UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

July 27, 2016

EA–16–126

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 05000456/2016002; 05000457/2016002; 07200073/2016001 AND EXERCISE OF ENFORCEMENT DISCRETION

Dear Mr. Hanson:

On June 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Braidwood Station, Units 1 and 2. On July 14, 2016, the NRC inspectors discussed the results of this inspection with 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 has identified two issues that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that both issues have associated violations. Because the licensee initiated Condition Reports to address these issues, these violations are being treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the Enforcement Policy. These NCVs are described in the subject inspection report.

A violation of the licensee's current site-specific licensing basis for tornado-generated missile protection was identified. Because this violation was identified during the discretion period discussed in Enforcement Guidance Memorandum 15–002, "Enforcement Discretion for Tornado Missile Protection Noncompliance," and because the licensee implemented compensatory measures, the NRC is exercising enforcement discretion by not issuing an enforcement action for the violation and allowing continued reactor operation.

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 Jamnes Cameron Acting for/

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 05000456/2016002; 05000457/2016002;
07200073/2016001

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	05000456; 05000457; and 0720073
License Nos:	NPF–72; NPF–77
Report No:	05000456/2016002; 05000457/2016002; and 07200073/2016001
Licensee:	Exelon Generation Company, LLC
Facility:	Braidwood Station, Units 1 and 2
Location:	Braceville, IL
Dates:	April 1 through June 30, 2016
Inspectors:	J. Benjamin, Senior Resident Inspector E. Sanchez-Santiago, Senior Resident Inspector D. Betancourt, Resident Inspector N. Feliz-Adorno, Senior Reactor Inspector N. Fields, Health Physicist T. Go, Health Physicist M. Learn, Reactor Engineer J. McGhee, Senior Resident Inspector, Byron D. Sargis, Reactor Inspector D. Szwarc, Senior Reactor Inspector
Approved by:	E. Duncan, Chief Branch 3 Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report 05000456/2016002, 05000457/2016002 and 07200073/2016001; 04/01/2016–06/30/2016; Braidwood Station, Units 1 and 2; Operability Determinations and Functional Assessments.

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 February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG–1649, "Reactor Oversight Process," dated February 2014.

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 3 of procedure ER–AA–2009, "Managing Gas Accumulation." Specifically, 36 gas-susceptible safety-related piping locations were not being monitored in accordance with the procedure. The planned corrective actions included an action to revise the Surveillance Frequency Control Program surveillance frequencies of accessible locations from 18 months to 6 months to align with procedural requirements, and an action to address the monitoring of locations inside the missile barrier (non-accessible locations at power). This issue was entered into the licensee's Corrective Action Program (CAP) as Issue Reports (IRs) 2644532 and 2660824.

The inspectors determined the performance deficiency was more than minor because it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to adequately monitor for gas accumulation in piping did not ensure the availability and reliability of systems required to perform accident mitigating functions because a potential adverse void would not be detected and assessed for operability impact. The inspectors determined that this finding was of very low safety significance because it did not result in the loss of operability or functionality of mitigating systems. Specifically, an engineering evaluation reasonably determined that the non-conforming condition did not result in a loss of operability. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance because the licensee did not recognize and plan for the possibility of mistakes, latent issues, and inherent risks, even while expecting successful outcomes. Specifically, the licensee had multiple recent opportunities to discover the non-compliance, but failed to do so because the licensee assumed that the surveillance frequencies were established correctly (H.12). (Section 1R15.2)

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 manage gas accumulation in the safety injection (SI)

system in accordance with procedure ER–AA–2009, “Managing Gas Accumulation.” Specifically, following identification of a void in the 2A SI train, the licensee failed to increase the monitoring frequency and account for the potential for the void to grow due to active gas mechanisms or planned evolutions, as required by the procedure. This ultimately led to a previously identified void growing beyond the pre-established limit by the next scheduled surveillance. Corrective actions for this issue included a planned action to establish an increased monitoring frequency for the affected line, and an action to remove the void in the upcoming Unit 2 Outage (Spring 2017). This issue was entered into the licensee’s CAP as IR 2640751.

The inspectors determined the performance deficiency was more than minor because, it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to monitor the gas accumulation for the 2A train of SI at the appropriate frequency did not ensure the availability and reliability of the SI system to perform its accident mitigating function. Additionally, this failure led to the 2A SI train exceeding the associated operability limits as established by evaluation BW–15–0100M during the next scheduled surveillance. The inspectors determined that this finding was of very low safety significance because it did not result in the loss of operability or functionality of mitigating systems. Specifically, an engineering evaluation reasonably determined that the non-conforming condition did not result in a loss of operability. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance because the licensee did not stop when faced with uncertain conditions. Specifically, the licensee did not reassess the gas accumulation monitoring plan to consider the potential for void growth due to active gas mechanisms or planned evolutions when accepting an unexpected void condition that differed with the initial conditions assumed by the monitoring plan. Ultimately, this led to a monitoring plan not being implemented as required (H.11). (Section 1R15.3)

REPORT DETAILS

Summary of Plant Status

Both Unit 1 and Unit 2 began the period at full power and operated at scheduled power levels for most of the period. During this inspection period, both Unit 1 and 2 at Braidwood Station were periodically scheduled to vary electrical output by the grid operator to ramp down a few hundred megawatts for short periods to respond to a transmission emergency, help ease congestion on the transmission system, or to support the economic dispatch agreement between Exelon and the grid operator.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Readiness of Offsite and Alternate AC Power Systems

a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator (TSO) and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included:

- coordination between the TSO and the plant during off-normal or emergency events;
- explanations for the events;
- estimates of when the offsite power system would be returned to a normal state; and
- notifications from the TSO to the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain the availability and reliability of both the offsite AC power system and the onsite alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the procedures addressed the following:

- actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant would not be acceptable to assure the continued operation of the safety-related loads without transferring to the onsite power supply;
- compensatory actions identified to be performed if it would not be possible to predict the post-trip voltage at the plant for the current grid conditions;
- re-assessment of plant risk based on maintenance activities which could affect grid reliability, or the ability of the transmission system to provide offsite power; and
- communications between the plant and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power was challenged.

Documents reviewed are listed in the Attachment. The inspectors also reviewed corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures.

This inspection constituted one readiness of offsite and alternate AC power systems sample as defined in Inspection Procedure (IP) 71111.01–05.

b. Findings

No findings were identified.

.2 Summer Seasonal Readiness Preparations

a. Inspection Scope

The inspectors performed a review of the licensee's preparations for summer weather for selected systems, including conditions that could lead to an extended drought.

During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. Documents reviewed are listed in the Attachment. The inspectors also reviewed CAP items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures. The inspectors' reviews focused specifically on the following plant systems:

- station auxiliary transformer;
- non-essential service water; and
- unit auxiliary transformer.

This inspection constituted one seasonal adverse weather sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

.3 Readiness For Impending Adverse Weather Condition – High Winds

a. Inspection Scope

Since thunderstorms with potential high winds were forecast in the vicinity of the facility for April 2, 2016, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On April 2, 2016, the inspectors walked down the station auxiliary transformers and the unit auxiliary transformers as well as surrounding areas, in addition to the licensee's emergency AC power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors evaluated the licensee staff's preparations against the site's procedures and determined whether the

staff's actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the UFSAR and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. The inspectors also reviewed a sample of CAP items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Documents reviewed are listed in the Attachment.

This inspection constituted one readiness for impending adverse weather condition sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

.4 Readiness for Impending Adverse Weather Condition – Tornado Watch

a. Inspection Scope

Since thunderstorms with potential tornados and high winds were forecast in the vicinity of the facility for June 23, 2016, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On June 22, 2016, the inspectors walked down the station auxiliary transformers and the unit auxiliary transformers as well as surrounding areas, in addition to the licensee's emergency AC power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors evaluated the licensee staff's preparations against the site's procedures and determined whether the staff's actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspector's evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the UFSAR and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. The inspectors also reviewed a sample of CAP items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Documents reviewed are listed in the Attachment.

This inspection constituted one readiness for impending adverse weather condition sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

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:

- 2B containment spray (CS) equipment alignment;
- 2B component cooling following return to service; and
- 1A and 1B emergency diesel generator with station auxiliary transformer 142–1 out-of-service for 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 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 three partial system walkdown samples as defined in IP 71111.04–05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

On May 26, 2016, the inspectors performed a complete system alignment inspection of the Unit 1 emergency diesel generator to verify the functional capability of the system. This system was selected because it was considered both safety-significant and risk-significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment lineups; electrical power availability; system pressure and temperature indications, as appropriate; component labeling; component lubrication; component and equipment cooling; hangers and supports; operability of support systems; and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding WOs was performed to determine whether any deficiencies significantly

affected the system function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment.

These activities constituted one complete system walkdown sample as defined in 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:

- 2B CS room;
- engineered safety feature room – Division 11;
- component cooling general area;
- 1A/2A essential service water pump room;
- 2A safety injection (SI) pump room;
- Unit 2 main power transformer area; and
- 2B auxiliary feedwater pump room.

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 seven quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk-important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the CAP to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant area to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- auxiliary building floor drains.

This inspection constituted one internal flooding sample as defined in IP 71111.06–05.

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 May 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;
- crew's 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 June 30, 2016, the inspectors observed Unit 1 and Unit 2 being ramped up from 70 percent to 100 percent power. This was an activity that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms (if applicable);
- correct use and implementation of procedures;
- control board (or equipment) manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications (if applicable).

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.

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 – work on DC112 battery charger;
- Planned Yellow Risk – 2B containment cooling water out-of-service for planned maintenance;
- Planned Yellow Risk – station auxiliary transformer 142–1 out-of-service for planned maintenance;
- Planned Yellow Risk – 1A CS out-of-service for planned maintenance; and
- Planned Yellow Risk – Unit 1 and Unit 2 auxiliary building ventilation damper work.

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 2665291 – UFSAR not consistent with TS;
- IR 2666932 – 2CC01PB inboard seal leak 30 dpm;
- IR 2676654 – fuel handling building crane fault while moving multi-purpose canister;
- IR 2651293 – TB–13–3 operating experience, resistance temperature detector amp card issue;
- IR 2651313 – Flex diesel generator failed to start;

- IR 2652841 – 'B' auxiliary feedwater room intake/fire scenario; and
- IR 2654226 – Division 11 miscellaneous electrical equipment room below temperature limit.

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 seven samples as defined in IP 71111.15–05.

b. Findings

No findings were identified.

.2 (Closed URI 05000456/201601–04; 05000457/2016001–04) Multiple Failure to Follow Procedure Leads to Inadequate Monitoring of Gas Susceptible Locations

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to follow Revision 3 of procedure ER–AA–2009, "Managing Gas Accumulation." Specifically, 36 gas susceptible safety-related piping locations were not being monitored in accordance with the procedure.

Description: On January 11, 2008, the NRC issued Generic Letter (GL) 2008–01, "Managing Gas Accumulation in Emergency Core Cooling (ECCS), Decay Heat Removal (DHR), and Containment Spray (CS) Systems." This document requested that licensees evaluate the ECCS, DHR, and CS systems licensing basis, design, testing, and corrective actions to ensure that gas accumulation was maintained less than the amount that would challenge the operability of these systems. In response to the GL, the licensee issued several engineering changes evaluating locations where gas could accumulate and where ultrasonic testing (UT) should be periodically performed to identify gas accumulation in the subject systems. These locations were then screened for gas intrusion mechanisms, and surveillance frequencies were then established.

At the time of this inspection, the licensee used Revision 3 of procedure ER–AA–2009 as the implementing procedure for managing gas accumulation in the ECCS. Step 4.7.1 stated that, "The initial monitoring frequency shall be established commensurate with plant Technical Specification frequencies (if any) for ensuring the system is full of water." It also stated, "Frequencies of once per refueling outage shall be used only for locations that are inaccessible due to actual (not posted) high radiation conditions."

However, on March 15, 2016, the inspectors noted that 17 locations for Unit 1, and 19 locations for Unit 2, which were accessible at power, were being performed on a frequency of once per refueling outage as established by ER–AA–2009. Thus, the inspectors were concerned because the Surveillance Frequency Control Program, which was established in September 2015, did not incorporate the requirements of procedure ER–AA–2009, which accounted for relevant technical considerations to ensure timely detection of unacceptable gas accumulation conditions.

In addition, Step 4.8.1 of procedure ER–AA–2009, stated, in part that, "Actual as-found data are recorded for each monitored location." However, the licensee did not obtain or record as found data for any of the locations mentioned above. Additionally, the inspectors noted that the inaccessible gas susceptible piping locations inside the missile barrier were only verified to be full of water once upon Mode ascension from an outage. Since the as-found condition of these locations inside and outside the missile barrier were not monitored, the inspectors determined that the licensee was not managing the potential to accumulate gas during at power operations.

On March 23, 2016, the licensee captured the inspectors' concerns into their CAP as IR 2644532 and evaluated operability of the affected systems and compliance with procedure ER–AA–2009. The operability evaluation determined that the affected systems were operable because no loss of function had been identified and all examinations currently required by the Surveillance Frequency Program were current. The inspectors questioned whether operability could be ensured on the basis of passing a past surveillance since no as-found data was being taken, and the specified frequency was not in accordance with procedural requirements. In response to the inspectors' questions the licensee performed an evaluation of the affected location to further justify operability. No further concerns were identified. In addition, the inspectors noted that the licensee's compliance evaluation contained a list of multiple missed opportunities to identify the non-compliance with the procedural requirements, which included:

- When procedure ER–AA–2009 was implemented in January 2010 a review was not performed to ensure that the previously established surveillance frequencies met the requirements contained in the procedure.

- A check-in self-assessment was performed by the corporate subject matter expert for GL 2008–01 in April 2015. One of the objectives was to review completeness of the program notebooks at the site. Step 4.8.1 was within the scope of the review; however, the failure to take as-found data was not discovered.

- An Apparent Cause Evaluation (ACE) was performed in September 2015 as a result of a licensee-identified historical mis-credit of a specific void susceptible location. The ACE considered "Additional locations examined at incorrect frequencies" as part of the Extent of Condition. However, the ACE did not verify that the frequencies met procedural requirements. Instead, it verified that the established surveillances were being performed at the already specified periodicity.

Regarding the reason for the failure to identify the non-compliance, the compliance evaluation concluded that, "current gaps in the implementation of ER–AA–2009 were caused by misinterpretation of procedural requirements during the initial issuance of the

procedure. Subsequent program reviews, assessments, evaluations, and turnovers did not identify these gaps. Turnover to new program owners did not ensure that all procedural and programmatic requirements were being met at the time of turnover." From interviews with engineering staff, the inspectors assessed that this was in part due to the fact engineering staff assumed that the original frequencies were established correctly, and assumed that the procedural requirements were "guidelines" instead of program requirements.

The licensee captured the failure to manage gas accumulation in accordance with ER–AA–2009 in the CAP as IRs 2644532 and 2660824. At the end of the inspection period, planned corrective actions included an action to revise the Surveillance Frequency Control Program surveillance frequencies of accessible locations from 18 months to 6 months to align with procedural requirements, and an action to address the monitoring of locations inside the missile barrier (non-accessible locations at power).

Analysis: The inspectors determined that the failure to monitor gas accumulation as specified in procedure ER–AA–2009 was contrary to 10 CFR Part 50, Appendix B, Criterion V, and was a performance deficiency. Specifically, 36 gas-susceptible safety-related piping locations were not monitored in accordance with the procedure.

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 affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to adequately monitor for gas accumulation in piping did not ensure the availability and reliability of systems required to perform accident mitigating functions because a potentially adverse void would not be detected and assessed for an operability impact.

The inspectors determined that the finding could be evaluated using the significance determination process (SDP) in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. 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 failure did not result in a loss of operability.

The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance because the licensee did not recognize and plan for the possibility of mistakes, latent issues, and inherent risks, even while expecting successful outcomes. Specifically, the licensee had multiple recent opportunities to discover the non-compliance but failed to do so because the licensee assumed that the surveillance frequencies were established correctly (H.12).

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures.

The licensee established procedure ER–AA–2009, Revision 3 as the implementing procedure for managing gas accumulation in the ECCS. Step 4.7.1 of the procedure stated that, "The initial monitoring frequency shall be established commensurate with plant Technical Specification frequencies (if any) for ensuring the system is full of water." It also stated that, "Frequencies of once per refueling outage shall be used only for locations that are inaccessible due to actual (not posted) high radiation conditions." Step 4.8.1, stated, in part, that "Actual as-found data are recorded for each monitored location."

Contrary to the above, since January 2010, the licensee failed to follow Steps 4.7.1 and 4.8.1 of procedure ER–AA–2009, Revision 3. Specifically, the licensee used frequencies of once per refueling outages for locations that were accessible at power (i.e., 17 locations for Unit 1, and 19 locations for Unit 2). Additionally, the licensee failed to record the actual as-found condition for these accessible locations and the gas susceptible locations inside the missile barrier that were inaccessible during at power operations.

At the end of this inspection period planned corrective actions included a planned action to change surveillance frequencies of accessible locations from 18 months to 6 months to align with procedural requirements, and an action to address the monitoring of locations inside the missile barrier (non-accessible locations at power). Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as IRs 2644532 and 2660824, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000456/2016002–01; 05000457/2016002–01, Multiple Failure to Follow Procedure Leads to Inadequate Monitoring of Gas Susceptible Locations)**.

.3 Failure to Manage Gas Accumulation in the Safety Injection System

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 manage gas accumulation in the safety injection (SI) system in accordance with procedure ER–AA–2009, "Managing Gas Accumulation." Specifically, following identification of a void in the 2A SI train, the licensee failed to increase the monitoring frequency and account for the potential for the void to grow due to active gas mechanisms or planned evolutions, as required by the procedure. This ultimately led to a previously identified void growing beyond the pre-established limit by the next scheduled surveillance.

Description: On October 5, 2015, Braidwood Unit 2 commenced refueling outage A2R18, which involved draining portions of the SI system. On October 20, 2015, the licensee performed surveillance 2BwOSR 3.2.2–2, "ECCS and CS Venting and Valve Alignment/ UT Verification Surveillance," to verify that susceptible locations were full of water prior to entry into Mode 4, "Hot Shutdown." During the surveillance, a 0.25 cubic foot void was found along location 2SI03BA, which is an SI injection line that connects to the A and D SI hot leg lines. Upon discovery, the licensee attempted to remove the void by venting the line, but was unsuccessful. Subsequently, engineering calculation BRW–15–0100M was developed to justify operability of the SI system prior to Mode 4, where the system was required to be operable. The evaluation established an acceptance criteria of 0.389 cubic feet, which bounded the void identified.

On March 15, 2016, the licensee performed a semiannual surveillance in accordance with procedure 2BwOSR 3.2.2–2 and discovered that the 2SI03BA void had grown to 0.960 cubic feet, exceeding the acceptance criteria established by BRW–15–0100M. As a result, the 2A SI pump train was declared inoperable and LCO 3.5.2, "ECCS Operating," Condition A, which requires the inoperable ECCS train to be returned to operable status within 7 days, was entered. The licensee revised calculation BRW–15–0110–M for the increased void size and evaluated the potential adverse effects on the piping structural integrity. This revised evaluation established an acceptance criteria of 1.5 cubic feet, which bounded the void identified, at which point the licensee exited LCO 3.5.2 Condition A on March 16, 2016.

While reviewing the licensee's original October 2015 evaluation, the inspectors noted that Step 4.9.7 of procedure ER–AA–2009 stated, "Evaluate changes to the monitoring frequency as a result of trends in performance monitoring." In addition, it stated, "Unexpected or unexplained gas accumulation in a system is an indication that increased frequency monitoring is required in accordance with Reference 6.13 [OP–AA–108–111, "Adverse Condition Monitoring and Contingency Plan]." However, upon discovery of the void in October 2015, the licensee did not increase the frequency for the affected location to address the potential to accumulate additional gas quantities. Specifically, the station assumed that the void was caused by an improperly performed fill and vent and did not evaluate for the potential of void growth due to an active gas mechanism or planned evolutions. In addition, the inspectors noted that the licensee's evaluation of the March 2016 discovery also failed to consider if the increase in void size was due to an active gas intrusion mechanism. In response to the inspector's questions, the licensee performed an evaluation and determined that the most probable cause for the void growth was pressure changes in the SI hot leg that occurred during a planned surveillance in Mode 3, "Hot Standby," which decreased the static pressure in the SI hot leg from approximately 37 psig to 10 psig, causing a change in the volume of the void.

The licensee captured the failure to manage gas accumulation in the 2A SI train in accordance with procedure ER–AA–2009 in the CAP as IR 02640751. At the end of this inspection period, planned corrective actions included a planned action to establish an increase monitoring frequency for the affected line and an action to remove the void in the upcoming Unit 2 Outage (Spring 2017).

Analysis: The inspectors determined that the failure to manage gas accumulation for the 2A SI train in accordance with procedure ER–AA–2009 was contrary to 10 CFR Part 50, Appendix B, Criterion V, and was a performance deficiency. Specifically, following identification of a void in the 2A SI train, the licensee failed to increase the monitoring frequency and account for the potential for the void to grow due to active gas mechanisms or planned evolutions, as required by the procedure.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to monitor the gas accumulation for the 2A train of SI at the appropriate frequency did not ensure the availability and reliability of the SI system to perform its accident mitigating function. Additionally, this failure led to the 2A SI train exceeding the associated operability limits as established by evaluation BW–15–0100M during the next scheduled surveillance.

The inspectors determined that 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 June 19, 2012. 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 non-conforming condition did not result in a loss of operability.

The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance because the licensee did not stop when faced with uncertain conditions. Specifically, the licensee did not reassess the gas accumulation monitoring plan to consider the potential for void growth due to active gas mechanisms or planned evolutions when accepting an unexpected void condition that differed with the initial conditions assumed by the monitoring plan. Ultimately, this led to a monitoring plan not being implemented as required (H.11).

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures.

The licensee established procedure ER–AA–2009, Revision 3 as the implementing procedure for managing gas accumulation in the ECCS. Step 4.9.7 of the procedure stated, “Unexpected or unexplained gas accumulation in a system is an indication that increased frequency monitoring is required in accordance with Reference 6.13 [OP–AA–108–111].”

Contrary to the above, on October 20, 2015, the licensee failed to follow Step 4.9.7 of procedure ER–AA–2009. Specifically, the licensee did not increase the monitoring frequency following the discovery of an unexpected accumulation of gas in the SI system.

Corrective actions for this issue included a planned action to establish an increased monitoring frequency for the affected line, and an action to remove the void in the upcoming Unit 2 Outage (Spring 2017). The continued non-compliance was not a current safety concern because the licensee increased the frequency of monitoring in the line to identify avoid size increase before the operability limit was exceeded. Because this violation was of very low safety significance and it was entered into the licensee’s CAP as IR 2640751, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000457/2016002–02; Failure to Manage Gas Accumulation in the 2A SI train)**

.4 Licensee Implementation of Enforcement Guidance Memorandum 15–002, “Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance”

On June 10, 2015, the NRC issued Regulatory Issue Summary (RIS) 2015–06, “Tornado Missile Protection,” focusing on the requirements regarding tornado-generated missile protection and required compliance with the facility-specific licensing basis. The RIS also provided examples of noncompliance that had been identified through different

mechanisms and referenced enforcement guidance memorandum (EGM) 15–002, which was also issued on June 10, 2015. The EGM provided guidance to allow the NRC staff to exercise enforcement discretion when an operating power plant licensee did not in comply with the current license basis for tornado-generated missile protection. Specifically, the discretion would be applied to structure system and components (SSCs) declared inoperable resulting in TS LCOs that would require a reactor shutdown or mode change if the licensee could not meet the required actions within the TS completion time. The discretion allowed the licensee to reestablish operability through compensatory measures and established criteria for continued operation of the facility as longer term corrective actions were implemented. This allows the licensee to continue operating until final corrective actions are taken in the timelines established in the EGM. The EGM stated that the bounding risk analysis performed for this issue concluded that this issue was of low risk significance and, in Braidwood's case, provided for enforcement discretion of up to 3 years from the date of issue of the EGM. However, the EGM does not provide the licensees enforcement discretion for any related underlying technical violations; and moreover, the EGM specifically requires that any associated underlying technical violation be assessed through the enforcement process.

Appendix A to 10 CFR Part 50, General Design Criteria for Nuclear Power Plants (GDC), Criterion 4, "Environmental and Dynamic Effects Design Basis," stated in part that SSCs important to safety shall be adequately protected against dynamic effects including missiles. On May 25, 2016, the licensee initiated IR 02673854, identifying a nonconforming condition of Criterion 4. Specifically, multiple locations were identified in the refueling water storage tank (RWST) roof hatches and in the L-line wall above the 451' elevation (separating the turbine building from the Class I auxiliary building) where SSCs were not adequately protected from tornado-generated missiles. The licensee declared multiple SSCs inoperable and promptly implemented compensatory measures designed to reduce the likelihood of tornado-generated missile effects. The inspectors reviewed the licensee's compensatory measures that included:

- review and revision of procedures for a tornado watch and a tornado warning to provide additional instructions for operators preparing for tornados/high winds, and potential loss of SSCs vulnerable to the tornado missiles;
- confirmation of readiness of equipment and procedures dedicated to the Diverse and Flexible Coping Strategy (FLEX);
- verification that training was up to date for individuals responsible for implementing preparation and response procedures; and
- establishment of a heightened station awareness and preparedness relative to identified tornado missile vulnerabilities.

The condition was reported to the NRC as Event Notice 51959 as an unanalyzed condition and potential loss of safety function. The licensee documented the inoperability of the SSCs and the affected TS LCO conditions in the CAP and in the control room operating log. The shift manager notified the NRC resident inspector of implementation of EGM 15–002, and documented the implementation of the compensatory measures to establish the SSCs "operable but nonconforming" prior to expiration of the LCO required action. The enforcement discretion was applied to the required shutdown actions of the following TS LCOs for both units:

- TS 3.0.3, General Shutdown LCO (cascading or by reference from other LCOs);

- TS 3.3.7, “Control Room Ventilation (VC) Filtration System Actuation Instrumentation”;
- TS 3.5.2, “ECCS – Operating”;
- TS 3.5.4, “Refueling Water Storage Tank (RWST)”;
- TS 3.6.6, “Containment Spray and Cooling Systems”;
- TS 3.7.5, “Auxiliary Feedwater System”;
- TS 3.7.10, “Control Room Ventilation (VC) Filtration System”;
- TS 3.7.11, “Control Room Ventilation (VC) Temperature Control System”;
- TS 3.8.4, “DC Sources – Operating”;
- TS 3.8.7, “Inverters – Operating”; and
- TS 3.8.9, “Distribution Systems – Operating”.

The inspectors’ review addressed the material issues in the plant, and whether the measures were implemented in accordance with the guidance documentation for the EGM. The inspectors also evaluated whether the measures as implemented would function as intended and were properly controlled. The licensee implemented actions to track the more comprehensive actions to resolve the nonconforming conditions within the required 60 days. These comprehensive actions were to remain in place until permanent repairs were completed, which for Braidwood were required to be completed in 3 years, or until the NRC dispositioned the non-compliance in accordance with a method acceptable to the NRC such that discretion was no longer needed.

The inspectors did not review the underlying circumstances that resulted in the TS violations. As stated in the EGM guidance, violations of other requirements, including 10 CFR 50 Appendix A Criterion 4, that may have contributed to the TS violations would be evaluated independently of the EGM implementation.

This operability inspection constituted a partial sample as defined in IP 71111.15–05 since all the corrective actions to support continued operability and resolution of the nonconforming conditions had not been identified. These actions and any underlying technical violations will be addressed with the completion of this inspection sample.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- 2B essential service water train return-to-service following work on room cooler;
- DC112 battery charger return-to-service following refurbishment;
- 2B component cooling pump return-to-service following maintenance; and
- 0SA140 (U0 station air compressor discharge valve) following repair.

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 four post-maintenance testing samples as defined in IP 71111.19–05.

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:

- Unit 2 ECCS vent and valve surveillance (Routine);
- 1B diesel generator 24-hour endurance run (Routine);
- 2B emergency diesel generator run (Routine);
- 2B CS pump American Society of Mechanical Engineers (ASME) test (Routine); and
- 1A SI discharge check valve inservice testing (IST).

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 inservice testing 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 function following testing;
- were all 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 annunciator and alarm setpoints consistent with design documents; 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 four routine surveillance testing samples, and one in-service test (IST) sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

2. RADIATION SAFETY

2RS7 Radiological Environmental Monitoring Program (71124.07)

.1 Site Inspection (02.02)

a. Inspection Scope

The inspectors walked down select air sampling stations and dosimeter monitoring stations to determine whether they were located as described in the Offsite Dose Calculation Manual (ODCM) and to determine the equipment material condition.

The inspectors reviewed calibration and maintenance records for select air samplers, dosimeters, and composite water samplers to evaluate whether they demonstrated adequate operability of these components.

The inspectors assessed whether the licensee had initiated sampling of other appropriate media upon loss of a required sampling station.

The inspectors observed the collection and preparation of environmental samples from select environmental media to determine if environmental sampling was representative of the release pathways specified in the ODCM and if sampling techniques were in accordance with procedures.

The inspectors assessed whether the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the UFSAR, NRC Regulatory Guide 1.23, “Meteorological Monitoring Programs for Nuclear Power Plants,” and licensee procedures. The inspectors assessed whether the meteorological data readout and recording instruments were operable.

The inspectors evaluated whether missed and/or anomalous environmental samples were identified and reported in the annual environmental monitoring report. The inspectors selected events that involved a missed sample, inoperable sampler, lost dosimeter, or anomalous measurement to determine if the licensee had identified the cause and had implemented corrective actions. The inspectors reviewed the licensee’s assessment of any positive sample results and reviewed any associated radioactive effluent release data that was the source of the released material.

The inspectors selected structures, systems, or components that involve or could reasonably involve a credible mechanism for licensed material to reach ground water, and assessed whether the licensee had implemented a sampling and monitoring program sufficient to detect leakage to ground water.

The inspectors evaluated whether records important to decommissioning, as required 10 CFR 50.75(g), were retained in a retrievable manner.

The inspectors reviewed any significant changes made by the licensee to the ODCM as the result of changes to the land census, long-term meteorological conditions, or modifications to the sampler stations since the last inspection. The inspectors reviewed technical justifications for any changed sampling locations to evaluate whether the licensee performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.

The inspectors assessed whether the appropriate detection sensitivities, with respect to the ODCM, were used for counting samples. The inspectors reviewed the quality control program for analytical analysis.

The inspectors reviewed the results of the licensee’s Inter-laboratory Comparison Program to evaluate the adequacy of environmental sample analyses performed by the licensee. The inspectors assessed whether the inter-laboratory comparison test included the media/nuclide mix appropriate for the facility. The inspectors reviewed the licensee’s determination of any bias to the data and the overall effect on the Radiological Environmental Monitoring Program (REMP).

These inspection activities constituted one sample as defined in IP 71124.07–05.

b. Findings

Introduction: The 2015 Braidwood Annual Radiological Environmental Operating Report for 2015 identified missed food samples in three out of four quadrants where food products were required by the licensee's ODCM. The inspectors also noted that this issue was identified in the licensee's CAP as Action Request 0214924, dated January 20, 2016, but it did not appear that any action was taken in 2015 to identify suitable alternative sampling locations.

Discussion: The assessment of the issue could not be completed within this inspection period. In particular, the licensee's ODCM is a site-specific document that included the radioactive effluent controls and the associated radiological environmental monitoring activities used to validate those controls. At the end of this inspection, the inspectors had not had the opportunity to review the bases documents for the ODCM to better understand the site-specific dose pathways for airborne and liquid effluent receptors and to assess the impact of these missed samples. Specifically, it was not clear whether the intended food product samples were designed to validate the airborne effluent control program or the liquid effluent control pathway. Each pathway has a different or unique requirement for validating the effluent controls. For example, validation of the airborne effluent control program would frequently measure, throughout the growing season, the radioactive material deposited on the sample surface and validation of the liquid effluent control pathway would measure, at the time of harvest, the radioactive material incorporated into the food product through irrigation. The issue remains under review by the NRC to determine the adequacy of ODCM performance and whether any violation of regulatory requirements occurred. This issue is categorized as an Unresolved Item (URI) pending completion of this review. **(URI 05000456/2016002–03; 05000457/2016002–03; Missed Radiological Environmental Monitoring Program Sampling)**

.2 Groundwater Protection Initiative Implementation (02.03)

a. Inspection Scope

The inspectors reviewed monitoring results of the groundwater protection initiative to evaluate whether the licensee had implemented the program as intended and to assess whether the licensee had identified and addressed anomalous results and missed samples.

The inspectors evaluated the licensee's implementation of the minimization of contamination and survey aspects of the groundwater protection initiative and the Decommissioning Planning Rule requirements in 10 CFR 20.1406 and 10 CFR 20.1501.

The inspectors reviewed leak and spill events and 10 CFR 50.75 (g) records and assessed whether the source of the leak or spill was identified and appropriately mitigated.

The inspectors assessed whether unmonitored leaks and spills where evaluated to determine the type and amount of radioactive material that was discharged. The inspectors assessed whether the licensee completed offsite notifications in accordance with procedure.

The inspectors reviewed evaluations of discharges from onsite contaminated surface water bodies and the potential for groundwater leakage from them. The inspectors

assessed whether the licensee properly accounted for these discharges as part of the Effluent Release Reports.

The inspectors assessed whether on-site groundwater sample results and descriptions of any significant on-site leaks or spills into groundwater were documented in the Annual Radiological Environmental Operating Report or the Annual Radiological Effluent Release Report.

The inspectors determine if significant new effluent discharge points where updated in the ODCM and the assumptions for dose calculations were updated as needed.

These inspection activities constituted one sample as defined in IP 71124.07–05.

.3 Problem Identification and Resolution (02.04)

a. Inspection Scope

The inspectors assessed whether problems associated with the REMP 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 that involved the REMP.

These inspection activities constituted one sample as defined in IP 71124.07–05.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams Per 7000 Critical Hours (1E01) performance indicator (PI) for Braidwood Unit 1 and Unit 2 for the period from the 2nd quarter 2015 through the 1st 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, IRs, event reports and NRC Integrated Inspection Reports for the period of April 1, 2015 through March 31, 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 unplanned scrams per 7000 critical hours samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.2 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications (1E04) performance indicator for Braidwood Unit 1 and Unit 2 for the period from the 2nd quarter 2015 through the 1st 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 and NRC Integrated Inspection Reports for the period of April 1, 2015 through March 31, 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 unplanned scrams with complications samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.3 Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the Radiological Effluent TS/ODCM radiological effluent occurrences (PR01) performance indicator 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 IR database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary data and the results of associated offsite dose calculations for selected dates to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Documents reviewed are listed in the Attachment.

This inspection constituted one Radiological Effluent TS/ODCM radiological effluent occurrences sample 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, that 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 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6-month period of January 2016 through June 2016, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

This review constituted one semi-annual trend inspection sample as defined in IP 71152–05.

b. Findings

No findings were identified.

.4 Selected Issue Follow-Up Inspection: Diesel Driven Auxiliary Feedwater Pump Temporary Configuration Change

This inspection constituted one annual in-depth sample of the problem identification and resolution inspection as defined by IP 71152–05, "Problem Identification and Resolution." Documents reviewed are listed in the Attachment.

a. Inspection Scope

In March 2016, during the Component Design Bases Inspection, NRC inspectors questioned the acceptability of the combustion air intake location for the diesel-driven auxiliary feedwater pumps during a high energy line break event. As a result, the licensee modified the air intake, moving it from the turbine building to the auxiliary building under Temporary Configuration Change 404988, "Temporary Modification of the Auxiliary Feedwater Diesel Pump (1/2AF01PB) Intake to Allow Suction from the Auxiliary Building." In order to ensure that sufficient oxygen would be available for combustion, the licensee propped open the doors to the diesel-driven auxiliary feedwater pump rooms. The propped open doors affected the separation of the redundant auxiliary feedwater pumps, as the opposite train motor-driven auxiliary feedwater pumps were located in the area immediately outside the doors to the rooms housing the diesel-driven pumps. The inspectors selected the following CAP document for in-depth review to determine if there was an impact on the plant's ability to safely shutdown in the event of a fire due to the propped open doors:

- IR 2635702; Question on Auxiliary Feedwater Diesel Air Intake.

As appropriate, the inspectors verified the following attributes during their review of the licensee's corrective actions for the above corrective action document and other related corrective action documents:

- 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 the root and contributing causes of the problem;
- 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;
- effectiveness of corrective actions taken to preclude repetition; and
- evaluation of the applicability for operating experience and communication of applicable lessons learned to appropriate organizations.

The inspectors discussed the corrective actions and associated evaluations with licensee personnel. Documents reviewed are listed in the Attachment.

This review constituted one in-depth problem identification and resolution sample as defined in IP 71152–05.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report 05000457/2015002–00, Automatic Actuation of Auxiliary Feedwater and Automatic Reactor Trip Signal due to Startup Feedwater Pump Failing to Start on Demand and Motor Driven Feedwater Pump Elevated Bearing Temperature Exceeding Limits

On October 4, 2015, during the planned Unit 2 down power for entry into refueling outage A2R18 the startup feedwater pump failed to start at approximately 15 percent power. As a result of the unavailability of the startup feedwater pump, the 2A motor driven feedwater pump was manually started to supply feedwater to the Unit 2 steam generators for decay heat removal and cooldown. At 12:38 p.m. on October 5, 2015, the motor driven feedwater pump was manually secured due to the pump inboard journal bearing temperature exceeding its operating limit.

At 1:05 a.m. an anticipated automatic auxiliary feedwater actuation signal was generated on steam generator Low 2 level (36.3 percent) and both the 2A and 2B auxiliary feedwater pumps auto-started. An additional Reactor Protection System Reactor trip signal was received due to low steam generator level (36.3 percent) with the reactor not

critical. Both auxiliary feedwater trains operated as designed. The inspectors responded to the control room following this event and reviewed available documentation related to the event and the associated corrective actions.

This licensee event report (LER) is closed. Documents reviewed are listed in the Attachment. This event follow-up review constituted one sample as defined in IP 71153–05.

a. Findings

Three self-revealed findings of very low safety significance were previously identified relating to this event (05000456/2015004–03; 05000457/2015004–03; 05000456/2015004–04; 05000457/2015004–04, and 0500457/2016001–05). Two of these findings involved violations of NRC requirements.

4OA5 Other Activities

.1 Operation of an Independent Spent Fuel Storage Installation at Operating Plants (60855.1)

a. Inspection Scope

The inspectors observed and evaluated select licensee loading, processing, and transfer operations of the fourth canister during the licensee's 2016 dry fuel storage campaign to verify compliance with the applicable Certificate of Compliance conditions, the associated TSs, and approved Independent Spent Fuel Storage Installation (ISFSI) procedures. Specifically, the inspectors observed: loading and independent verification of fuel assemblies placed into a multi-purpose canister (MPC); removal of the MPC within the transfer cask (HI-TRAC) from the spent fuel pool; decontamination and surveying; welding of the MPC closure rings; draining of water from the MPC; forced helium dehydration of the MPC; helium backfilling of the MPC; and transfer of the MPC from the HI-TRAC to storage cask (HI-STORM). The licensee used the Holtec International HI-STORM 100 Cask System for this campaign.

The inspectors reviewed procedures used to perform ISFSI preparation, loading, sealing, transfer, monitoring, and storage activities. The inspectors also reviewed applicable heavy loads procedures and inspection documentation to verify compliance with the site's heavy loads program. Select documents, in part, were reviewed after the licensee completed certain loading activities.

The inspectors reviewed the licensee's evaluations associated with fuel characterization and selection for storage. The licensee did not plan to load any damaged fuel assemblies or fuel debris during this campaign. The inspectors reviewed the canister fuel selection packages for the 2016 campaign to verify that the licensee was loading fuel in accordance with the Certificate of Compliance-approved contents.

The inspectors reviewed a number of IRs and the associated corrective actions since the last ISFSI inspection. The inspectors also reviewed 72.48 screenings and changes to the licensee's 10 CFR 72.212 evaluations since the last ISFSI inspection.

The inspectors performed a walk-down of the ISFSI pad to assess the material condition of the pad and the loaded HI-STORM 100 storage casks. The inspectors reviewed the

licensee's ISFSI radiation monitoring program. Additionally, the inspectors performed independent radiation surveys around the ISFSI pad and storage casks.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On July 14, 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 area of radiological environmental monitoring on May 27, 2016, with Ms. M. Marchionda, Site Vice President, and other members of the licensee's staff.

- The inspection results for the area of ISFSI operational inspection on May 9, 2016, to Ms. M. Marchionda, Site Vice President, and other members of the licensee's staff.

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 Manager
J. Cady, Radiation Protection Manager
B. Casey, Inservice Inspection Program Owner
K. Dovas, Operations Training Director
L. Dworakowski, Licensing Engineer
B. Finlay, Site Security Manager
R. Hall, Chemical Environment & Radwaste Manager
C. Ingold, Work Management Director
R. Melgoza, Reactor Services Manager
D. Poi, Emergency Preparedness Manager
F. Piriano, Electrical Design Branch Manager
P. Raush, Operations Manager
S. Reynolds, Regulatory Assurance Manager
J. Rogozinski, Dry Cask Storage Program Manager
M. Shue, Welding Administrator
M. Struck, Maintenance Program Manager
R. Schliessmann, NRC Coordinator
R. Zeman, Chemical Environment & Radwaste

U.S. Nuclear Regulatory Commission

E. Duncan, Chief, Reactor Projects Branch 3

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000456/2016002–01; 05000457/2016002–01	NCV	Multiple Failure to Follow Procedures Leads to Inadequate Monitoring of Gas Susceptible Locations (Section 1R15.2)
05000457/2016002–02	NCV	Failure to Manage Gas Accumulation in the 2A SI Train (Section 1R15.3)
5000456/2016002–03; 05000457/2016002–03	URI	Missed Radiological Environmental Monitoring Program Sampling (Section 2RS7.1)

Closed

05000456/2016002–01; 05000457/2016002–01	NCV	Multiple Failure to Follow Procedures Leads to Inadequate Monitoring of Gas Susceptible Locations (Section 1R15.2)
05000457/2016002–02	NCV	Failure to Manage Gas Accumulation in the 2A SI Train (Section 1R15.3)
5000456/2016001–04; 05000457/2016001–04	URI	Questions Regarding Implementation of the Gas Accumulation Program (Section 1R15.3)
05000457/2015–002–00	LER	Automatic Actuation of Auxiliary Feedwater and Automatic Reactor Trip Signal due to Startup Feedwater Pump Failing to Start on Demand and Motor Driven Feedwater Pump Elevated Bearing Temperature Exceeding Limits (Section 4OA3.1)

Discussed

05000456/2015004–03; 05000457/2015004–03	NCV	Failure to Establish Adequate Feedwater Pump Operational Guidance During a Normal Plant Shutdown (Section 4OA3.1)
05000456/2015004–04; 05000457/2015004–04	NCV	Failure to Establish a Written Procedure for a Loss of Feedwater Event In Mode 3 (Section 4OA3.1)
05000457/2016001–05	FIN	Failure to Ensure Unit 2 Startup Feedwater Pump Availability (Section 4IOA3.1)

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.

1R01 Adverse Weather Protection

- IR 2586940; Actions for New ER–AA–3004
- IR 2649730; Entered Into 0/1/2BwOA ENV–1 Due to High Winds; April 2, 2016
- IR 26649982; Secondary Bus Duct, Cooling Ducting Separated
- WC–AA–107; Seasonal Readiness; Revision 16
- WO 585205; Install Spare MPT 1E
- WO 585841; Install Spare MPT 1W
- WO 1594081; Install Spare MPT 2G
- WO 1594083; Install Spare MPT 2W
- Memo To D. Enright from M. Marchionda-Palmer; Certification of 2016 Summer Readiness; May 15, 2016

1R04 Equipment Alignment

- IR 1470656; Air Dryer High Temperature Alarm in for 1B DG; February 2, 2013
- IR 2617386; 1DG01MB Weeps Oil At Gasket; January 26, 2016
- IR 2627272; 1DG01MB Leak Has Gotten Worse; February 17, 2016
- IR 2647569; 1DG01MB Second Bypass Valve Cover Leaking; March 30, 2016
- IR 2658707; 1DG01MB Oil Leak Getting Worse; April 20, 2016
- IR 2659339; Damper Positioner Not Moving Damper; April 22, 2016
- IR 2671326; 1B DG Compressor Pressure Switch Needs Calibration; May 18, 2016
- BwOP CS–M1; Operating Mechanical Lineup Unit 1; Revision 12
- BwOP DG–1; Diesel Generator Alignment to Standby Condition; Revision 29
- BwOP DG–E1; Electrical Lineup 1A Diesel Generator; Revision 7
- BwOP DG–E2; Electrical Lineup 1B Diesel Generator; Revision 6
- BwOP DG–M1; Operating Mechanical Lineup 1A; Revision 17
- BwOP DG–M2; Operating Mechanical Lineup 1B; Revision 17
- P&ID M–46; Diagram of Containment Spray Unit 1 (Critical Control Room Drawing), Sheet 1A; Revision AZ
- P&ID M–46; Diagram of Containment Spray Unit 1 (Critical Control Room Drawing), Sheet 1B; Revision BA
- Braidwood Pre-Fire Plan #43; SWGA 426’ Division 11 ESF Switchgear Room; Fire Zone 5.2–1

1R05 Fire Protection

- Pre-Fire Plan #96; AB 330’ Unit 1 Aux. Bldg. Basement (1A/2A SX); FZ11.1A–0
- Pre-Fire Plan #108; AB 246” Containment Spray Pump 2B Room; FZ 11.2C–2
- Pre-Fire Plan #113; AB 364’ Unit 1 Aux. Bldg. General Area – South; FZ 11.3–0 South
- Fire Protection Report; Safe Shutdown Analysis, Section 2.4.2.77; pages 2.4–280 through 2.4–282

1R13 Maintenance Risk Assessments and Emergent Work Control

- 2B SX Pump Work Window; April 2016
- 125VDC Battery Charger 112 1DC04E OOS – 1B CS Pump, 1B EDG; April 2016
- 1A CS Train Work Window – May 2016

1R15 Operability Evaluations

- IR 2651293; BRW Review of Westinghouse Technical Bulletin TB–16–3; April 5, 2016
- IR 2651313; 0FX01KA Diesel Generator 'A' Not functional; April 5, 2016
- IR 2652841; NRC CDBI Question – Impact on 'B' AF PPS with 393' Fire; April 7, 2016
- IR 2655128; Known Gas Void at Line 2SI03BA; April 13, 2016
- IR 2656964; Grid Voltage Dropped Below 353Kv Without an Exception; April 17, 2016
- IR 2660824; Gas Management Program Update; April 25, 2016
- IR 2665291; UFSAR Description Not Consistent with Tech Spec Bases; May 4, 2016
- IR 2666932; 2CC01PB INB Seal Leak 30 DPM; May 8, 2016
- IR 2673854; Non-Conforming Conditions Identified – Tornado Missiles; May 25, 2016
- IR 2666932; 2CC01PB Inboard Seal Leak 30 dpm; May 8, 2016
- OP–AA–108–111; Adverse Condition Monitoring and Contingency Plan – 2CC01PB, 2B CC Pump Inboard Pump Mechanical Seal Water Leakage; May 10, 2016
- MA–AA–716–010–1104; Mechanical Seal Leakage Evaluation and Reporting; Revision 0
- WO 01648458 03; Fluctuating Amps When on Equalize 1DC04E; April 19, 2016

1R19 Post Maintenance Testing

- IR 2671903; Solenoid Valve Blowing Air Continuously; May 20, 2016
- 2BwOSR 3.7.8.1; Essential Service Water System Surveillance; Revision 19
- 1BwOSR 3.8.9.1; Bus Division 111/112 Operability Surveillance; Revision 5
- 2BwOSR 5.5.8.CC–6B; Group A IST Requirements for Component Cooling Pump (2CC01PB) and Discharge Check Valves; Revision 3
- WO 01372734 05; 1DC04E Battery Recharger Refurbishment; April 19, 2016
- WO 01431962 02; 2CC01PB Outboard Seal Has 2 DPM Water Leak/Inboard 1 DPM; May 4, 2016
- WO 01686710 02; No Flow From U2 CC Alternate Sample Point; May 4, 2016
- WO 01742422 02; 2VA01SB PM Clean 2B SX PP Cubicle Cooler; April 19, 2016
- WO 01764147 02 and 04; Disassemble and Inspect Check Valve 2CC9463B; May 4, 2016
- WO 01906222 01; IST for 2CC9463A/B & 0CC9464 – ASME Surveillance Requirements for 2CC01PB; May 4, 2016

1R22 Surveillance Testing

- IR 2668444; 1BwOSR 5.5.8.SI-10A Failed A Portion of Acceptance Criteria; May 12, 2016
- IR 2672081; Incomplete Data in Surveillance 1BwOSR 3.8.1.14–2
- BwOP DG–1; Diesel Generator Alignment to Standby Condition; Revision 29
- BwOP DG–11; Diesel Generator Startup and Operation; Revision 46
- BwOP DG–12; Diesel Generator Shutdown; Revision 30
- 1BwOSR 3.8.1.14–2; 1B Diesel Generator 24 Hour Endurance Run; Revision 8
- 1BwOSR 5.5.8.SI–10A; Group A IST Requirement; Revision 006
- 2BwOSR 3.5.2.2–2; ECCS and CS Venting and Valve Alignment/UT Verification Surveillance; Revision 23
- WO 01781007 01; 1B Diesel Generator 24 Hour Endurance Run 18 Month; May 19, 2016

- WO 01916009 01; Unit 2 ECCS Venting and Valve Alignment Surveillance Data Sheet; April 29, 2016
- WC–AA–111–F–01; Surveillance WO Disposition Sheet; April 27, 2016

2RS7 Radiological Environmental Monitoring Program

- IR–02674553; 2016 REMP Broad Leaf Vegetation Open Issue; May 26, 2016
- IR–02654277; REMP Air Sampler BD-3 has No Power; April 12, 2016
- IR–02654264; ODCM Samples of River Dredging Spoil Piles for REMP; April 12, 2016
- IR–02650610; February 2016 REMP Missed Samples and Anomalies; April 4, 2016
- IR–02625470; January 2016 REMP Missed Samples and Anomalies; February 12, 2016
- IR–02617081; Tritium Concentration at MW–BW–144D (Inside the Protected Area) Slightly Above RGPP Alert Level; January 26, 2016
- IR–02614924; Missed REMP Samples Third and Fourth Quarters of 2015; January 20, 2016
- IR–02605789; REMP Sample Anomaly at BD–22 Wilmington Water Facility on December 24, 2015; December 30, 2015
- IR–02591005; Meteorological Tower Air Temperature Delta-T Indication Failed; November 22, 2015
- IR–02566435; REMP Air Sample Anomalies, Loaded Filter Paper due to Surrounding Crop Harvesting; October 6, 2015
- IR–02530861; Met Tower Inspection due to Wind Damage; July 21, 2015
- IR–02525113; June 2015 REMP Air sampling Anomalies due to June 22, 2015 Tornado; July 8, 2015
- IR–02523082; Second Quarter 2015 RGPP Samples MW–103 and OWM–31P were Missed due Tornado Damage; July 2, 2015
- IR–02511588; Missed 2015 REMP Water Samples BD–25, BD–38, BD–55, BD–56 due to Winter Seasonal Weather Condition, June 8, 2015
- IR–02503554; Vacuum Breaker VB–1 Remediation Review due to Contamination of VB–1 Compositor from a Reversed flow of the Blowdown Line; dated May 19, 2015
- Braidwood Station Unit-1 and 2 Annual Radiological Environmental Operating Report as Prepared by Teledyne Brown Engineering Environmental Services 2015
- AMO Environmental Decisions; October – December 2015 RGPP Summary Report; February 11, 2016
- ER–AA–5400–1002; Underground Piping and Tank Examination Guide; Revision 6
- EC–400165; Detailed Evaluation of SSC for; Condensate Piping; Primary Water Piping; and Radwaste Piping
- Environmental Inc. Midwest Lab.; Environmental Incorporated Sampling Procedures Manual; Revision 15
- ATI Environmental Inc., Midwest Lab.; Quality Assurance Program; Revision 3
- EA Engineering, Science and Technology; Standard Operating Procedures for 2016 – 2018 Collection of Fish for Radiological Analysis Near Six Exelon Nuclear Power Plants; April 2016
- Murray and Trettle, Inc.; Monthly Report on Meteorological Monitoring Program at the Braidwood Nuclear Generating Station; March 2016
- Murray and Trettle, Inc.; Annual Report on the Meteorological Monitoring Program at the Braidwood Nuclear Generating Station 2015

4OA1 Performance Indicator Verification

- LS–AA–2150; Monthly Data Elements for NRC RETS/ODCM Radiological Effluent Occurrences; Revision 5
- Data Elements for NRC RETS/ODCM Radiological Effluent Occurrences; January 2015 through March 2016

4OA2 Problem Identification and Resolution

- IR 2635702; CDBI – Question on AFW Diesel Air Intake; March 4, 2016
- IR 2652841; NRC CDBI Question – Impact on 'B' AF Pumps with 383' Fire; April 7, 2016
- IR 2650807; Fire Brigade Truck Deficiencies; April 5, 2016
- IR 2653391; 2AF006A Leaking By; April 10, 2016
- IR 2653558; 1A Diesel Generator Mystery Alarm – 1 PL07J; April 11, 2016
- IR 2659367; Tech Spec Bistables Did Not Trip; April 22, 2016
- IR 2667266; Inadvertent Siren Activation of Will County Sirens; May 7, 2016
- IR 2668402; Abnormal SX Strainer Operation; May 12, 2016
- IR 2676244; 2B RCP Seal Injection Greater Than Limit; June 1, 2016
- EC 404988; Temporary Modification of the Auxiliary Feedwater Diesel Pump (1/2AF01PB) Intake to Allow Suction for the Auxiliary building; March 6, 2016
- BwAP 1101–1; Fire Protection Program System Requirements; Revision 37
- CC–AA–112; Temporary Configuration Changes; Revision 23
- CC–AA–211–1001; Fire Protection Engineering Evaluations; Revision 1

4OA3 Event Followup

- LER –5000457/2015–002–00; Automatic Actuation of Auxiliary Feedwater and Automatic Reactor Trip Signal due to Startup Feedwater Pump Failing to Start on Demand and Motor Driven Feedwater Pump Elevated Bearing Temperature Exceeding Limits; October 5, 2015

4OA5 Other

- 0BwDCSR 3.1.1.1; MPC Integrity Verification; Revision 4
- 0BwDCSR 3.1.3.1; MPC Cavity Pressure Verification; Revision 5
- 0BwDCSR 3.1.4.1; SCS Operability Verification; Revision 5
- 0BwDCSR 3.2.2.1; MPC Surface Contamination Verification; May 3, 2016
- 0BwDCSR 3.2.2.1; MPC Surface Contamination Verification; Revision 1
- 0BwDCSR 3.3.1.1; DCS Boron Concentration; Revision 6
- 0BwOSR 0.1–0; Shiftly and Daily Operating Surveillance Data Sheet; Revision 46
- 2.4.4–BRW–15–006–S; Structural Evaluation of Gaps under HI-STORM 100 Casks on Braidwood ISFSI Pad; Revision 0
- 2016 Braidwood Dry Cask Storage Check In; March 16, 2016
- 401' Fuel Handling Bldg. Cask Washdown Area Top View Survey Map; April 20, 2016
- 72.48 Log through 72.48–170; March 25, 2016
- 8 MC–GTAW; Machine Gas Tungsten Arc Welding; Revision 15
- 8 MN–GTAW; Manual Gas Tungsten Arc Welding; Revision 5
- Airgas Certificate of Analysis Part Number HE UHPPT; February 1, 2016
- ALARA Presentation "2016 Dry Cask Storage Campaign 6 Casks"; February 24, 2016
- IR 02402488; DCS: Fuel Cell in MPC 193 Damaged; October 28, 2014
- IR 02500376; Potential Issue with Compliance to DCS Surv, Requirement. 3.3.1.1; May 13, 2015
- IR 02665286; 2016 DCS LL-Use of Remote Camera Monitoring During Blowdown; May 4, 2016
- IR 02665901; 2016 DCS – Place Keeping GTE Reset; May 5, 2016
- IR 02666349; MPC Lid Inspections BWFP FH_75; May 6, 2016
- Braidwood Dry Cask Storage Organization Chart; for the 2016 campaign
- Braidwood Nuclear Power Station Units 1 and 2 10 CFR 72.212 Evaluation Report; Revision 2; August 28, 2014

- BWD–0015; Fuel Selection Package; Revision 0
- BWD–0016; Fuel Selection Package; Revision 0
- BWD–0017; Fuel Selection Package; Revision 0
- BWD–0018; Fuel Selection Package; Revision 0
- BWD–0019; Fuel Selection Package; Revision 0
- BWD–0020; Fuel Selection Package; Revision 0
- BWFP FH–20; Operation of the Fuel Handling Building Crane; Revision 26
- BWFP FH–35 Contingency Fuel Handling Building Crane Operations; Revision 0
- BWFP FH–63; HI-STORM Inspection; Revision 2
- BWFP FH–65; Spent Fuel Cask Site Transportation; Revision 11
- BWFP FH–69; HI-TRAC Movement within the Fuel Handling Building; Revision 17
- BWFP FH–70; HI-TRAC Loading; Revision 13
- BWFP FH–71; MPC Processing; Revision 24
- BWFP FH–71; MPC Processing; Revision 26
- BWFP FH–75; MPC Inspection; Revision 6
- BWFP FH–83; Spent Fuel Cask Contingency Actions; Revision 10
- Cask Tracking Data; through planned 2017 campaign
- CY–BR–170–301; Offsite Dose Calculation Manual; Revision 9
- EC 404393; Spent Fuel Casks for the 2016 Loading Campaign (Braidwood) – ISFSI; Revision 0
- EP–AA–1001, E–HU1; Damage to a Loaded Cask Confinement Boundary; February 2016
- GQP–1.0; Project Organization and Documentation; Revision 20
- GQP–7.1; Procurement, Receipt, Storage and Issue of ASME III Subsection NCA 3800 Weld Materials; Revision 7
- GQP–8.1; Process Traveler; Revision 19
- GQP–9.0; Training, Qualification, Examination, and Certification of NDE Personnel in Accordance with SNT–TC–1A and CP–189; Revision 16
- GQP–9.2; High Temperature Liquid Penetrant Examination and Acceptance Standards for Welds, Base Materials and Cladding (50F–350F); Revision 09
- GQP–9.6; Visual Examination of Welds; Revision 15
- GQP–12.0; Control of Measuring and Test Equipment; Revision 20
- GQP–17.0; Quality Records; Revision 15
- H2–MON–002; Hydrogen Monitoring for Holtec Canisters; Revision 6
- HI–2125197; Evaluation of Effects of Wheeled VCT Fire on HI-STORM 100S Version B; Revision 2
- HI–2125197; Evaluation of Effects of Wheeled VCT Fire on HI-STORM 100S Version B; Revision 2, Addendum Report P801596
- ISFSI Dosimetry Results for 2012–2015
- ISFSI Pad Survey Map; April 26, 2016
- LMS Supervisor Matrix Report; May 2, 2016
- LS–AA–108, Attachment 1, Revision 0; Braidwood 72.212 Evaluation Change Request 02–03; April 22, 2013
- LS–AA–108, Attachment 1, Revision 0; Braidwood 72.212 Evaluation Change Request 02–04; October 24, 2013
- LS–AA–108, Attachment 1, Revision 0; Braidwood 72.212 Evaluation Change Request 02–05; October 25, 2013
- LS–AA–108, Attachment 1, Revision 1; Braidwood 72.212 Evaluation Change Request 03–01; January 16, 2016
- LS–AA–108, Attachment 1, Revision 2; Braidwood 72.212 Evaluation Change Request 03–02; September 14, 2015
- LS–AA–114–1003; Selected 72.48 Screenings

- LS–AA–114–1004; 72.48–077 - EC 390048; Revision 0
- LS–AA–114–1004; 72.48–096 - Braidwood 10 CFR 72.212 Evaluation Report, Revision 2; Revision 0
- MA–AA–716–022; Control of Heavy Loads Program, Revision 12
- MSLT–MPC–EXELON–MW; Helium Mass Spectrometer Leak Test Procedure; Revision 0
- NF–AA–60; Fuel Selection for Dry Cask Storage Process Description; Revision 2
- NF–AA–622; Fuel Selection and Documentation for Dry Cask Loading; Revision 2
- OP–AA–108–111–1001; Severe Weather and Natural Disaster Guidelines; Revision 14
- OU–AA–630–1002; Guidance for Holtec HI-STORMS and MPC Delivery/Fit-Up/Dimensional/Pre-Use Inspections; Revision 0
- OU–AA–630–1002; Guidance for Holtec HI-STORMs and MPC's Delivery/Fit-Up/Dimensional/Pre-Use Inspections; Revision 0
- PI–CNSTR–OP–EXE–H–01; Closure Welding of Holtec Multi-Purpose Canisters at Exelon Facilities; Revision 12
- Receipt 184292 ISFSI Helium Testing of Lid DOC–1023–240R1; July 24, 2014
- Receipt 184292 ISFSI Helium Testing of Lid DOC–1023–241R1; July 24, 2014
- Receipt 184292 ISFSI Helium Testing of Lid DOC–1023–242R1; July 24, 2014
- Receipt 184292 ISFSI Helium Testing of Lid DOC–1023–243R1; July 24, 2014
- Receipt 184292 ISFSI Helium Testing of Lid DOC–1023–244R1; July 24, 2014
- Receipt 184292 ISFSI Helium Testing of Lid DOC–1023–245R1S/N245; DOC–1024–623; June 4, 2014
- Receipt 184292 Part 1 Cat ID 1432487–3 Liner Cask MPC 32; August 8, 2012
- Receipt 184292 Part 10 Cat ID 1407896–3 Container Cask Storage HI-STORM 100–S; August 8, 2012
- Receipt 184292 Part 11 Cat ID 1407896-3 Container Cask Storage HI-STORM 100–S; August 8, 2012
- Receipt 184292 Part 12 Cat ID 1407896-3 Container Cask Storage HI-STORM 100–S; August 8, 2012
- Receipt 184292 Part 2 Cat ID 1432487-3 Liner Cask MPC 32; August 8, 2012
- Receipt 184292 Part 3 Cat ID 1432487-3 Liner Cask MPC 32; August 8, 2012
- Receipt 184292 Part 4 Cat ID 1432487-3 Liner Cask MPC 32; August 8, 2012
- Receipt 184292 Part 5 Cat ID 1432487-3 Liner Cask MPC 32; August 8, 2012
- Receipt 184292 Part 6 Cat ID 1432487-3 Liner Cask MPC 32; August 8, 2012
- Receipt 184292 Part 7 Cat ID 1407896-3 Container Cask Storage HI-STORM 100–S; August 8, 2012
- Receipt 184292 Part 8 Cat ID 1407896-3 Container Cask Storage HI-STORM 100–S; August 8, 2012
- Receipt 184292 Part 9 Cat ID 1407896-3 Container Cask Storage HI-STORM 100–S; August 8, 2012
- RP–AA–401; Dry Cask Storage ALARA Plan; for the 2016 campaign
- RP–BF–304–1001, Attachment 1; HI-TRAC Radiation Survey; May 4, 2016
- RP–BF–304–1001; HI-TRAC Radiation Survey; Revision 4
- RP–BF–304–1002, Attachment 1; HI-STORM Radiation Survey; April 25, 2016
- RP–BF–304–1002; HI-STORM Radiation Survey; Revision 4
- RP–BF–304–1003, Attachment 1; Independent Spent Fuel Storage Installation Radiation Survey; date April 26, 2016
- RP–BF–304–1003; Independent Spent Fuel Storage Installation Radiation Survey; Revision 5
- WCP–3; Weld Material Control; Revision 2
- WCP–5; Weld and Base Metal Repair; Revision 0
- WO 01719585; Annual ISFSI Concrete Pad and HI-STORM Integrity Inspection; March 15, 2015

- WO 01818156; Annual ISFSI Concrete Pad and HI-STORM Integrity Inspection; February 26, 2016
- WO 01828553; MPC Lift Cleat Inspection; January 5, 2016
- WO 01829756; HI-TRAC Trunnion Inspections; January 15, 2016
- WO 01838725; Lift Yoke Inspection; February 18, 2016
- WO 01838726; HI-TRAC Trunnion Inspection; January 22, 2016
- WO 01518824; RXS Helium Leak Test MPC Lid Recertify Amendment 9 Criteria; August 12, 2014

LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agencywide Documents Access Management System
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CS	Containment Spray
ECCS	Emergency Core Cooling System
EGM	Enforcement Guidance Memorandum
GL	Generic Letter
HI-STORM	Storage Cask
HI-TRAC	Transfer Cask
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
ISFSI	Independent Spent Fuel Storage Installation
IST	Inservice Testing
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MPC	Multi-Purpose Canister
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PARS	Publicly Available Records System
PI	Performance Indicator
psig	Pounds Per Square Inch Gauge
REMP	Radiological Environmental Monitoring Program
SDP	Significance Determination Process
SI	Safety Injection
SSCs	Structure System and Components
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UT	Ultrasonic Testing
WO	Work Order

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 Jamnes Cameron Acting for/

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

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