



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
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November 2, 2017

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 05000456/2017003 AND 05000457/2017003**

Dear Mr. Hanson:

On September 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Braidwood Station, Units 1 and 2. On October 5, 2017, the NRC inspectors discussed the results of this inspection with the Site Vice President, Ms. M. Marchionda, 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 one issue that was evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that a violation of regulatory requirements is associated with this issue. Because the issue was entered into the site's corrective action program (CAP) and actions were initiated to address it, the violation is being treated as a Non-Cited Violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy. The NCV is described in the subject inspection report.

If you contest the violation or significance of the NCV, 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 Inspectors' Office at the Braidwood Station.

In addition, if you disagree with the cross-cutting aspect assignment to the 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 Inspectors' Office at the Braidwood Station.

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

Sincerely,

/RA/

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

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

Enclosure:
IR 05000456/2017003; 05000457/2017003

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Letter to Bryan C. Hanson from Eric R. Duncan dated November 2, 2017

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION
REPORT 05000456/2017003 AND 05000457/2017003

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REGION III

Docket Nos: 50-456; 50-457
License Nos: NPF-72; NPF-77

Report No: 05000456/2017003; 05000457/2017003

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: July 1 through September 30, 2017

Inspectors: D. Kimble, Senior Resident Inspector
D. Betancourt, Resident Inspector
M. Bielby, Senior Operator Licensing Examiner
M. Doyle, Reactor Engineer
G. Edwards, Health Physicist
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Approved by: E. Duncan, Chief
Branch 3
Division of Reactor Projects

Enclosure

TABLE OF CONTENTS

SUMMARY	2
REPORT DETAILS	4
Summary of Plant Status.....	4
1. REACTOR SAFETY	4
1R01 Adverse Weather Protection (71111.01)	4
1R04 Equipment Alignment (71111.04).....	5
1R05 Fire Protection (71111.05).....	6
1R06 Flood Protection Measures (71111.06)	7
1R11 Licensed Operator Requalification Program (71111.11)	8
1R12 Maintenance Effectiveness (71111.12)	12
1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)	13
1R15 Operability Determinations and Functionality Assessments (71111.15) ...	14
1R19 Post-Maintenance Testing (71111.19)	15
1R22 Surveillance Testing (71111.22).....	16
1EP6 Drill Evaluation (71114.06)	17
2. RADIATION SAFETY	18
2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06).....	18
4. OTHER ACTIVITIES	24
4OA1 Performance Indicator Verification (71151).....	24
4OA2 Identification and Resolution of Problems (71152).....	26
4OA6 Management Meetings	27
SUPPLEMENTAL INFORMATION	1
Key Points of Contact.....	1
List of Items Opened, Closed and Discussed.....	2
List of Documents Reviewed	3
List of Acronyms Used	15

SUMMARY

Inspection Report 05000456/2017003; 05000457/2017003; 07/01/2017 – 09/30/2017;
Braidwood Station, Units 1 and 2; Radioactive Gaseous and Liquid Effluent Treatment.

This report covers a three month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Green finding was identified by the inspectors. The finding was considered a Non-Cited Violation (NCV) 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 November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

NRC-Identified and Self-Revealed Findings

Cornerstone: Public Radiation Safety

- **Green.** The inspectors identified a finding of very low safety significance and an associated NCV of Title 10 of the *Code of Federal Regulations* (CFR), Part 20.1406(c), when the licensee failed to conduct operations to minimize the introduction of residual radioactivity onto the site. Specifically, the licensee failed to identify and evaluate the environmental risk and control work practices with a credible mechanism to prevent spills and leaks from reaching groundwater at the circulating water blowdown (CWBD) area, a radiologically unrestricted area in the licensee's owner controlled area. Specifically, tritium contaminated sump water was intermittently pumped to the environs. The licensee documented this finding in their corrective action program (CAP) as Issue Report (IR) 4020644.

The failure to conduct operations and control work practices with a credible mechanism to prevent spills and leaks to reach groundwater and minimize residual radioactivity onto the site represented a licensee performance deficiency. The performance deficiency was of more than minor significance because it was associated with the Program and Process attribute of the Public Radiation Safety cornerstone and adversely affected the cornerstone objective of ensuring the adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. In accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," the finding was determined to be of very low safety significance (Green) because the issue involved a radioactive effluent release, but did not: (1) represent a substantial failure to implement the radioactive effluent release program; or (2) result in public exposure that exceeded the dose values in Appendix I to 10 CFR Part 50 and/or 10 CFR 20.1301(e) limits. The inspectors determined that this finding had a cross-cutting component in the area of

Human Performance, in the aspect of Challenging the Unknown, because licensee personnel did not stop when faced with uncertain conditions or evaluate and manage risk before proceeding. (Section 2RS6) [H.11]

Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1

Unit 1 began the inspection period operating at full power. On September 2, 2017, reactor power was lowered to approximately 20 percent to allow the main electrical generator to be removed from operation to facilitate planned repairs to the voltage regulator base adjuster. Following these repairs, the main electrical generator was synchronized to the power grid on September 3, 2017, and the unit reached full power operation in the early morning hours of September 4, 2017. With the exception of minor reductions in power to support scheduled testing activities and brief load changes requested by the transmission system operator (TSO), the unit remained operating at or near full power for the remainder of the inspection period.

Unit 2

Unit 2 began the inspection period operating at full power. With the exception of minor reductions in power to support scheduled testing activities and brief load changes requested by the TSO, the unit remained operating at or near full power for the balance of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

1R01 Adverse Weather Protection (71111.01)

.1 External Flooding

a. Inspection Scope

During the course of the inspection period, the inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood event. The evaluation included a review to check for deviations from the descriptions provided in the Updated Final Safety Analysis Report (UFSAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined whether the barriers required to mitigate a flooding event were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also checked underground bunkers/manholes subject to flooding that contained multiple train or multiple function risk-significant cables. Additionally, the inspectors reviewed the licensee's off-normal procedure for mitigating flooding to ensure it could be implemented as written.

These reviews by the inspectors constituted a single external flooding inspection sample as defined in Inspection Procedure (IP) 71111.01–05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Alignment Verifications

a. Inspection Scope

The inspectors performed partial system physical alignment verifications of the following risk-significant systems:

- The Unit 1 Train B (1B) Safety Injection (SI) Train during the Unit 1 Train A (1A) SI Train unavailability for maintenance during the week ending August 5, 2017;
- The Unit 2 electrical safety buses while System Auxiliary Transformer (SAT) 242 was out-of-service for preventative maintenance during the week ending September 9, 2017; and
- The 1A Auxiliary Feedwater (AF) Train during a 1B AF Train preventative maintenance work window during the week ending September 16, 2017.

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, work orders (WOs), IRs, and the impact of ongoing work activities on redundant trains of equipment 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.

These activities by the inspectors constituted three partial system alignment verification inspection samples as defined in IP 71111.04–05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Alignment Verification

a. Inspection Scope

During the weeks ending August 5, 2017 through September 2, 2017, the inspectors performed a complete system alignment inspection of the station's circulating water (CW) system to verify the functional capabilities of the system. This system was selected because CW is risk-significant as both a transient initiator and as a source of

internal flooding within the licensee's probabilistic risk assessment. The inspectors physically inspected accessible system components and piping to verify 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 licensee's CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved.

These activities constituted a single annual complete system alignment verification inspection sample as defined in IP 71111.04–05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Fire Protection Zone Inspections

a. Inspection Scope

During the week ending July 22, 2017, the inspectors conducted fire protection zone inspection tours which were focused on the availability, accessibility, and condition of firefighting equipment in the following risk-significant plant areas:

- The Unit 1 Non-Engineered Safety Feature (ESF) Switchgear Room (Fire Zone 5.3–1);
- The Unit 2 Non-ESF Switchgear Room (Fire Zone 5.3–2); and
- The Unit 1 Containment Refrigeration Equipment Room (Fire Zone 11.5–1).

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. 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.

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

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)

.1 Underground Bunkers/Manholes

a. Inspection Scope

During the weeks ending August 5, 2017, through August 26, 2017, the inspectors conducted a review of underground bunkers/manholes subject to flooding that contained electrical cables. The inspectors' reviews included the following underground bunkers/manholes subject to flooding:

- Electrical Manholes 1D, 1E, 1F, 2D, and 2N.

The inspectors checked for submerged cables, that splices were intact, and that appropriate cable support structures were in place. In those areas where dewatering devices were used, such as sump pumps, the inspectors verified that the devices were functional and that any level alarm circuits were set appropriately to ensure that the cables would not be submerged. In those areas without dewatering devices, the inspectors verified that drainage of the area was available, or that the cables were qualified for submerged conditions. The inspectors also reviewed the licensee's corrective action documents with respect to past submerged cable issues to verify the adequacy of the corrective actions.

The inspectors' reviews of these underground bunkers/manholes constituted a single inspection sample as defined in IP 71111.06-05.

b. Findings

No findings were identified.

.2 Internal Flooding

a. Inspection Scope

The inspectors conducted internal flooding reviews for:

- The AF tunnel separation from the main steam isolation valve (MSIV) rooms during the weeks ending September 9, 2017, through September 23, 2017; and
- The turbine building flood evaluation for circulating water piping rupture during the weeks ending August 26, 2017, through September 9, 2017.

The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. 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 cooling tower makeup 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 physical walkdowns of the

above noted plant areas to assess the adequacy of watertight boundaries/barriers and verify drains and sumps were clear of debris and were operable, and that the licensee had complied with applicable commitments.

The inspectors' reviews constituted two internal flooding inspection samples 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 Simulator Training

a. Inspection Scope

On September 19, 2017, the inspectors observed a crew of licensed operators in the plant's simulator during a graded simulator scenario. 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. In addition, the inspectors verified that licensee personnel were observing NRC examination security protocols to ensure that the integrity of the graded scenario was being protected from being compromised. The inspectors evaluated the following areas:

- Licensed operator performance;
- The clarity and formality of communications;
- The ability of the crew to take timely and conservative actions;
- The crew's prioritization, interpretation, and verification of annunciator alarms;
- The correct use and implementation of abnormal and emergency procedures by the crew;
- Control board manipulations;
- The oversight and direction provided by licensed Senior Reactor Operators (SROs); and
- The ability of the crew to identify and implement appropriate TS actions and Emergency Plan (EP) actions and notifications.

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

These observations and activities by the inspectors constituted a single quarterly licensed operator requalification program simulator training inspection sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation of Control Room Activities

a. Inspection Scope

During the course of the inspection period, the inspectors performed several observations of licensed operator performance in the plant's control room to verify that operator performance was adequate and that plant evolutions were being conducted in accordance with approved plant procedures. Specific activities observed that involved a heightened tempo of activities or periods of elevated risk included, but were not limited to:

- Reactivity manipulations and plant power maneuvers directed by the TSO for both Unit 1 and Unit 2 during the week ending July 22, 2017;
- Reactivity manipulations and plant power maneuvers on Unit 1 during a planned corrective maintenance outage for the main turbine/electrical generator during the weeks ending September 2, 2017, and September 9, 2017; and
- Electrical switching operations and operation of the 2A and 2B Emergency Diesel Generators (EDGs) to support SAT 242 scheduled maintenance during the week ending September 9, 2017.

The inspectors evaluated the following areas during the course of the control room observations:

- Licensed operator performance;
- The clarity and formality of communications;
- The ability of the crew to take timely and conservative actions;
- The crew's prioritization, interpretation, and verification of annunciator alarms;
- The correct use and implementation of normal operating, annunciator alarm response, and abnormal operating procedures by the crew;
- Control board manipulations;
- The oversight and direction provided by on-watch SROs and plant management personnel; and
- The ability of the crew to identify and implement appropriate TS actions and notifications.

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

These observation activities by the inspectors of operator performance in the station's control room constituted a single quarterly inspection sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

.3 Annual Operating Test Results

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the annual operating test, administered by the licensee from August 28 through October 5, 2017, required by Title 10 of the *Code of Federal Regulations* (CFR) Part 55.59(a). The results were compared to the thresholds established in IMC 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process," to assess the overall adequacy of the licensee's licensed operator requalification training (LORT) program to meet the requirements of 10 CFR 55.59. (02.02)

These activities by the inspectors constituted a single annual licensed operator requalification examination results inspection sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

.4 Biennial Review

a. Inspection Scope

The following inspection activities were conducted during the weeks of September 18 and September 25, 2017, to assess: (1) the effectiveness and adequacy of the facility licensee's implementation and maintenance of its systems approach to training based LORT program, put into effect to satisfy the requirements of 10 CFR 55.59; (2) conformance with the requirements of 10 CFR 55.46 for use of a plant referenced simulator to conduct operator licensing examinations and for satisfying experience requirements; and (3) conformance with the operator license conditions specified in 10 CFR 55.53.

- Licensee Requalification Examinations (10 CFR 55.59(c); Systems Approach to Training Element 4 as defined in 10 CFR 55.4): The inspectors reviewed the licensee's program for the development and administration of the LORT biennial written examination and annual operating tests to assess the licensee's ability to develop and administer examinations that were acceptable for meeting the requirements of 10 CFR 55.59(a).
 - The inspectors conducted a detailed review of one version of the 2016 biennial requalification written examination administered to Crew 3 on August 19, 2016, to assess content, level of difficulty, and quality of the written examination materials. (02.03)
 - The inspectors conducted a detailed review of 10 job performance measures and four simulator scenarios to assess content, level of difficulty, and quality of the operating test materials. (02.04)

- The inspectors observed the administration of the annual operating test to assess the licensee's effectiveness in conducting the examinations, including the conduct of pre-examination briefings, evaluations of individual operator and crew performance, and post-examination analysis. The inspectors evaluated the performance of one shift crew split into two simulator operating crews in parallel with the facility evaluators during four dynamic simulator scenarios, and evaluated various licensed crew members concurrently with facility evaluators during the administration of several job performance measures. (02.05)
- The inspectors assessed the adequacy and effectiveness of the remedial training conducted since the last requalification examinations and the training planned for the current examination cycle to ensure that they addressed weaknesses in licensed operator or crew performance identified during training and plant operations. The inspectors reviewed remedial training procedures and individual remedial training plans. (02.07)
- Conformance with Examination Security Requirements (10 CFR 55.49): The inspectors conducted an assessment of the licensee's processes related to examination physical security and integrity (e.g., predictability and bias) to verify compliance with 10 CFR 55.49, "Integrity of Examinations and Tests." The inspectors reviewed the facility licensee's examination security procedure, and observed the implementation of physical security controls (e.g., access restrictions and simulator input/output controls) and integrity measures (e.g., security agreements, sampling criteria, bank use, and test item repetition) throughout the inspection period. (02.06)
- Conformance with Operator License Conditions (10 CFR 55.53): The inspectors reviewed the facility licensee's program for maintaining active operator licenses and to assess compliance with 10 CFR 55.53(e) and (f). The inspectors reviewed the procedural guidance and the process for tracking on-shift hours for licensed operators, and which control room positions were granted watch-standing credit for maintaining active operator licenses. Additionally, medical records for 10 licensed operators were reviewed for compliance with 10 CFR 55.53(l). (02.08)
- Conformance with Simulator Requirements Specified in 10 CFR 55.46: The inspectors assessed the adequacy of the licensee's simulation facility (simulator) for use in operator licensing examinations and for satisfying experience requirements. The inspectors reviewed a sample of simulator performance test records (e.g., transient tests, malfunction tests, scenario based tests, post-event tests, steady state tests, and core performance tests), simulator discrepancies, and the process for ensuring continued assurance of simulator fidelity in accordance with 10 CFR 55.46. The inspectors reviewed and evaluated the discrepancy corrective action process to ensure that simulator fidelity was being maintained. Open simulator discrepancies were reviewed for importance relative to the impact on 10 CFR 55.45 and 55.59 operator actions as well as on nuclear and thermal hydraulic operating characteristics. (02.09)
- Problem Identification and Resolution (10 CFR 55.59(c); Systems Approach to Training Element 5 as defined in 10 CFR 55.4): The inspectors assessed the licensee's ability to identify, evaluate, and resolve problems associated with

licensed operator performance (a measure of the effectiveness of its LORT program and their ability to implement appropriate corrective actions to maintain its LORT program up to date). The inspectors reviewed documents related to licensed operator performance issues (e.g., recent examination and inspection reports including cited and non-cited violations; NRC End of Cycle and Mid-Cycle reports; NRC plant issues matrix; licensee event reports; licensee condition/problem identification reports including documentation of plant events and review of industry operating experience). The inspectors also sampled the licensee's quality assurance oversight activities, including licensee training department self-assessment reports. (02.10)

These activities by the inspectors constituted a single biennial licensed operator requalification program inspection sample as defined in Inspection Procedure (IP) 71111.11-05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations

a. Inspection Scope

The inspectors evaluated performance issues and/or maintenance effectiveness involving the following risk-significant systems and components:

- The Unit 2 Start-Up Feedwater Pump during the weeks ending September 2, 2017, through September 30, 2017; and
- The station's summer 2017 dry fuel storage cask loading campaign (5 of 6 casks) during the weeks ending July 29, 2017, through September 30, 2017 (Quality Control).

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

- Implementing appropriate work practices;
- Identifying and addressing common cause failures;
- Scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- Characterizing system reliability issues for performance;
- Charging unavailability for performance;
- Trending key parameters for condition monitoring;
- Ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- Verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance

effectiveness issues were entered into the corrective action program (CAP) with the appropriate significance characterization.

For the inspection sample related to the station's summer 2017 dry fuel storage cask loading campaign, the inspectors also performed a quality control review for the recent activities associated with this safety-significant SSC, as discussed in IP 71111.12, Section 02.02.

These maintenance effectiveness review activities conducted by the inspectors constituted a single maintenance effectiveness sample and a single quality control inspection sample as defined in IP 71111.12-05.

b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

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

- Planned activities associated with the loading and transport of dry fuel storage casks (5 of 6 casks total) during the weeks ending July 29, 2017, through September 30, 2017;
- Unplanned troubleshooting and maintenance activities associated with anomalies identified during a scheduled calibration of Pressurizer Pressure Loop Channel 3 on Unit 2 during the week ending August 19, 2017, through the week ending September 9, 2017; and
- Planned corrective maintenance activities involving repairs to the Unit 1 main electrical generator voltage regulator during the week ending August 19, 2017, through the week ending September 9, 2017.

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 Technical Specification (TS) requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

The inspectors' review of these maintenance risk assessments and emergent work control activities constituted three inspection samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

.1 Operability Evaluations and Functionality Assessments

a. Inspection Scope

Throughout the course of the inspection period, the inspectors reviewed the following issues:

- The evaluation of the Unit 2 containment liner metal loss exceeding 10 percent nominal thickness, as documented in IR 4008686 during the weeks ending July 8, 2017, through July 15, 2017;
- The impact of the 2A Essential Service Water (SX) strainer backwash timer failure, as documented in IR 4038915 during the weeks ending August 12, 2017, through August 26, 2017;
- The evaluation of deficiencies noted during 1A Containment Spray (CS) pump surveillance testing, as documented in IR 4049526 during the weeks ending September 23, 2017, through September 30, 2017; and
- The evaluation of a previously unanalyzed condition, specifically the lifting of main steam safety valve room concrete roof plugs during a worst-case steam line break event, as documented in IR 4049759 during the weeks ending September 16, 2017, through September 30, 2017 (Operability Evaluation 17-002, Rev. 0).

The inspectors selected these potential operability issues based on the risk significance of the associated SSCs. The inspectors examined the technical adequacy of the evaluations to ensure that TS operability was properly justified, and also to ensure that the applicable SSCs 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 Updated Final Safety Analysis Report (UFSAR) to the licensee's evaluations to determine whether the applicable SSCs were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were appropriately controlled. The inspectors verified, where applicable, that the bounding limitations of the evaluations were valid. Additionally, the inspectors reviewed a sample of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with the operability evaluations and functionality assessments.

The review of these operability evaluations and functionality assessments by the inspectors constituted four inspection samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Quarterly Resident Inspector Observation and Review of Post-Maintenance Testing Activities

a. Inspection Scope

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

- Operational and functional testing of the Unit 1 Station Air Compressor (1SA01C) following a planned maintenance work window during the week ending July 22, 2017;
- Operational and functional testing of the 1A Safety Injection (SI) Pump following a planned maintenance work window during the week ending August 5, 2017;
- Operational and functional timed stroke testing of motor-operated valves associated with the 1A SI Train following a planned maintenance work window during the week ending August 5, 2017; and
- Calibration and functional testing of the Unit 1 main electrical generator voltage regulator following base adjuster power supply replacement during the week ending September 9, 2017.

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 the PMT activities 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.

The inspectors' reviews of these activities constituted four PMT inspection 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:

- The 2A Emergency Diesel Generator monthly operability run during the week ending July 15, 2017 (Routine); and
- The Unit 1 turbine over speed protection system valve stem freedom checks during the week ending September 6, 2017 (Routine).

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

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, sufficient to demonstrate operational readiness, and consistent with the system design basis;
- was plant equipment calibration correct, accurate, and properly documented;
- were as-left setpoints within required ranges; and was the calibration frequency in accordance with TSs, the UFSAR, plant procedures, and applicable commitments;
- was measuring and test equipment calibration current;
- was the test equipment used within the required range and accuracy, and were applicable prerequisites described in the test procedures satisfied;
- did test frequencies meet TS requirements to demonstrate operability and reliability;
- were tests performed in accordance with the test procedures and other applicable procedures;
- were jumpers and lifted leads controlled and restored where used;
- were test data and results accurate, complete, within limits, and valid;
- was test equipment removed following testing;
- where applicable for IST activities, was testing performed in accordance with the applicable version of Section XI of the American Society of Mechanical Engineers (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 (PI) data;
- were test results not meeting acceptance criteria addressed with an adequate operability evaluation or was the system or component declared inoperable;
- was the reference setting data accurately incorporated into the test procedure;
- was equipment returned to a position or status required to support the performance of its safety functions following testing;

- were problems identified during the testing appropriately documented and dispositioned in the licensee's CAP;
- were annunciators and other alarms demonstrated to be functional and were setpoints consistent with design requirements; and
- were alarm response procedure entry points and actions consistent with the plant design and licensing documents.

These activities conducted by the inspectors constituted two routine surveillance testing inspection samples as defined in Inspection Procedure (IP) 71111.22, Sections 02 and 05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Operations Crew Simulator Training Observation

a. Inspection Scope

The inspectors observed the following training evolution for licensed operators that required emergency plan implementation by the crews in the control room simulator:

- September 19, 2017—morning session.

The training evolution was planned and evaluated, and included independent assessment of the control room simulator crew. The inspectors observed event classification and notification activities performed by the crew, and also attended the post-evolution critiques for the scenario.

The focus of the inspectors' activities was to identify any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the CAP.

The inspectors' review of this licensee training evolution with emergency preparedness drill aspects constituted a single inspection sample as defined in IP 71114.06–06.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

.1 Walkdowns and Observations

a. Inspection Scope

The inspectors walked down select effluent radiation monitoring systems to evaluate whether the monitor configurations aligned with offsite dose calculation manual (ODCM) descriptions and to observe the material condition of the systems.

The inspectors walked down selected components of the gaseous and liquid discharge systems to evaluate whether equipment configuration and flow paths aligned with plant documentation and to assess equipment material condition. The inspectors also assessed whether there were potential unmonitored release points, building alterations, which could impact effluent controls, and ventilation system leakage that communicated directly with the environment.

For equipment or areas associated with the systems selected for review that were not readily accessible, the inspectors reviewed the licensee's material condition surveillance records.

The inspectors walked down filtered ventilation systems to assess for conditions such as degraded high-efficiency particulate air/charcoal banks, improper alignment, or system installation issues that would impact the performance or the effluent monitoring capability of the effluent system.

As available, the inspectors observed selected portions of the routine processing and discharge of radioactive gaseous effluents to evaluate whether appropriate treatment equipment was used and the processing activities aligned with discharge permits.

The inspectors determined if the licensee has made significant changes to their effluent release points.

As available, the inspectors observed selected portions of the routine processing and discharging of liquid waste to determine if appropriate effluent treatment equipment was being used and that radioactive liquid waste was being processed and discharged in accordance with procedure requirements and aligned with discharge permits.

These activities by the inspectors constituted a single complete inspection sample as defined in IP 71124.06–05.

b. Findings

(1) Failure to Implement Adequate Radiological Controls for Treated Liquid Radioactive Effluents Containing Tritium

Introduction: The inspectors identified a self-revealing finding of very low safety significance (Green) and an associated non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (CFR) Part 20.1406, *Minimization of Contamination*, when licensee personnel failed to establish and implement adequate radiological controls for radioactive contaminated water that leaked from the circulating water blowdown (CWBD) 0CW260A/B valves into the lower section of valve pit/sump area of the CWBD house. The accumulated sump water was subsequently pumped by licensee personnel to the ground surrounding the CWBD house, thus contaminating the environs. This was a failure to conduct, to the extent practical, the minimization of residual radioactivity required by 10 CFR 20.1406(c) of the surrounding radiologically unrestricted area.

Description: The station utilizes a blowdown line to return water from the cooling lake back to the Kankakee River for the purposes of reducing the dissolved mineral concentration of the lake water. This blowdown line also serves as the conduit for permitted discharge of the station's treated liquid radioactive effluents. The CWBD house contains control valves for the blowdown line and is located on licensee property approximately five miles east of the plant and directly adjacent to the Kankakee River. The licensee's treated liquid radioactive effluent discharges via the blowdown line are not continuous and typically occur in discrete increments.

On June 8, 2017, a chemistry technician conducting a routine periodic check of the CWBD sampling compositor, equipment that is used by the licensee to verify and log that the station's treated liquid radioactive effluents and tritium concentrations are within limits, observed a hose from the CWBD house discharging water onto the surrounding ground. The hose was placed on the ground approximately 10 feet from the CWBD house entryway, and this unusual configuration prompted the technician to obtain a sample of the discharged water for analysis. The sample was analyzed to contain approximately 200,210 picocuries per liter (pCi/liter) of tritium; however, a sample that was taken later on the afternoon of June 11, 2017, indicated a concentration of 1,100 pCi/liter of tritium. The lower concentration of tritium corresponded to the licensee's termination of a routine permitted discharge of treated liquid radioactive effluent to the blowdown line.

In response to this event, the licensee conducted a formal root cause evaluation. This evaluation determined that the source of the water from the hose at the CWBD house was accumulated leakage from packing leaks on the blowdown line control/throttle valves (0CW260A and 0CW260B) that were located in the pit area of the CWBD house. These valves had developed leaks in January 2016, and licensee maintenance personnel had tightened the valve packing temporarily stopping the leakage. On May 25, 2017, due to renewed leakage, licensee maintenance personnel attempted to replace the packing on the valves without success. Plant operators subsequently identified that the water level in the CWBD house valve pit was rising and permission was granted by operations supervisory personnel to pump the water out from the valve pit with sump pumps. On May 28, 2017, the licensee's staff pumped the accumulated water in the CWBD house valve pit to the outside of the building and onto the

surrounding ground. This discharge of the accumulated water in the CWBD house valve pit was approximately 50 feet from the permitted discharge canal to the Kankakee River.

The licensee's root cause evaluation further revealed that plant operators were not aware of the possibility that the accumulated water in the CWBD house valve pit was potentially contaminated with tritium from treated liquid radioactive effluent. The record of the liquid discharge permits indicated that the licensee performed at least six treated liquid radioactive effluent discharges between May 27, 2017, and June 9, 2017.

In contrast to the event identified on June 8, 2017, the licensee had identified previous 0CW260A valve leakage on September 14, 2016. During this event, however, the water from the CWBD house valve pit was pumped to an approved discharge path. Specifically, licensee personnel had pumped the water in the CWBD house valve pit to the sampling compositor sink inside the CWBD house, which constituted an approved and monitored release path. The licensee had evaluated and documented the September 14, 2016, issue in their corrective action program (CAP) as IR 2715867.

Corrective actions taken by the licensee in response to the June 8, 2017, event included the placement of multiple monitoring wells at various depths in the vicinity of the CWBD house to determine soil contamination levels, as well as the establishment of soil remediation efforts to remove the tritium contamination from the area. The issue and the licensee's formal root cause evaluation were entered into their CAP as IR 4020644.

Analysis: The inspectors determined that the issue constituted a failure on the part of the licensee to conduct, to the extent practical, the minimization of residual radioactivity required by 10 CFR 20.1406(c) of the radiologically unrestricted area in the vicinity of the CWBD house. Specifically, the licensee failed to establish and implement adequate radiological practices for the control of treated liquid radioactive effluent containing tritium leaking from the CWBD line control/throttle valves that had accumulated in the CWBD house valve pit. The licensee failed to conduct operations to minimize the introduction of residual radioactivity into a radiologically unrestricted area by intermittently releasing treated liquid radioactive effluent containing tritium directly onto the site environs. The total discharge identified associated with this issue was approximately 35,000 gallons. The inspectors determined that the cause of the issue constituted a performance deficiency that was reasonably within the licensee's ability to foresee and correct and that should have been prevented. The finding was not subject to traditional enforcement since the event did not result in a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and was not willful.

The performance deficiency was of more than minor significance because it was associated with the Program and Process attribute of the Public Radiation Safety cornerstone and adversely affected the cornerstone objective of ensuring the adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. In accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," the finding was determined to be of very low safety significance (Green) because the issue involved a radioactive effluent release, but did not: (1) represent a substantial failure to implement the radioactive effluent release program; or (2) result in public exposure that exceeded the dose values in Appendix I to 10 CFR Part 50 and/or 10 CFR 20.1301(e) limits.

The inspectors determined that the finding had a cross-cutting component in the area of Human Performance, in the aspect of Challenging the Unknown. In particular, licensee personnel did not stop when faced with uncertain conditions or evaluate and manage risk before proceeding. [H.11]

Enforcement: NRC requirements set forth in 10 CFR 20.1406, *Minimization of Contamination*, Paragraph (c), stipulate, in part, that licensees shall, to the extent practical, conduct operations to minimize the introduction of residual radioactivity into the site, including the subsurface, in accordance with the existing radiation protection requirements.

Contrary to these requirements, the licensee failed to conduct operations to minimize the introduction of residual radioactivity into a radiologically unrestricted area, which included the subsurface area in the vicinity of the site's CWBD house, by intermittently releasing treated liquid radioactive effluent containing tritium directly onto the ground between May 27, 2017, and June 9, 2017. The treated liquid radioactive effluent containing tritium was released approximately 50 feet short of the permitted discharge outfall, and consisted of a total discharge volume of approximately 35,000 gallons.

The licensee's failure to implement and maintain adequate radiological control of treated liquid radioactive effluent containing tritium from leaking CWBD control valves was of very low safety significance. Because this violation was of very low safety significance and was entered into the licensee's CAP as IR 4020644, it is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy.
(NCV 05000456/2017003-01; 05000457/2017003-01)

.2 Calibration and Testing Program

a. Inspection Scope

The inspectors reviewed calibration and functional tests for select effluent monitors to evaluate whether they were performed consistent with the ODCM. The inspectors assessed whether National Institute of Standards and Technology traceable sources were used, primary calibration represented the plant nuclide mix, secondary calibrations verified the primary calibration, and calibration encompassed the alarm setpoints.

The inspectors assessed whether effluent monitor alarm setpoints were established as provided in the ODCM and procedures.

The inspectors evaluated the basis for changes to effluent monitor alarm setpoints.

These activities by the inspectors constituted a single complete inspection sample as defined in IP 71124.06-05.

b. Findings

No findings were identified.

.3 Sampling and Analyses

a. Inspection Scope

The inspectors reviewed select effluent sampling activities and assessed whether adequate controls had been implemented to ensure representative samples were obtained.

The inspectors reviewed select effluent discharges made with inoperable effluent radiation monitors and assessed whether controls were in place to ensure compensatory sampling was performed consistent with the ODCM and that those controls were adequate to prevent the release of unmonitored effluents.

The inspectors determined whether the facility was routinely relying on the use of compensatory sampling in lieu of adequate system maintenance.

The inspectors reviewed the results of the inter-laboratory comparison program to evaluate the quality of the radioactive effluent sample analyses and assessed whether the inter-laboratory comparison program included hard-to-detect isotopes as appropriate.

These activities by the inspectors constituted a single complete inspection sample as defined in Inspection Procedure (IP) 71124.06–05.

b. Findings

No findings were identified.

.4 Instrumentation and Equipment

a. Inspection Scope

The inspectors reviewed the methodology used to determine effluent stack and vent flow rates to determine if the flow rates were consistent with plant documentation, and whether differences between assumed and actual stack and vent flow rates affected the results of projected public dose.

The inspectors assessed whether surveillance test results for Technical Specification (TS) required ventilation effluent discharge systems met TS acceptance criteria.

The inspectors assessed calibration and availability for select effluent monitors used for triggering emergency action levels or for determining protective action recommendations.

These activities by the inspectors constituted a single complete inspection sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.5 Dose Calculations

a. Inspection Scope

The inspectors reviewed significant changes in reported dose values compared to the previous radiological effluent release report to evaluate the factors which may have resulted in the change.

The inspectors reviewed radioactive liquid and gaseous waste discharge permits to assess whether the projected doses to members of the public were accurate.

The inspectors evaluated the isotopes that are included in the source term to assess whether analysis methods were sufficient to satisfy detectability standards. The review included the current Part 61 analyses to ensure hard-to-detect radionuclides were included in the source term.

The inspectors reviewed changes in the licensee's offsite dose calculations to evaluate whether changes were consistent with the ODCM and Regulatory Guide 1.109. The inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to evaluate whether appropriate factors were being used for public dose calculations.

The inspectors reviewed the latest land use census to assess whether changes have been factored into the dose calculations.

For select radioactive waste discharges, the inspectors evaluated whether the calculated doses were within the 10 CFR Part 50, Appendix I and TS dose criteria.

The inspectors reviewed select records of abnormal radioactive waste discharges to ensure the discharges were monitored by the discharge point effluent monitor. Discharges made with inoperable effluent radiation monitors, or unmonitored leakages were reviewed to ensure that an evaluation was made to account for the source term and projected dose to the public.

These activities by the inspectors constituted a single complete inspection sample as defined in IP 71124.06-05.

b. Findings

No findings were identified.

.6 Problem Identification and Resolution

a. Inspection Scope

The inspectors assessed whether problems associated with the effluent monitoring and control program were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. In addition, the inspectors evaluated the appropriateness of the corrective actions for a selected sample of problems documented by the licensee involving radiation monitoring and exposure controls.

These activities by the inspectors constituted a single complete inspection sample as defined in IP 71124.06–05.

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 Mitigating Systems Performance Index—Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI)—Heat Removal System performance indicator (PI) for the period from the third quarter 2016 through the second quarter 2017 for Units 1 and 2. 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, MSPI derivation reports, and NRC integrated inspection reports for the period of July 2016 through June 2017 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee’s CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

The inspectors' reviews constituted two MSPI—Heat Removal System PI inspection samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index—Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI—Residual Heat Removal System PI for the period from the third quarter 2016 through the second quarter 2017 for Units 1 and 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in 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, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of July 2016 through June 2017 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee’s CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

The inspectors' reviews constituted two MSPI—Residual Heat Removal System PI inspection samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index—Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI—Cooling Water Systems performance for the period from the third quarter 2016 through the second quarter 2017 for Units 1 and 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in 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, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of July 2016 through June 2017 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee’s CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

The inspectors' reviews constituted two MSPI—Cooling Water Systems PI inspection samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.4 Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system specific activity PI for the period from the first quarter of 2016 through the second quarter of 2017 for Units 1 and 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's reactor coolant system chemistry samples, TS requirements, IRs, event reports and NRC integrated inspection reports to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample.

The inspectors' reviews constituted two Reactor Coolant System Specific Activity PI inspection samples as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

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

a. Inspection Scope

As part of the various baseline IPs 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 to this report.

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 CR 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.

4OA6 Management Meetings

.1 Exit Meeting Summary

On October 5, 2017, the inspectors presented the inspection results to the Site Vice President, Ms. M. Marchionda, 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 results of inspections in the area of radiation protection and radiation safety with the Plant Manager, Ms. A. Ferko, and other members of the licensee staff on August 11, 2017; and
- The results of the annual and biennial inspections in the area of operator licensing and requalification with the Training Director, Mr. R. Cameron, and other members of the licensee staff on September 29, 2017; and
- The results of the 2017 annual operating test with the Licensed Operator Requalification Training (LORT) Supervisor, Mr. J. Taff, via telephone on October 6, 2017.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received by the inspectors and reviewed in the course of these inspections 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. Cady, Radiation Protection Manager
R. Cameron, Training Director
B. Currier, Engineering Director
B. Finlay, Security Manager
R. Hall, Chemical Environment & Radwaste Manager
M. Holba, Environmental Chemistry
J. Sanchez, Operations
T. Leaf, Operations Director
P. Moodie, Shift Operations Superintendent
P. Rausch, Work Management Director
S. Reynolds, Regulatory Assurance Manager
R. Schliessmann, NRC Coordinator
G. Smith, Emergency Preparedness Manager
J. Taff, Licensed Operator Requalification Training Supervisor

U.S. Nuclear Regulatory Commission

E. Duncan, Chief, Reactor Projects Branch 3

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000456/2017003-01; 05000457/2017003-01	NCV	Failure to Implement Adequate Radiological Controls for Treated Liquid Radioactive Effluents Containing Tritium (Section 2RS6.1)
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Closed

05000456/2017003-01; 05000457/2017003-01	NCV	Failure to Implement Adequate Radiological Controls for Treated Liquid Radioactive Effluents Containing Tritium (Section 2RS6.1)
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Discussed

None

LIST OF DOCUMENTS REVIEWED

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

1R01 Adverse Weather Protection

Action Requests/Issue Reports:

- 2473324; Procedural Enhancement to MA-AA-716-026

Procedures:

- 0BwOA ENV-1; Adverse Weather Conditions Unit 0; Revision 123
- MA-AA-716-026; Station Housekeeping Material Condition Program; Revision 15
- OP-AA-108-111-1001; Severe Weather and Natural Disaster Guidelines; Revision 15

Other:

- Letter from Mr. Glen Kaegi to NRC; Mitigating Strategies Flood Hazard Assessment (MSFHA) Submittal; June 30, 2016
- Letter from NRC to Mr. Bryan C. Hansen; Braidwood Station, Units 1 and 2 – Flood Hazard Mitigation Strategies Assessment (CAC Nos. MF7898 and MF7899); November 28, 2016

1R04 Equipment Alignment

Action Requests/Issue Reports:

- 2390200; 1C CW Tan Delta Test Did Not Meet Acceptance Criteria; October 2, 2014
- 2483670; OSP-A Failed Static Baker Test 1A CW Motor; April 11, 2015
- 3986220; Address Corroded Bisulfite Pipe – CW Blowdown Vacuum Breaker Inspection; March 17, 2017
- 3986225; CW Make-Up Vacuum Breaker Inspection Roll Up; March 16, 2017;
- 4045078; Pipe 0CW63A Not Painted and Signs of Corrosion at 0CW09B-36; August 23, 2017
- 4049402; NRC ID: D-474 Not Fully Closing Without Assistance; September 6, 2017

Procedures:

- BwOP AF-E1; Electrical Lineup – Unit 1; Revision 15
- BwOP AF-M1; Operating Mechanical Lineup – Unit 1; Revision 20
- BwOP AF-5; Motor Driven Auxiliary Feedwater Pump – A Startup on Recirc; Revision 20
- BwOP AP-21; Isolating System Auxiliary Transformer (SAT) 242-1 With Unit 2 UAT Energized; Revision 23
- BwOP AP-24; Isolating System Auxiliary Transformer (SAT) 242-2 With Unit 2 UAT Energized; Revision 21
- BwOP AP-38; Unit One SAT Crosstie to Unit Two ESF Bus; Revision 5
- BwOP CW-E1; Electrical Lineup – Unit 1 Operating; Revision 8
- BwOP CW-E2; Electrical Lineup – Unit 0 Operating; Revision 3
- BwOP CW-E3; Operating Electrical Lineup – Unit 2; Revision 8
- BwOP CW-M6; Circulating Water Operating Mechanical Lineup – Unit 2; Revision 16
- BwOP CW-M2; Operating Mechanical Lineup Unit 0 CW Makeup, Blowdown, and River Screen House Screen Wash; Revision 20
- BwOP SI-M1; Operating Mechanical Lineup Unit 1; Revision 26
- BwOP SI-E1; Electrical Lineup – Unit 1 Operating; Revision 12

- ER-BR-400-101; Unit Common Circulating Water (CW) System Blowdown and Makeup Vacuum Breaker Valve Inspection; Revision 1
- 0BwOS CW-1; Unit Common CW System Blowdown Line Inspection; Revision 3
- 0BwOS CW-A1; Unit Common CW System Blowdown Line Inspection; Revision 7
- 0BwOS CW-2; CW Blowdown Vacuum Breaker Vault Moisture Sensor System Status Check; Revision 9

Drawings/Prints:

- M-37; Auxiliary Feedwater Unit 1; Revision BK
- M-61, Sheet 1A; Safety Injection Unit 1; Revision BJ
- M-44, Sheet 1; Circulating Water; Revision V
- M-44, Sheet 3A; Circulating Water Make-up Units 1 & 2; Revision AX
- M-44, Sheet 4; Circulating Water Unit 1; Revision AO
- M-144, Sheet 1; Circulating Water; Revision V
- M-144, Sheet 3; Circulating Water Unit 2; Revision AJ

Engineering Changes/Technical Evaluations:

- EC 336241; Installation of Circulating Water Blowdown Booster Pumps; Revision 2
- EC 619221; Engineering Evaluation to Address All Aspects of Braidwood Unit 2 Containment Moisture Barrier Class CC Degraded Areas Found in A2R19; Revision 0

Work Orders:

- 1906216; CW Blowdown/Makeup Vacuum Breaker Valve Annual Inspection

1R05 Fire Protection

Action Requests/Issue Reports:

- 4013724; Quarterly Grout Test Needed for Masterflow 928 Batch; May 22, 2017
- 4033122; Spurious Fire Alarm for Zone 1D-9; July 18, 2017

Procedures:

- BwAP 1100-4; Fire Brigade Implementing Procedure; Revision 5
- BwAP 1100-16; Fire/Hazardous Materials Spill and/or Injury Response; Revision 32
- BwAP 1110-1; Fire Protection Program System Requirements; Revision 40
- BwAP 1110-1A3; GOCAR Action Chart Fire Protection Water Suppression Systems; Revision 8
- BwAP 1110-1A4; GOCAR Required Compensatory Measures Action Response Carbon Dioxide Fire Suppression Systems; Revision 10
- BwAP 1110-1A5; GOCAR Required Compensatory Measures Action Response Halon Fire Suppression Systems; Revision 5
- BwOP FP-100; Fire Response Guidelines; Revision 23
- CC-AA-201; Plant Barrier Control Program; Revision 11
- ER-AA-600-1069; High Risk Fire Area Identification; Revision 4
- ER-BR-600-1069; Site List of High Risk Fire Areas – Braidwood Unit 1 and Unit 2; Revision 0
- OP-AA-201-004; Fire Prevention for Hot Work; Revision 14
- OP-AA-201-008; Pre-Fire Plan Manual; Revision 4
- OP-AA-201-009; Control of Transient Combustible Material; Revision 19
- OP-MW-201-007; Fire Protection System Impairment Control; Revision 7

Pre-Fire Plans:

- No. 45; Fire Zone 5.3-1: SWGA 451' Unit 1 Non-ESF Switchgear Room; Revision 0
- No. 46; Fire Zone 5.3-2: SWGA 451' Unit 2 Non-ESF Switchgear Room; Revision 0

1R06 Flood Protection Measures

Action Requests/Issue Reports:

- 2487013; 1DM03J Sump Pump is in Alarm; April 17, 2015
- 3965084; Cable Vault Pump Running in Auto with High Level Alarm; January 20, 2017
- 4033340; Multiple PM's are at Risk of Going Late on 08/09/2017; July 19, 2017
- 4037994; NRC Identified Water on Cables in 1E Cable Vault; August 1, 2017
- 4045897; Sump Pump in Cable Vault 1DM03J Not Working-Cable Vault 1F; August 25, 2017
- 4049199; NRC ID'D – MSIV Room Issues for Resolution; September 5, 2017

Procedures:

- ER-AA-300-150; Cable Condition Monitoring Program; Revision 4
- BwMS 3150-001; Circulating Water Large Diameter Expansion Joint Annual Inspection; Revision 3E1

Work Orders:

- 1934210; 1DM03P Remove and Replace Cable Vault Sump Pump
- 1934211; 1DM02P Remove and Replace Cable Vault Sump Pump

Drawings/Prints:

- M-67A; Diagram of Miscellaneous Drains Electrical Cable Vaults Units 1 & 2; Revision D
- 20E-0-1001A; Duct Runs Outdoor Plan Plant Area; Revision L
- 20E-0-3586; Electrical Installation Manholes 1E, 1F, & 1G Racks Plan and Section; Revision W

Engineering Changes:

- EC 378880; Install a Permanent De-Watering System for the Unit 1 Duct Runs to the Lake Screen House (LSH); Revision 2
- EC 393714; Braidwood Turbine Building Flood Evaluation; Revision 0

Calculations:

- BRW-13-0076-M; Turbine Building Flood Level Evaluation; November 2, 2013
- BRW-13-0102-M; Circulating Water Piping Seismic Analysis; July 19, 2013

Other:

- Letter from Mr. Darin Benyak to NRC; Response to NRC Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients;" Dated May 7, 2007.

1R11 Licensed Operator Requalification Program

Action Requests/Issue Reports:

- 2565513; Auxiliary Feedwater Auto-Start on LO-2 SGWL; October 5, 2015
- 2575961; 2FI-523A Not Indicating Flow; October 23, 2015
- 2620772; Reportable Fire; February 2, 2016
- 2720889; Pre-NRC 71111.11 Inspection Licensed Operator Requalification Training Assessment; April 21, 2017
- 2722783; LVL 2 C&T – 1CV111B Gas From VCT Present at Valve; October 1, 2016
- 2731293; Missed Procedure Steps in SSPS Surveillance; October 22, 2016
- 3897867; Training: Performance EP Failure (DEP); March 21, 2017
- 4020644; H3 Water Being Pumped on to Surrounding Ground; June 11, 2017
- 4027999; 2CB01PB-A Breaker Misposition; July 1, 2017

- 4034997; Malfunctions Entered Early in Evaluated Scenario; July 24, 2017
- 4035408; Training: Performance EP Failure (DEP); July 25, 2017
- 4035426; Training: Crew Failure During OBE; July 25, 2017
- 4048501; Unexpected Annunciator 1-10-A7, Rod Deviation Power Range Tilt; September 2, 2017
- 4051735; Training: Crew Failure During NRC Annual Exam; September 13, 2017
- 4052124; Training: Inability to Reset Simulator Master Executive File; September 14, 2017
- 4056750; Training: Incorrect SWR ID Number on Simulator Record; September 27, 2017

Procedures:

- OP-AA-101-111-1001; Operations Standards and Expectations; Revision 18
- OP-AA-101-113; Operator Fundamentals; Revision 10
- OP-AA-101-113-1006; 4.0 Crew Critique Guidelines; Revision 7
- OP-AA-103-102; Watch-Standing Practices; Revision 16
- OP-AA-103-102-1001; Strategies for Successful Transient Mitigation; Revision 1
- OP-AA-103-103; Operation of Plant Equipment; Revision 1
- OP-AA-104-101; Communications; Revision 3
- OP-AA-105-102; NRC Active License Maintenance; Revision 13
- OP-AA-108-107-1002; Interface Procedure Between BGE/COMED/PECO and Exelon Generation (Nuclear/Power) for Transmission Operations; Revision 11
- OP-AA-111-101; Operating Narrative Logs and Records; Revision 13
- OP-AA-300; Reactivity Management; Revision 11
- TQ-AA-10; Systematic Approach to Training Process Description; Revision 5
- TQ-AA-150; Operator Training Programs; Revision 14
- TQ-AA-155; Conduct of Simulator Training and Evaluation; Revision 6
- TQ-AA-155-J050; Evaluated Scenario Grading Flowchart; Revision 0
- TQ-AA-155-F01; Critical Task Supplemental Form; Revision 1
- TQ-AA-224-F100; Remedial Training Notification and Action on Failure; Revision 7
- TQ-AA-306; Simulator Management; Revision 8
- TQ-AA-306; ATT 10, Plant Data Added; Cycle 20; Moderator Temperature Coefficient of Reactivity; November 3, 2016
- TQ-AA-306; ATT 11, Plant Data Added; Cycle 20; Rod Worth Coefficient of Reactivity; November 3, 2016
- TQ-AA-306; ATT 12; Cycle 20; Boron Coefficient of Reactivity; June 29, 2016
- TQ-BR-201-0113; Braidwood Training Department Simulator Examination Security Actions; Revision 21
- TQ-BR-302-0103; Cycle 20 Testing; Steady State Test at 100% and 50%; April 4, 2017
- TQ-BR-302-0103; SS-1 Cycle 20 Testing; Steady State Test at 75%; June 10, 2017
- TQ-BR-302-0111; Cycle 20 Testing; Transient Test 6; December 30, 2016
- TQ-BR-302-0113; Cycle 20 Testing; Transient Test 8; December 29, 2016
- TQ-BR-302-0115; Cycle 20 Testing; Transient Test 10; December 30, 2016
- 1BwGP 100-3; Power Ascension 5% to 100%; Revision 71
- 1BwGP 100-4; Power Descension; Revision 41
- 1BwOS TRM 3.3.g.3; Unit One Turbine Overspeed Protection System Valve Stem Freedom Checks (RV-IV Cycling); Revision 19
- 1BwOS TRM 3.3.g.4; Unit One Turbine Overspeed Protection Systems Valve Stem Freedom Checks (TV-GV Cycling); Revision 19
- BwOP AP-21; Isolating System Auxiliary Transformer (SAT) 242-1 With Unit 2 UAT Energized; Revision 23
- BwOP AP-24; Isolating System Auxiliary Transformer (SAT) 242-2 With Unit 2 UAT Energized; Revision 21

- BwOP FW-1; Startup of a Turbine Driven Main Feedwater Pump; Revision 37

Engineering Changes/Technical Evaluations:

- EC 619221; Engineering Evaluation to Address All Aspects of Braidwood Unit 2 Containment Moisture Barrier Class CC Degraded Areas Found in A2R19; Revision 0

Work Orders:

- 4625692; Turbine Throttle, Governor Valve Semi-Annual Cycle
- 4670860; Unit 1 Reheat and Intercept Valve Monthly Cycle

Simulator Work Requests:

- 132479; CC Pump 0 OCCO1P Switch Has Assumed Dirty Contacts; September 8, 2016
- 132498; EC 406154: Switchyard ACB to GCB Replacement: BT 1-8; September 16, 2016
- 132543; Natural Circ Flow Does Not Establish or Cool; September 29, 2016
- 132609; EC 401148: U-1 Charcoal Filter Unit Abandonment; October 14, 2016
- 132612; SD Bank C, D and E Do Not Move During Rod Testing; October 16, 2016
- 132628; Transient Test 4 Anomaly; October 25, 2016
- 132631; BKR Closing Improperly/Turbine Not Tripping; October 26, 2016
- 132797; Anomaly in Transient Test 8; January 11, 2017
- 132901; Anomaly on AF Pump Start; February 7, 2017
- 132933; EC 407078 Starting Interlock on S/U FW Pump; February 13, 2017
- 132986; Tc's Read Excessively, Varying Values During a LBLOCA; March 1, 2017
- 133280; Update Dispatch Spreadsheet for IC Resets; June 6, 2017
- 133334; RH Pumps Go to a Dead Head Condition; June 24, 2017
- 133363; Main Steam Rads Scaled Wrong for Malfuction; July 8, 2017
- 133396; Initial Conditions Need to be Fixed; July 19, 2017
- 133445; Continuous Dilution; August 4, 2017
- 133508; 1PM05J Control Bank B Group 2 Step Counter; August 29, 2017
- 133511; Large Steam Flow Spikes While Placing 2nd FW Pump in Service; August 31, 2017
- 133541; Core Th Model Issue, Drawing a Bubble in PZR; September 9, 2017
- 133554; MST Will Not Reset; September 14, 2017
- 133564; DR for Core Th with Random SG Level Rise in Low Power/Temp Situations; September 16, 2017
- 16369; EC 400917: DEHC Ovation Install; September 9, 2015
- 16384; EC 401810: RCP Seals SDS Design Change; September 18, 2015
- 16476; EC 403314: PPC Changes; October 27, 2015
- 16487; MST Stopped During Training Scenario; November 3, 2015
- 16505; 1B SG NR Level Rises Unexpectedly; November 12, 2015
- 16546; Evaluate RCS CL Temp Response to LOCAs; December 10, 2015
- 16661; 1A AF Pump Does Not Start; February 8, 2016
- 16787; Simulator Crash During Exercise; April 6, 2016
- 16804; Simulator MST Halt During LBLOCA; April 11, 2016
- 16914; Loss of Subcooling When in Natural Circulation; June 3, 2016
- 16971; Change of the RCP UF Relays; July 8, 2016
- 16983; Indicated Steam Line Rads on a Faulted/Ruptured S/G; July 13, 2016
- 60233; MST Froze; March 22, 2016

Other:

- BR1C20-05.0; Unit 1, Cycle 20, Voltage Regulator Repair Reactivity Plan; August 31, 2017
Crew 3; 2017 Annual Test Job Performance Measures (JPMs) (10); Various
- Crew 3; 2017 Annual Test Scenarios (2); Various

- Crew 1; 2017 Annual Test Scenarios (2); Various
- Crew 3; 2016 Biennial Written Examination (1 Version)
- Post Event Review of 2CY182 Failure; 02/18/2016
- Post Event Review of Turbine Trip Below P-8; 10/26/2016
- Post Event Review of Turbine Trip Less Than P-8 on 10/26/16; 12/27/2016
- Simulator Scenario Based Testing; Scenario Number 1741; 06/26/2017
- Simulator Scenario Based Testing; 2017 CPE #2; 07/11/2017
- Simulator Scenario Based Testing; Reactivity 1/17-1; 06/26/2017

1R12 Maintenance Effectiveness

Action Requests/Issue Reports:

- 4046975; 2017 DCS: Transporter Failed Due to Failed Thermostat; August 29, 2017
- 4050919; DCS: Fuel Handling Building Overhead Crane Abnormal Noise – 0HC03G; September 11, 2017
- 4019828; U2 Function FW1 Maintenance Rule Reliability Criteria Exceeded; June 8, 2017
- 4001575; Unit 2 Startup Feedwater Pump Tripped During Unit Shutdown; April 24, 2017
- 2565442; OSP-A Pump Failed To Start; October 4, 2015
- 2584592; Maintenance Rule Plant Level Performance Criteria Exceeded; November 9, 2015
- 4002183; OSP-A 2PS-FW281B Found Not Repeatable; April 25, 2017

Procedures:

- ER-AA-310; Implementation of the Maintenance Rule; Revision 10
- ER-AA-310-1001; Maintenance Rule – Scoping; Revision 4
- ER-AA-310-1002; Maintenance Rule Functions – Safety Significant Classification; Revision 3
- ER-AA-310-1003; Maintenance Rule – Performance Criteria Selection; Revision 5
- ER-AA-310-1004; Maintenance Rule – Performance Monitoring; Revision 13
- BwFP FH-63; HI-STORM Inspection (ISFSI); Revision 2
- BwFP FH-64; Transporter Operations (ISFSI); Revision 8
- BwFP FH-65; Spent Fuel Cask Site Transportation (ISFSI); Revision 13
- BwFP FH-66; DCS Campaign Restoration and Equipment Layup (ISFSI); Revision 3
- BwFP FH-67; Trackmobile Operation (ISFSI); Revision 0
- BwFP FH-68; HI-TRAC Preparation; Revision 11
- BwFP FH-69; HI-TRAC Movement Within the Fuel Building (ISFSI); Revision 21
- BwFP FH-70; HI-TRAC Loading Operations (ISFSI); Revision 16
- BwFP FH-72; HI-STORM Processing (ISFSI); Revision 3
- BwFP FH-73; Unrestrained Stack-Up Support (ISFSI); Revision 2
- BwFP FH-75; MPH Inspection; Revision 7
- BwFP FH-83; Spent Fuel Cask Contingency Actions (ISFSI); Revision 12
- BwFP FH-84; HI-TRAC Operations Within the Fuel Building (ISFSI); Revision 2
- OU-AA-630; Dry Cask Storage Program Implementation (ISFSI); Revision 8
- OU-AA-630-1000; Spent Fuel Loading Campaign Management (ISFSI); Revision 7
- OU-AA-630-1001; Guidelines for Dry Cask Storage ISFSI Inspection Surveillance Program (ISFSI); Revision 0
- OU-AA-630-1002; Guidelines for Holtec Hi-Storms and MPC's Delivery/Fit-Up/Dimensional/Pre-Use Inspections; Revision 0
- OU-AA-640-1000; Dry Cask Storage Lifting Device Inspection/Testing for Holtec Components; Revision 0
- OU-AP-204; Fuel Movement in the Spent Fuel Pool for Byron and Braidwood; Revision 15
- BwOP FW-5; Operation of a Startup Feedwater Pump; Revision 16

Work Orders:

- 1644260; WO to Process MPC 32-299
- 1644261; WO to Process MPC 32-300
- 1644262; WO to Process MPC 32-301
- 1644263; WO to Process MPC 32-302
- 1644264; WO to Process MPC 32-303
- 1764774; Install EC 407078 U2 Startup Feedwater Pump Starting Logic Valve
- 4630231; 2P-FW281B Startup Feedwater Pump Lube Oil Pressure Switch Replacement

Other:

- Maintenance Rule Expert Panel Meeting Notes; December 10, 2015
- Maintenance Rule System Basis Document; Main Feedwater; August 29, 2017
- EACE 2565442-04; Feedwater Reliability to Support Unit Shutdown; November 25, 2015

1R13 Maintenance Risk Assessments and Emergent Work Control

Action Requests/Issue Reports:

- 4042589; 01899665-01: 2PB-0457A/B Out-of-Tolerance 0-10 Volt Signal; August 16, 2017
- 4042901; Abnormalities Observed with Unit 1 Main Generator; August 16, 2017
- 4046975; 2017 DCS: Transporter Failed Due to Failed Thermostat; August 29, 2017
- 4048596; 1MP09E Base Adjuster Follower Card Failed; September 2, 2017
- 4050919; DCS: Fuel Handling Building Overhead Crane Abnormal Noise – 0HC03G; September 11, 2017

Procedures:

- ER-AA-600; Risk Management; Revision 7
- ER-AA-600-1042; On-Line Risk Management; Revision 11
- OP-AA-108-117; Protected Equipment Program; Revision 4
- WC-AA-101-1006; On-Line Risk Management and Assessment; Revision 2
- WC-AA-104; Integrated Risk Management; Revision 24
- BwFP FH-63; HI-STORM Inspection (ISFSI); Revision 2
- BwFP FH-64; Transporter Operations (ISFSI); Revision 8
- BwFP FH-65; Spent Fuel Cask Site Transportation (ISFSI); Revision 13
- BwFP FH-66; DCS Campaign Restoration and Equipment Layup (ISFSI); Revision 3
- BwFP FH-67; Trackmobile Operation (ISFSI); Revision 0
- BwFP FH-68; HI-TRAC Preparation; Revision 11
- BwFP FH-69; HI-TRAC Movement Within the Fuel Building (ISFSI); Revision 21
- BwFP FH-70; HI-TRAC Loading Operations (ISFSI); Revision 16
- BwFP FH-72; HI-STORM Processing (ISFSI); Revision 3
- BwFP FH-73; Unrestrained Stack-Up Support (ISFSI); Revision 2
- BwFP FH-75; MPH Inspection; Revision 7
- BwFP FH-83; Spent Fuel Cask Contingency Actions (ISFSI); Revision 12
- BwFP FH-84; HI-TRAC Operations Within the Fuel Building (ISFSI); Revision 2
- BwISR 3.3.1.10-M239; Operational Test and Channel Verification/Calibration for Loop P-0457, Pressurizer Pressure Protection Channel III, Cabinet 3 (PA03J); Revision 22
- OU-AA-630; Dry Cask Storage Program Implementation (ISFSI); Revision 8
- OU-AA-630-1000; Spent Fuel Loading Campaign Management (ISFSI); Revision 7
- OU-AA-630-1001; Guidelines for Dry Cask Storage ISFSI Inspection Surveillance Program (ISFSI); Revision 0
- OU-AA-630-1002; Guidelines for Holtec Hi-Storms and MPC's Delivery/Fit-Up/Dimensional/Pre-Use Inspections; Revision 0

- OU-AA-640-1000; Dry Cask Storage Lifting Device Inspection/Testing for Holtec Components; Revision 0
- OU-AP-204; Fuel Movement in the Spent Fuel Pool for Byron and Braidwood; Revision 15

Work Orders:

- 1644260; WO to Process MPC 32-299
- 1644261; WO to Process MPC 32-300
- 1644262; WO to Process MPC 32-301
- 1899665; 2P-0457: 18-Month Electrical Calibration of Pressurizer Pressure Loop, Channel 3
- 4042901; Abnormalities Observed with Unit 1 Main Generator

1R15 Operability Evaluations

Action Requests/Issue Reports:

- 4008686; Containment Liner Metal Loss Exceeding 10 Percent Nominal Thickness; May 9, 2017
- 4038915; 2A SX PP Strainer Not Backwashing on 8 Hour Timer (2SX01FA); July 31, 2017
- 4039001; Unexpected Alarm 2-2-C2 SX Strainer D/P High; August 4, 2017
- 4039429; 2SX150A Will Not Work Electrically; August 6, 2017
- 4049526; 1CS040A Closed Limit Switch is Sticking; September 6, 2017
- 4049530; 1A CS Pump ASME Differential Pressure Tracking IR; September 6, 2017
- 4049759; Unanalyzed Consequence From the Main Steam Line Break Outside Containment (Operability Evaluation 17-002, Rev. 0); September 7, 2017

Procedures:

- OP-AA-108-115; Operability Determinations (CM-1); Revision 19
- ER-AA-335-018; Visual Examination of ASME IWE Class MC and Metallic Liners of IWL Class CC Components; Revision 12
- BwOP SX-6; Essential Service Water Strainer Manual Operation; Revision 14
- 1BwOSR 5.5.8.CS-3A; Comprehensive Full Flow Test For 1A Containment Spray Pump (1CS01PA) And Check Valves 1CS003A, 1CS011A; Revision 15

Engineering Changes/Technical Evaluations:

- EC 619221; Engineering Evaluation to Address All Aspects of Braidwood Unit 2 Containment Moisture Barrier Class CC Degraded Areas Found in A2R19; Revision 0

Drawings/Prints:

- 20E-1-4031CS05; Loop Schematic Diagram Containment Spray Pump 1A Additive Flow Control System; Revision H
- M-46, Sheet 1A; Diagram of Containment Spray; Revision AZ

Engineering Design Analyses/Calculations:

- Calculation 5.2.6-BRW-11-0312-S; Containment Liner Inspection/Acceptance Criteria; Revision 0

Work Orders:

- 1904481; Remove / Restore Containment Moisture Barrier in A2R19 for IWE Exams

1R19 Post Maintenance Testing

Action Requests/Issue Reports:

- 4038491; 1SI8923A Diagnostic Test Results
- 4042901; Abnormalities Observed with Unit 1 Main Generator; August 16, 2017

Drawings/Prints:

- M-54: Sheet 1A; Service Air, Units 1 & 2; Revision AD

Procedures:

- ER-AA-330-001; Section XI Pressure Testing; Revision 14
- ER-AA-330-009; ASME Section XI Repair/Replacement Program; Revision 13
- ER-AA-335-015-2003; VT-2 Visual Examination in Accordance with ASME 2001 Edition, 2003 Addenda; Revision 1
- BwOP SA-1; Startup and Operation of Station Air Compressors; Revision 43
- BwOP SA-8; Aligning Service Air Compressor for Standby Operation; Revision 22
- BwVS SA-2; Station Air Compressor Operational Data; Revision 4
- 1BwOS SA-1; Unit 1 Station Air Compressor Surge Point Testing; Revision 2
- 1BwOSR 5.5.8.SI-1A; Train A Safety Injection System Valve Stroke Surveillance; Revision 11
- 1BwOSR 5.5.8.SI-10A; Group A IST Requirements for 1A Safety Injection Pump; Revision 7
- 1BwOSR 5.5.8.SI-12; Test Operation of ECCS MOV Surveillance; Revision 7
- 1BwGP 100-3; Power Ascension 5 Percent to 100 Percent; Revision 72

Work Orders:

- 1893825; Unit 1 Station Air Compressor Surge Point Pressure Test
- 1893826; 1SA01A Detailed Clean and Inspect
- 1897323; 1SA01C Detailed Clean and Inspect
- 4636821; U1 Train A Safety Injection System Valve Stroke Quarterly
- 1836078; 1SI8923A Motor Operated Valve Diagnostic Test
- 4641684; ASME Surveillance Requirement for 1A SI Pump
- 1762074; Cleaning and Visual Inspection of 1A SI Pump Lube Oil Cooler
- 1828048; 1SI8923A Surveillance for Age Related Degradation
- 1736753; 1SI8821A Mechanical Inspections
- 4675680; Abnormalities Observed with Unit 1 Main Generator

1R22 Surveillance Testing

Action Requests/Issue Reports:

- 4030859; 2DG01KA Injection Pump 7L Has Oil Leak; July 12, 2017
- 4031189; Recirc Camper 2VD10YB Sluggish Not Full Open for 2VD01CA; July 12, 2017
- 4031193; Door Seal Degraded in the 2A Diesel Plenum 2VD01CA; July 12, 2017

Procedures:

- 1BwOS TRM 3.3.g.3; Unit One Turbine Overspeed Protection System Valve Stem Freedom Checks (RV-IV Cycling); Revision 19
- 1BwOS TRM 3.3.g.4; Unit One Turbine Overspeed Protection Systems Valve Stem Freedom Checks (TV-GV Cycling); Revision 19
- 2BwOSR 3.8.1.2-1; 2A Diesel Generator Operability Surveillance; Revision 42

Work Orders:

- 4654527; IST-2A Diesel Generator Operability Monthly
- 4625692; Turbine Throttle, Governor Valve Semi-Annual Cycle
- 4670860; Unit 1 Reheat and Intercept Valve Monthly Cycle

1EP6 Drill Evaluation

Action Requests/Issue Reports:

- 3897867; Training: Performance EP Failure (DEP); March 21, 2017
- 4035408; Training: Performance EP Failure (DEP); July 25, 2017

Procedures:

- EP-AA-1000; Exelon Nuclear Standardized Radiological Emergency Plan; Revision 28
- EP-AA-1001; Exelon Nuclear Emergency Action Levels for Braidwood Station; Addendum 3, Revision 2
- EP-AA-1001; Exelon Nuclear Radiological Emergency Plan Annex for Braidwood Station; Revision 33
- EP-AA-111; Emergency Classification and Protective Action Recommendations; Revision 19
- EP-AA-112-100; Control Room Operations; Revision 14
- EP-AA-122; Drills and Exercise Program; Revision 18
- EP-AA-125-1002; ERO Performance – Performance Indicator Guidance; Revision 12
- EP-MW-114-100; Midwest Region Off-Site Notifications; Revision 16

2RS6 Radioactive Gaseous and Liquid Effluent Treatment

Action Requests/Issue Reports:

- 2596303; Fuel Handling Building Filter 0VA09FB Degraded Test Results; December 5, 2015
- 2608666; Packings on 0CW26A/B/C at Blowdown House are Leaking; January 6, 2016
- 2714132; Non-Accessible Plenum 0VA05FD Charcoal Penetration Exceeds Admin Limit; September 9, 2016
- 2715867; Packing Leak Has Significantly Increased – 0CW260A; September 14, 2016
- 3973298; 0PR10J Failed Due to Loss of Power Test; February 13, 2017
- 3979822; 0PR01J High Alarm During 0W01T Release; February 28, 2017
- 3985429; 0PR01J Auto Isolated Liquid Release on Loss of Sample Flow on Liquid Radwaste Effluent Monitor; March 15, 2017
- 4015383; Abbreviated Maintenance for Valve 0CW260A; May 26, 2017
- 4020088; 0VA09FB Charcoal Penetration Test at Risk of Failure; June 9, 2017
- 4020644; H3 Water Being Pumped onto Surrounding Ground; June 11, 2017
- 4021825; Extent of Condition for IR 4020644: H3 Water Being Pumped to Surrounding Ground; June 14, 2017
- 4022805; Possible CWBD House and Vacuum Breaker Enhancement; June 16, 2017

Procedures:

- BwMSR 5.5.11.c-3; Auxiliary Building Non-Accessible System Charcoal Sample Removal/Analysis; Revision 4
- CY-BR-170-301; ODCM: Radioactive Effluent Treatment and Monitoring; Revision 9
- CY-BR-170-303-F-02; ODCM Monthly Compliance Verification; Revision 1
- RP-BR-911; Units 1 and 2, RE-OR011J Radiation Monitor Radiological and Non-Radiological Air Sampling; Revision 13
- RP-BR-928; Units 1 and 2, RE-PR028J Radiation Monitor Radiological Air Sampling; Revision 7

- RP-BR-980; Containment Vent Mini Purge Gaseous Effluents; Revision 18; Dated August 1, 2017
- RP-BR-951; Set Point Changes for Process Radiation Monitors: ODCM (Effluent) Monitor; Revision 0

NUCON International Radioiodine Test Reports:

- B Non-Accessible ABVS 0VA05FD; September 7, 2016
- B Non-Accessible ABVS 0VA05FE; March 23, 2017
- B Non-Accessible ABVS 0VA05FE; September 7, 2016
- Ventilation System 0VA09FB; June 23, 2017
- B Non-Accessible ABVS 0VA05FH; March 23, 2017

Instrument Calibration Records:

- 2AR21J; Electronic Calibration High Range Containment Monitor; March 10, 2016
- 2AR12J; Electronic Calibration Area Radiation Monitor for Containment Release; February 19, 2016
- 2PR11J; Calibration of Gaseous Effluent Radiation Monitors Containment Atmosphere; December 12, 2016
- 0PR10J; Calibration of Liquid Effluent Radiation Monitors; July 12, 2016
- 2AR20J; Calibration of High Range Containment Monitors; September 2, 2016
- 0PR01J; Liquid Radwaste Effluent Monitor Channel Background Needs New Baseline; March 26, 2017

Open Effluent Management Software (EMS) Reports:

- Gas Permit Post Release Data; August 10 2017
- Liquid Permit Post Release Data; January 23, 2017
- Liquid Permit Post Release Data; May 28, 2017
- Liquid Permit Post Release Data; May 30, 2017
- Liquid Permit Post Release Data; June 6, 2017
- Liquid Permit Post Release Data; June 4, 2017
- Liquid Permit Post Release Data; June 7, 2017
- Liquid Permit Post Release Data; June 9, 2017

Other:

- Braidwood Station, Units 1 and 2, 2016 Radioactive Effluent Release Report; May 12, 2017
- Braidwood Station, Units 1 and 2, 2016 Annual Radiological Environmental Operating Report; May 12, 2017
- 1RE-PR011; Containment Air Monitor Iodine Radionuclide Analysis; July 31, 2017
- 1RE-PR011; Containment Air Monitor General Gas Radionuclide Analysis; July 31, 2017
- Teledyne Brown Engineering; Report of Analysis/Certificate of Conformance; June 2, 2017
- 2016 River Flow Data to Verify Dilution Rate

40A1 Performance Indicator Verification

Action Requests/Issue Reports:

- 3897867; Training: Performance EP Failure (DEP); March 21, 2017
- 4035408; Training: Performance EP Failure (DEP); July 25, 2017
- 4035857; Unit 1 and Unit 2 Component Cooling Water – Exceeded MSPI Early Warning Criteria; July 26, 2017
- 4036318; Unit 1 and Unit 2 Auxiliary Feedwater – Exceeded MSPI Early Warning Criteria; July 27, 2017
- 4051188; BW-MSPI-001, Revision 16, Not Submitted to Records; September 12, 2017

Procedures:

- BW-CSR-3.4.16.2-1; Units 1 and 2, Reactor Coolant Dose Equivalent Iodine-131 Once Per 14 Days or Due to Changing Reactor Power; Revision 4
- BW-MSPI-001; Reactor Oversight Program MSPI (Mitigating System Performance Index) Bases Document; Revisions 14, 15, and 17
- LS-AA-2001; Collecting and Reporting of NRC Performance Indicator Data; Revision 14
- LS-AA-2090; Monthly Data Elements for NRC Reactor Coolant System (RCS) Specific Activity; Revision 4
- LS-AA-2200; Mitigating System NRC Performance Index Data Acquisition and Reporting; Revision 5

Other:

- Performance Indicator Data Compiled by the Licensee from January 2016 through June 2017

4OA2 Problem Identification and Resolution

Action Requests/Issue Reports:

- 4020644; H3 Water Being Pumped Onto Surrounding Ground; June 11, 2017
- 4021825; Extent of Condition for IR 4020644: H3 Water Being Pumped to Surrounding Ground; June 14, 2017
- 4027918; New Blowdown House Cameras Offline on Amcrest View; July 1, 2017
- 4029342; Lake Screen House 0SX115E Valve Pit Temporary Storage Permit Expired – Mechanical Maintenance Department; July 6, 2017
- 4029381; Notice of Violation Received From the IEPA; July 6, 2017
- 4029478; Gap in Facilities Maintenance Department in Performing Environmental Screenings; July 7, 2017
- 4039400; Silt Buildup at Mouth of Old CWBD Discharge to River; August 5, 2017
- 4046861; Circulating Water Blowdown House Sump Pump BwOP WX-902; August 29, 2017
- 4053386; Water Slowly Dripping into CWBD House Sump; September 19, 2017
- 4056711; RW-11 Sump Pump Needs Replacement; September 28, 2017

Procedures:

- NO-AA-10; Quality Assurance Topical Report; Revision 91
- PI-AA-120; Issue Identification and Screening Process; Revision 7
- PI-AA-125; Corrective Action Program (CAP) Procedure; Revision 6
- PI-AA-125-1001; Root Cause Analysis Manual; Revision 3
- BwOP WX-902; Use of Portable Sump Pumps for Non-Installed Sump Pump Application; Revision 0
- EN-AA-103; Environmental Review; Revision 7
- EN-AA-103-F-02; Environmental Screening Checklist; Revision 2
- EN-AA-103-F-03; Environmental Evaluation; Revision 0
- EN-AA-103-0001; Environmental Evaluations; Revision 8
- EN-AA-407; Response to Inadvertent Releases of Licensed Materials to Groundwater, Surface Water, Soil, or Engineered Structures; Revision 8
- EN-AA-408; Radiological Groundwater Protection Program; Revision 0
- EN-BR-103-F-01; Environment Equipment at Braidwood Station; Revision 11
- EN-BR-402; NPDES [National Pollutant Discharge Elimination System]; Revision 4
- EN-BR-408-4160; Radiological Groundwater Protection Program Reference Material; Revision 5

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AF	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	<i>Code of Federal Regulations</i>
CS	Containment Spray
CW	Circulating Water
CWBD	Circulating Water Blowdown
ESF	Engineered Safety Feature
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
LORT	Licensed Operator Requalification Training
MSIV	Main Steam Isolation Valve
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PI	Performance Indicator
PMT	Post-Maintenance Testing
SAT	System Auxiliary Transformer
SDP	Significance Determination Process
SI	Safety Injection
SRO	Senior Reactor Operator
SSC	Structure, System, and Component
SX	Essential Service Water
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
WO	Work Order