluated the appropriateness of the corrective actions for selected problems involving airborne radioactivity documented by the licensee.

These inspection activities constituted one complete sample as defined in IP 71124.03-05.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

.1 Source Term Characterization

a. Inspection Scope

The inspectors evaluated whether the licensee had characterized the radiation types and energies being monitored and that the characterization included gamma, beta, hard-to-detects, and neutron radiation.

The inspectors assessed whether the licensee had developed scaling factors for including hard-to-detect nuclide activity in internal dose assessments.

These inspection activities constituted one complete sample as defined in IP 71124.04–05.

b. Findings

No findings were identified.

.2 External Dosimetry

a. Inspection Scope

The inspectors evaluated whether the licensee's dosimetry vendor was National Voluntary Laboratory Accreditation Program accredited and if the approved irradiation test categories for each type of personnel dosimeter used were consistent with the types and energies of the radiation present and the way the dosimeter was being used.

The inspectors evaluated the onsite storage of dosimeters before their issuance, during use, and before processing/reading. For personal dosimeters stored onsite during the monitoring period, the inspectors evaluated whether they were stored in low-dose areas with control dosimeters. For personal dosimeters that are taken off-site during the monitoring period, the inspectors evaluated the guidance provided to individuals with respect to care and storage of the dosimeter.

The inspectors evaluated the calibration of active dosimeters. The inspectors assessed the bias of the active dosimeters compared to passive dosimeters and the correction factor used. The inspectors also assessed the licensee's program for comparing active and passive dosimeter results, investigations for substantial differences, and recording of dose. The inspectors assessed whether there were adverse trends for active dosimeters.

These inspection activities constituted one complete sample as defined in IP 71124.04–05.

b. Findings

No findings were identified.

.3 Internal Dosimetry

a. Inspection Scope

The inspectors reviewed procedures used to assess internal dose using whole body counting equipment to evaluate whether the procedures addressed methods for differentiating between internal and external contamination, the release of contaminated individuals, the route of intake and the assignment of dose. The inspectors assessed whether the frequency of measurements was consistent with the biological half-life of the nuclides available for intake. The inspectors reviewed the licensee's evaluation for use of portal radiation monitors as a passive monitoring system to determine if instrument minimum detectable activities were adequate to detect internally deposited radionuclides sufficient to prompt additional investigation. The inspectors reviewed whole body counts and evaluated the equipment sensitivity, nuclide library, review of results, and incorporation of hard-to-detect radionuclides.

The inspectors reviewed procedures used to determine internal dose using in vitro analysis to assess the adequacy of sample collection, determination of entry route and assignment of dose. The inspectors reviewed select analyses for adequacy and assessed the laboratory's cross-check program to ensure quality assurance.

The inspectors reviewed the licensee's program for dose assessment based on air sampling, as applicable, and calculations of derived air concentration. The inspectors determined whether flow rates and collection times for air sampling equipment were adequate to allow lower limits of detection to be obtained. The inspectors also reviewed the adequacy of procedural guidance to assess internal dose if respiratory protection was used.

The inspectors reviewed select internal dose assessments and evaluated the monitoring protocols, equipment, and data analysis.

These inspection activities constituted one complete sample as defined in IP 71124.04–05.

b. Findings

No findings were identified.

.4 Special Dosimetric Situations

a. Inspection Scope

The inspectors assessed whether the licensee informs workers of the risks of radiation exposure to the embryo/fetus, the regulatory aspects of declaring a pregnancy, and the specific process to be used for declaring a pregnancy. The inspectors reviewed the records of selected individuals who had declared pregnancy during the current assessment period and evaluated whether the monitoring program for declared pregnant workers was technically adequate to assess the dose to the embryo/fetus. The inspectors assessed results and/or monitoring controls for compliance with regulatory requirements.

The inspectors reviewed the licensee's methodology for monitoring external dose in non-uniform radiation fields or where large dose gradients exist. The inspectors evaluated the licensee's criteria for determining when alternate monitoring was to be implemented. The inspectors reviewed dose assessments performed using multi-badging to evaluate whether the assessment was performed consistently with licensee procedures and dosimetric standards.

The inspectors evaluated the licensee’s methods for calculating shallow dose equivalent from distributed skin contamination or discrete radioactive particles. The inspectors reviewed select shallow dose equivalent dose assessments for adequacy.

The inspectors evaluated the licensee’s program for neutron dosimetry, including dosimeter types and/or survey instrumentation. The inspectors reviewed select neutron exposure situations and assessed whether dosimetry and/or instrumentation was appropriate for the expected neutron spectra, there was sufficient sensitivity, and neutron dosimetry was properly calibrated. The inspectors also assessed whether interference by gamma radiation had been accounted for in the calibration and whether time and motion evaluations were representative of actual neutron exposure events.

For the special dosimetric situations reviewed in this section, the inspectors assessed how the licensee assigns dose of record. This included an assessment of external and internal monitoring results, supplementary information on individual exposures, and radiation surveys and/or air monitoring results when dosimetry was based on these techniques.

These inspection activities constituted one complete sample as defined in IP 71124.04–05.

b. Findings

No findings were identified.

.5 Problem Identification and Resolution

a. Inspection Scope

The inspectors assessed whether problems associated with occupational dose assessment were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee involving occupational dose assessment.

These inspection activities constituted one complete sample as defined in IP 71124.04–05.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, and Occupational Radiation Safety

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index—Emergency Alternating Current Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency Alternating Current Power System (MS06) performance indicator (PI) for Unit 1 and Unit 2 for the period from the fourth quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99–02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee’s operator narrative logs, MSPI derivation reports, IRs, event reports and NRC Integrated Inspection Reports for the period of October 1, 2015 through June 30, 2016, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable

NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two MSPI emergency AC power system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index—High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems (MS07) performance indicator for Unit 1 and Unit 2 for the period from the fourth quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99–02, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 1, 2015 through June 30, 2016, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two MSPI high pressure injection system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index—Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Heat Removal System (MS08) performance indicator for Unit 1 and Unit 2 for the period from the fourth quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99–02, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, event reports, MSPI derivation reports, and NRC Integrated Inspection Reports for the period of October 1, 2015 through June 30, 2016 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance

with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two MSPI heat removal system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.4 Mitigating Systems Performance Index—Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - RHR System (MS09) performance indicator for Unit 1 and Unit 2 for the period from the fourth quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99–02, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 1, 2015 through June 30, 2016, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two MSPI residual heat removal system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.5 Mitigating Systems Performance Index—Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Cooling Water Systems (MS10) performance indicator for Unit 1 and Unit 2 for the period from the fourth quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99–02, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 1, 2015 through June 30, 2016, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance

with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two MSPI cooling water system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.6 Reactor Coolant System Leakage

a. Inspection Scope

The inspectors sampled licensee submittals for the RCS Leakage (B102) PI for Unit 1 and Unit 2 for the period from the fourth quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99–02, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator logs, RCS leakage tracking data, IRs, event reports and NRC Integrated Inspection Reports for the period of October 1, 2015 through June 30, 2016, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two reactor coolant system leakage samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.7 Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the Reactor Coolant System Specific Activity (B101) PI for Units 1 and 2 for the period from the first quarter 2015 through the first quarter 2016. The inspectors used PI definitions and guidance contained in NEI 99–02, dated August 2013, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's reactor coolant system chemistry samples, TS requirements, IRs, Event Reports and NRC Integrated Inspection Reports to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Documents reviewed are listed in the Attachment.

This inspection constituted two reactor coolant system specific activity samples as defined in IP 71151–05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee's CAP at an appropriate threshold, adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: identification of the problem was complete and accurate; timeliness was commensurate with the safety significance; evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Annual Follow-up of Selected Issues: Fish Losses in Braidwood Lake

a. Inspection Scope

On July 20, 2016, the licensee identified an elevated fish loss in Braidwood Lake. The inspectors selected the following CAP document for an in-depth review to determine if the licensee had addressed the potential impacts of the identified fish loss and review any reportability aspects associated with this issue.

- IR 2694866; Fish Losses in Braidwood Lake.

As appropriate, the inspectors verified the following attributes during their review of the licensee's corrective actions for the above issue report and other related condition reports:

- complete and accurate identification of the problem in a timely manner commensurate with its safety significance and ease of discovery;
- consideration of the extent of condition, generic implications, common cause, and previous occurrences;

- evaluation and disposition of operability/functionality/reportability issues;
- classification and prioritization of the resolution of the problem commensurate with safety significance;
- identification of corrective actions, which were appropriately focused to correct the problem;
- completion of corrective actions in a timely manner commensurate with the safety significance of the issue;

The inspectors discussed the corrective actions and associated evaluations with licensee personnel.

This review constituted one in-depth problem identification and resolution inspection sample as defined in IP 71152.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On October 12, 2016, the inspectors presented the inspection results to Ms. M. Marchionda, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- The inspection results for the Radiation Safety Program review with Ms. M. Marchionda, Site Vice President, on August 19, 2016.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Marchionda, Site Vice President
A. Ferko, Plant Manager
J. Bashor, Engineering Director
J. Cady, Radiation Protection Manager
K. Dovas, Operations Training Manager
B. Finlay, Site Security Manager
R. Hall, Chemical Environment & Radwaste Manager
A. Myers, Engineering Manager
D. Poi, Emergency Preparedness Manager
P. Rausch, Operations Director
S. Reynolds, Regulatory Assurance Manager
R. Schliessmann, NRC Coordinator
R. Simonson, Tech Manager
W. Spahr, Maintenance Director

U.S. Nuclear Regulatory Commission

E. Duncan, Chief, Reactor Projects Branch 3

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000456/2016003–01; 05000457/2016003–01	NCV	Failure to Erect Scaffolding in Accordance with Station Procedures (Section 1R15.1 (2))
05000456/2016003–02; 05000457/2016003–02	NCV	Failure to Follow Inservice Testing Requirements for the 2A Essential Service Water Pump Leads to an Invalid Test (Section 1R22.1 (1))

Discussed

None.

LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

1R04 Equipment Alignment

- IR 2652933; 2A VP Chiller Tripped; April 8, 2016
- IR 2656373; 2A VP Chiller Trip Due to Unknown Electrical Issue; April 15, 2016
- IR 2659711; 2A VP Chiller Tripped; April 21, 2016
- IR 2709206; 2B VP Chiller Not Cooling – 2WO01CB; August 27, 2016
- Event Issue Braidwood Station – IR 2709206 – 2B VP Chiller Not Cooling-
- BwOP AF-E2; Electrical Lineup – Unit 2 Operating; Revision 11
- BwOP AF-M2; Operating Mechanical Lineup, Auxiliary Feedwater, Unit 2; Revision 18
- BwOP CS-E2; Electrical Lineup – Unit 2 Containment Spray System; Revision 0E2
- BwOP RH-E1; Electrical Lineup – Unit 1 Operating; Revision 9
- BwOP RH-M1; Operating Mechanical Lineup Unit 1A RH Train; Revision 14
- 2BwOSR 3.6.6.1; Containment Spray System Valve Lineup Monthly Surveillance; Revision 0
- ER-AA-310-1001; Maintenance Rule – Scoping; Revision 4
- ER-AA-310-1001; Maintenance Rule Scoping; Spent Fuel Pool Cooling; Revision 4
- ER-AA-310-1002; Maintenance Rule Function Safety Significance Determination; Spent Fuel Pool Cooling
- ER-AA-310-1002; Delphi Risk Ranking; Spent Fuel Pool Cooling System
- ER-AA-310-1003; Maintenance Rule Performance Criteria Selection; Provide Indication of Spent Fuel Pool Level To Main Control Room
- Braidwood Maintenance Rule Expert Panel Meeting; July 28, 2016
- Maintenance Rule System Basis Document; Primary Containment HVAC
- Maintenance Rule System Basis Document; Auxiliary Building Floor Drains
- Maintenance Rule Function Evaluation; Unit 2 VP-01

1R05 Fire Protection

- IR 2695842; NRC ID: 1A/C DOST Room Walkdown; July 22, 2016
- Braidwood Pre-Fire Plan 26; CSR 439' Lower Cable Spreading Room; FZ 3.2D-2
- Braidwood Pre-Fire Plan 94; DOST 383' Diesel Fuel Oil Storage Room 1B; FZ 10-1-1
- Braidwood Pre-Fire Plan 97; AB 330' Unit 2 Auxiliary Building Basement (1B/2B SX); FZ 11.1B-0
- Braidwood Pre-Fire Plan 178; FH 401' Fuel Handling Building; FZ 12.1-0
- Braidwood Pre-Fire Plan 179; FH 426' Fuel Handling Building; FZ 12.1-0
- Braidwood Pre-Fire Plan 224; LSH 602' Lake Screen House; FZ 18.12-0
- Fire Protection Report 2.3.10.3; Amendment 24 – December 2010
- Fire Protection Report 2.3.11.2; Amendment 24 – December 2014
- Fire Protection Report 2.3.12.1; Amendment 24 – December 2014
- Fire Protection Report 2.3.18.28; Amendment 22; December 2006
- Fire Protection Report 2.4.2.67; Amendment 26 – December 2014
- Fire Protection Report 2.4.2.70; Amendment 26 – December 2014

1R11 Licensed Operator Requalification Program

- Scenario for August 31, 2016

1R12 Maintenance Effectiveness

- IR 2652933; 2A VP Chiller Tripped
- IR 2656373; 2A VP Chiller Trip due to Unknown Electrical Issue
- IR 2659711; 2A VP Chiller Tripped
- IR 2709206; 2B VP Chiller Not Cooling – WO01CB
- ER-AA-310-1001; Maintenance Rule – Scoping; Revision 4
- Maintenance Rule System Basis Document for VP
- Maintenance Rule System Basis Document for SX
- IR 2606711; 2SX01FP Has a Packing Leak
- IR 2622055; Instrumentation Difficulties Delay 2A SX pump ASME
- IR 2631101; 2SX01FB – Unable to Move broken Stud on 2B SX strainer head
- IR 2644578; Need Contingency Work for 2Sx01PA Impeller Replacement
- IR 2655737; Missed MIC Sample on 2A SX pump cooler
- IR 2703391; 2B SX Discharge Temp Abnormal Trend

1R13 Maintenance Risk Assessments and Emergent Work Control

- IR 2689456; Entered 0/1/2BwOA ENV-1 for High Winds/Severe Thunderstorm; July 6, 2016
- IR 2702968; NRC Questioned Clearances at Scaffold in U2 AF Room; August 9, 2016
- IR 2703650; NRC ID MA-AA-716-025 for WO 1927655-06 Not Completed Properly; August 12, 2016
- IR 2703895; NRC Identified Scaffold Pole Contacting Bolt on 2CC9458; August 12, 2016
- IR 2703967; Scaffold Build Deficiencies; August 12, 2016
- BwISR 3.3.2.10-217; Operational Test/Surveillance Calibration of Auxiliary Feedwater Pump Suction Loop – P-AF051; Revision 19
- MA-AA-716-014; Scaffold Installation, Inspection, and Removal; Revision 10
- MA-AA-716-015; Scaffold Installation, Modification and Removal Request Process; Revision 12
- MA-AA-716-025 WR 01892960-41/42; U1 Aux. Bldg. Elev. 383, Cable Riser/1R287 (K1B); April 27, 2016
- MA-AA-716-025 WR 01922142–10/11; U1 Aux. Bldg. Elev. 364+14', Penetration Sleeve/1AB-190; July 6, 2016
- MA-AA-716-025 WR 01922142-12/13; U1 Aux. Bldg. Elev. 364+12', Penetration Sleeve/1A1-070; July 6, 2016
- MA-AA-716-025 WR -01927655-06/07; U2 Aux. Bldg. Elev. 383+9', Line/2DOB1A-14"; August 4, 2016
- NEIS-MS-041; Seismic Prequalified Scaffolds; Revision 7
- OP-AA-108-117; Protected Equipment Program; Revision 4
- WC-AA-101; On-Line Work Control Process; Revision 26
- WO 1925616 01; 1PSL-AF051 Functional Check of 1A AF Pump Suction Pressure; August 5, 2016
- WO 1943333 01; Erratic Gauge Reading Causing Strainer to Backwash Early; August 5, 2016

1R15 Operability Evaluations

- IR 1603715; Voids in 2A AF Suction Line Exceed Acceptance Criterion; January 3, 2016
- IR 2582928; Voids Found During 2AF01PA SX Suction Piping UT Exam; November 5, 2015

- IR 2609252; Voids Found During 2A AF SX Suction Piping UT Exam; January 7, 2016
- IR 2625736; 1A AF Tell-Tale Drain Still Indicates Leakage 1Af006A; February 13, 2016
- IR 2671029; NOS ID: SD-226 was Found Open; June 13, 2014
- IR 2691451; Void in 2AF03AA Suction Piping Required Venting; July 7, 2016
- IR 2692376; NRC Identified Potential Seismic Concern; July 13, 2016
- IR 2692621; NRC Identified Open Door at U2 MESAC Cabinet; July 12, 2016
- IR 2692856; IR Not Generated in a Timely Manner; July 7, 2016
- IR 2703916; Void in 2AF03AA Suction Piping Required Venting; August 12, 2016
- IR 2700162; HELB Door SD-226 Found Approximately 2" Open; August 3, 2016
- IR 2701421; NRC ID: 2B AF Pump Room Concerns; August 5, 2016
- IR 2702483; NRC Question on Past Operability of Un-Chocked Cart; August 9, 2016
- BwAP 1110-3; Plant Barrier Impairment Program; Revision 38
- 2BwOSR 3.6.3.5.AF-1A; Train A Auxiliary Feedwater Valve Stroke Surveillance; Revision 24
- CC-AA-201; Plant Barrier Impairment Permit # 17680, HELB Door SD-226; Revision 11
- EC-383308; Small Voids in 2A & 2B SX to AF Suction Piping; Revision 10
- EC 384393; Review of Voided Pipe Between AF006 and AF017
- ER-AA-335-007; Report 2016-157; Auxiliary Feedwater 2AF03AA-6"; July 8, 2016
- ER-AA-335-007; Report 2016-188, Auxiliary Feedwater 2AF03AA-6"; August 26, 2016
- ER-AA-335-007; Report 2016-195, Auxiliary Feedwater 2AF03AA-6"; September 8, 2016
- MA-AA-716-026; Station Housekeeping/Material Condition Program; Revision 15
- NEI 09-10; Guidelines for Effective Prevention and Management of System Gas Accumulation; Revision 1a-A
- NEI Letter; NEI Regulatory Issues Task Force Position Paper Managing Risk and Operability While Opening Doors on Seismically Qualified Cabinets; October 6, 2015
- OP-AA-108-115; Operability Determinations (CM-1); Revision 16
- WO 01936320 01; 2AF01PA SX Suction Monthly UT-Credit PMID 44647-07; July 8, 2016

1R18 Plant Modifications

- EC 405740-000; U1 AF DG Air Intake Modification (Phase 1); September 2, 2016
- EC 405741-000; U1 AF DG Air Intake Modification (Phase 1); September 2, 2016
- LS-AA-104-1001; U1 & 2 AFW Diesel Engine Air Intake Relocation; Revision 4
- LS-AA-104-1003; Relocate AFW Diesel Engine Combustion Air Intake to 364' Elevation Auxiliary Building; Revision 4
- LS-AA-104-1004; Relocate AFW Diesel Engine Combustion Air Intake to 364' Elevation Auxiliary Building; Revision 6

1R19 Post Maintenance Testing

- IR 2696319; 2MS0180 Failed to Stroke Closed; July 25, 2016
- BwIP 2500-146; Calibration of Steam Generator Main Steam Atmospheric Relief Valve Nutherm control Panel; Revision 17
- BwIP 2500-146A1; Charging and Draining Steam Generator Main Steam Atmospheric Relief Valves Nutherm Control Panel; Revision 5
- BwOP RH-5; RH System Startup for Recirculation; Revision 24
- 2BwOSR 3.6.3.5.RF-1; Reactor Building Floor Drain Containment Isolation Valve Stroke Quarterly Surveillance; Revision 2
- 2BwOSR 3.7.4.1; Main Steam System Isolation 2MS018A/B/C/D Valve Travel and Indication 18 Month Surveillance; Revision 4
- 2BwOSR 5.5.8.AF-3B; Group A IST Requirements for Unit Two Diesel Driven Auxiliary Feedwater Pump; Revision 20

- 1BwOSR 5.5.8.RH-5B; Group A IST Requirements for Residual Heat Removal Pump 1RH01PB; Revision 16
- 2BwOSR 3.6.3.5 MS-1; Main Steam System Containment Isolation Valve Stroke Surveillance; Revision 14
- WO 1776181 02; 2FSV-RR027 Replace Solenoid Valve; July 14, 2016
- WO 1886656 02; EOC Insp. From 2RH606 Key – 1RH607; July 29, 2016
- WO 1886657 02; EOC Insp. From 2RH606 Key – 1RH619; July 28, 2016
- WO 192336B 01; IST – 1RH01PB ASME Group a Test & CC- 1SI8959B; July 28, 2016
- WO 1931389 01; IST – SX174/8, AF001B/3B-2AF01PB ASME Quarterly Surveillance; September 13, 2016
- WO 1941106 01; FNI 27-MS012/2MS018D Unscheduled Maintenance; July 26, 2016
- WO 1941106 02; 2MS018D Failed to Stroke Closed (27); August 3, 2016
- WO 1952007 01; U2 Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance; September 13, 2016

1R20 Refueling and Other Outage Activities

- A1R19 Containment Closure Plan; August 17, 2016
- BwMP 3100-009; Reactor Vessel Closure Head Removal; Revision 33
  MA-AA-716-008; Foreign Material Exclusion Program; Revision 13
- MA-AA-716-008-1008; Reactor Services Refuel Floor FME Plan; Revision 11
- OU-AP-104; Shutdown Safety Management Program Byron/Braidwood Annex; Revision 22
- OU-AP-205; Fuel Movement in Containment for Byron and Braidwood; Revision 12
- OU-AP-209; Operation of the Refuel Machine for Byron and Braidwood; Revision 19
- IR 2722157; 1SI8808D Time Stroke Closed Below Minimum
- IR 2719990; Gas Monitoring of IMB Locations
- A1R19 Containment Closure Plan
- 1B RH Protected Equipment List
- Unit 1 SATs Protected Equipment List
- ACB 3-4 Protected Equipment List
- 1A SI Protected as the Make-up Train – Equipment List
- A1E19 Shutdown Safety Review Plan, Revision 0
- IR 2720469; Received Unexpected Alarm 2-21-D6 “125 DC Bus 211 Ground

1R22 Surveillance Testing

- IR 2700660; 2SX169A Stroke Time Not Obtained During Stroke Surveillance; August 4, 2016
- IR 2713206; 1A CS Pump ASME Pump DP Less Than 187 PSID; September 7, 2016
- BwMSR 3.7.1.1; Main Steam Safety Valves Operability Test (Setpoint Verification Using the Furmanite Trevitest System); Revision 13
- BwOP PC-1; Local Leak Rate Flowmeter Monitor Operation; Revision 20
- 1BwOSR 3.6.1.1-7; Primary Containment Type C Local Leakage Rate Test of ILRT Test Valves; Revision 9
- 1BwOSR 3.8.1.2-2; 1B Diesel Generator Operability Surveillance; Revision 40
- 1BwOSR 5.58.CS-3A; Comprehensive Full flow Test for 1A Containment Spray Pump (1CS01PA) and Check Valves 1CS003A, 1CS011A; Revision 14
- 2BwOSR 5.5.8.SX-1A; Essential Service Water Train A Valve Stroke Surveillance; Revision 10
- 1BwOSR 5.5.8.SX-3B; Group A IST Requirements for 1B Essential Service Water Pump (1SX01PB); Revision 11
- 2BwOSR 5.5.8.SX-7; Essential Service Water System Valve Stroke Surveillance; Revision 3

- WO 1821466 06/17; IST-RT-1MS013S/014S/015S/016S/017S/ - MSSV Operability Test; September 21, 2016
- WO 1822299 01; IST-LT-1VQ016/017/018/019 – U1 LLRT ILRT Test; September 28, 2016
- WO 1927222 01; IST – STT – 2SX016A/027A/112A/114A/146A/169A – U2 ASME Surveillance Requirements; August 5, 2016
- WO 1927230 01; IST-STT-2SX150A Stroke Time Testing; September 7, 2016
- WO 1928802 01; LR-OP ASME Surveillance Requirements for 2A Essential Service Water Pump; September 7, 2016
- WO 1930795 01; LR-IST for 1SX002B ASME Surveillance Requirements for 1B Essential Service Water Pump; September 12, 2016
- WO 1935361 01; IST For 1CS003A/11A-U1 ASME Surveillance Requirements for 1CS01PA & Check Valve; September 7, 2016
- WO 1948723 01; LR-IST-1B DG Operability Monthly; September 14, 2016
- Certificate of Calibration 10935107; April 4, 2016
- IR 2714964; Op Eval Required for 2SX01PA
- IR 2711261; Engineering 4.0 Critique of 2A SX Comprehensive Test Issues
- IR 270872; 2SX01PA and 2SX007 Troubleshooting Log
- 2BwOSR 5.5.8.SX-3A; Group A IST Requirements for 2A Essential Service Water Pump; Revision 11
- IR 2716644; NRC Discussions and Resolution – SX ASME surveillances
- NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Revision 2

<u>1EP6 Drill Evaluation</u>

- Drill Scenario for August 31, 2016

<u>2RS3 In-Plant Airborne Radioactivity Control and Mitigation</u>

- IR 2706038; NRC Inspector Identified that Licensee Failed to Include Compensatory Actions for Monitoring Carbon Monoxide during Filling SCBA Bottles in the RP-BR-828 Charging of Air Cylinders for SCBA; August 18, 2016
- IR 2580662; SCBA kits Head Up Display (HUD) Experienced Battery Drains in the Control Room; dated November 2, 2015
- IR 1682426; Fuel Handling Building (FHB) Charcoal Sample Lessons Learned from an Independent Test Results; July 16, 2014
- IR 2419454; Elimination of In- Place Leak Testing of Downstream HEPA Filters of the Fuel Handling Building; December 2, 2014
- IR 2596303; FHB Charcoal Filter 0VA09FB NUCON Test Results; December 5, 2015
- IR 2681061; Unable to Perform Post LOCA Purge Filter Test; June 13, 2016
- IR 2697071; DOP Procedure was Not-included in the Work Package; July 26, 2016
- IR 1628461; Non Access Filter 0VA04FA needs to be Changed; March 11, 2014
- RWP-BW-01016-00305; Containment Entry at Power; August 16, 2016
- HR-AA-07-106; Respirator Surveillance Exam; Revision 7
- RP-AA-440; Respiratory Protection Program; Revision 13
- RP-BR-828; Charging of Air Cylinders for Self-Contained Breathing Apparatus; Revision 3
- N-AN-RP-508-049; Training and Testing Portable Filter Units – Task 508-049; Reviewed Four Individuals Training; August 18, 2016
- BWMSR 5.5.11.c-4; Fuel Handling Building Exhaust Ventilation System Carbon Sample Removal and Analysis; Revision 3
- RP-AA-870-1003; Testing Portable HEPA Filter Units; Revision 4

- RP-Aa-700-1301; Calibration, Source Check, Operation and Set-up of the Eberline Beta Air Monitoring, Model AMS-4; Revision 3
- RP-AA-302; Determining of Alpha Levels and Monitoring; Revision 7
- Professional Service Industries Inc.; Quarterly Service Air and Self Contained Breathing Apparatus Performed December 17, 2015
- RP-AA-1010; Braidwood Gatehouse PM-7 and PM-12 Sensitivity Study; July 28, 2016
- Canberra System #96-4709; Calibration of the Canberra Fast-Scan A1 WBC System at the Braidwood Generating Station; Report Date March 1, 2016
- RP-AA-700-1215; Calibration of Low Volume Air Samplers; Revision 1

2RS4 Occupational Dose Assessment

- IR 2554034; Nuclear Oversight Identified that Some Dose Rate Alarm were Set Significantly Higher than the Work Conditions Dose Rates; September 11, 2015
- IR 2477563; QC Checks on the Inside Whole Body Counter; March 31, 2015
- IR 2558035; New Whole Body Counter Needs Set-up and Relocation; September 21, 2015
- IR 2566807; Level-1 PCE on Master Lee Contractor due to Seal Table work; October 9, 2015
- IR 2627361; Managing EDEX for Sequential Jobs; February 17, 2016
- RP-AA-350; Personnel Contamination Monitoring Decontamination and Reporting; Revision 12
- RP-AA-203-1001; Ander-4979; Personnel Exposure Investigation; December 10, 2015
- RP-AA-2013-1001; Angel-1576; Personnel Exposure Investigation; December 10, 2015
- RP-AA-2013-1001; Waldv-7595; Personnel Exposure Investigation; December 11, 2015
- BRW-16-001; Annual Re-Evaluation of the Braidwood Nuclear Plant's Need for Internal Monitoring for 2015
- WMG Sample Report for 15 DAW Hard to Detect Nuclides; Sample April 22, 2015
- RP-AA-220-1001; Collection and Handling of In-Vitro Bioassay Samples; Revision 2
- Teledyne Brown Engineering Environmental Services; Inter-Laboratory Performance Evaluation Programs; December 16, 2014
- RP-AA-270; Samples of Declaration of Pregnancy from September 2012 to Present

4OA1 Performance Indicator Verification

- IR 2393334; U1 DG Exceeded MSPI Early Warning Criteria of ER-AA-2008; October 9, 2014
- IR 2461262; U2 DG Exceeded MSPI Early Warning Criteria of ER-AA-2008; March 1, 2015
- IR 2479591; Emergency AC Power SSPI Year End Projection Just Above Goal; April 2, 2015
- IR 2528646; 1A EDG Exceeds MR Unavailability – Evaluate for (A)(1); July 15, 2015
- IR 2536515; Unexpected Alarm 1SI8811B High Canister Level (1-5-E7); August 2, 2015
- IR 2537142; Grease in 1SI8807B is Old; August 4, 2015
- IR 2537550; 0DO03T Failed Oil Sample for 0BwOSR 3.8.3.201; August 4, 2015
- IR 2538768; Grease Degraded (1SI8814); August 4, 2015
- IR 2539061; Improvement for Pump Shaft Guards Identified – 1CV01PA; August 7, 2015
- IR 2548113; 2B DG Start Time Increase; August 27, 2015
- IR 2570197; Noise From 1B CV Pump Motor; October 13, 2015
- IR 2592546; 2B DG Tripped on Incomplete Sequence During Cooldown Cycle; November 25, 2015
- IR 2601343; 8R Exhaust Roller Degraded; December 16, 2015
- IR 2601468; 6L Rocker Arm is Degraded Need to Use Critical Spare; December 17, 2015
- IR 2603934; Braidwood EDG SSPI Business Plan Goal Exceeded; December 23, 2015
- IR 2612501; 2B DG 10R Metering Rod Found Stuck; January 14, 2016
- LS-AA-2090; NRC Reactor Coolant System (RCS) Specific Activity; Revision 4
- Monthly Data Elements for RCS were reviewed from January 2015 through March 2016

- 2BwCSR-3.4.16.2-1; Unit-2 Reactor Coolant Dose Equivalent Iodine-131 Once per 14 days or Due to Changing Reactor Power; Revision 12

4OA2 Problem Identification and Resolution

- IR 934941; Fish Losses in Braidwood Lake; June 24, 2009
- IR 950219; No Corporate Guidance Exists for Fish Kill Classification; August 6, 2009
- IR 2691276; Potential for Fish Losses Due to Elevated Lake Temperatures; July 11, 2016
- IR 2694866; Fish Losses in Braidwood Lake; July 20, 2016
- OP-AA-108-111-1001; Sever Weather and Natural Disaster Guidelines
- LS-MW-1340; Reportability Reference Manual; Revision 5
- EN-BR-402-0005; Extreme Heat Implementation Plan; Revision 8
- IR 2705092; CB&I NES-MS-04.1 Revision 7 Knowledge Gap Identified
- IR 2720157; 1CV131 Is Stuck at About Two-Thirds Open
- IR 2719907; The C Phase is Not Completely at 90 Degrees

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AF	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CIV	Containment Isolation Valve
d/p	Differential Pressure
EGM	Enforcement Guidance Memorandum
gpm	Gallons per Minute
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
IST	Inservice Testing
MSPI	Mitigating System Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
PARS	Publicly Available Records System
PI	Performance Indicator
psid	Pounds Per Square Inch Differential
RHR	Residual Heat Removal
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SSC	Systems, Structures, and Components
SOW	System Outage Window
SX	Essential Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
WO	Work Order

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Eric R. Duncan, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50–456 and 50–457
License Nos. NPF–72 and NPF–77

Enclosure:
IR 05000456/2016003, 05000457/2016003

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