



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
2443 WARRENVILLE RD. SUITE 210  
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August 7, 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 05000456/2017002 AND 05000457/2017002**

Dear Mr. Hanson:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Braidwood Station, Units 1 and 2. On July 6, 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 three issues that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that violations of regulatory requirements are associated with each of these issues. Because the issues were entered into the site's corrective action program (CAP) and actions were initiated to address them, the violations are being treated as Non-Cited Violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. The NCVs are described in the subject inspection report.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to: (1) the Regional Administrator, Region III; (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and (3) the NRC Resident Inspectors' Office at the Braidwood Station.

In addition, if you disagree with the cross-cutting aspect assignment to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident 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 05000456/2017002, 05000457/2017002

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Letter to Bryan C. Hanson from Eric Duncan dated August 7, 2017

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION  
REPORT 05000456/2017002 AND 05000457/2017002

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000456/2017002; 05000457/2017002

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: April 1 through June 30, 2017

Inspectors: D. Kimble, Senior Resident Inspector  
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G. Edwards, Health Physicist  
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Approved by: E. Duncan, Chief  
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Enclosure

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## SUMMARY

Inspection Report 05000456/2017002; 05000457/2017002; 04/01/2017 – 06/30/2017; Braidwood Station, Units 1 and 2; Operability Determinations and Functionality Assessments; Radiological Environmental Monitoring Program.

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

### **NRC-Identified and Self-Revealed Findings**

#### **Cornerstone: Mitigating Systems**

- **Green**. A finding of very low safety significance and an associated NCV of Technical Specification (TS) 5.5.19.b, "Surveillance Frequency Program," were identified by the inspectors for the licensee's failure to implement the requirements contained in the surveillance frequency control program when making a change to the specified frequency of TS Surveillance Requirement (SR) 3.3.1.11. On May 3, 2017, the licensee improperly deferred a TS required surveillance through the preventive maintenance deferral process due to a belief that it was a preventive maintenance activity and not an activity supporting a TS SR. The licensee entered this issue into their corrective action program (CAP) as Issue Report (IR) 4009050 with an action to re-establish the surveillance at an 18-month frequency and to perform it before the end of the Unit 2 refueling outage (RFO) A2R19.

The performance deficiency was determined to be more than minor because if left uncorrected it could lead to a more significant safety concern. The finding screened as being of very low safety significance (Green) because it did not result in the loss of operability or functionality of any system, structure, or component (SSC). The inspectors determined that this finding had a cross-cutting component in the area of human performance, work management aspect, because the licensee failed to utilize a work process that included proper coordination with different groups or job activities. Specifically, licensee personnel conducting the deferral did not coordinate the activity with personnel in either the operations or regulatory assurance departments. Knowledgeable personnel in either of these station organizations could have identified that the wrong process for deferral was being utilized. [H.5] (Section 1R15.1.b(1))

- **Green**. A finding of very low safety significance and an associated NCV of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," were identified by the inspectors for the licensee's failure to have appropriate implementing procedures for TS SR 3.9.3.2. Specifically, procedure BwIS NR-203, "Post Accident Neutron Monitoring System Discriminator Adjustment,"

did not provide for determining and checking the discriminator voltage for the system at an 18-month frequency, as specified by TS SR 3.9.3.2. The licensee entered this issue into their CAP as IR 4010147 with an action to revise the surveillance frequency to every 18 months for each channel.

The performance deficiency was determined to be more than minor because it was associated with the Procedure Quality attribute of the Mitigating Systems cornerstone and adversely impacted the cornerstone objective. The finding screened as having very low safety significance (Green) because it did not result in the loss of operability or functionality of any SSC. The licensee performed a review of the records associated with the last three years of operation and did not find any instances in which the post-accident neutron monitors (PANMs) were used to satisfy TS 3.9.3, "Nuclear Instrumentation," requirements. No cross-cutting aspect was associated with this finding because it was confirmed not to be reflective of current licensee performance due to the age of the performance deficiency. (Section 1R15.1.b(2))

### **Cornerstone: Public Radiation Safety**

- Green. A finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix I, Section IV(B), were identified by the inspectors for the licensee's failure to establish an appropriate surveillance and monitoring program in order to provide data on measurable levels of radiation and radioactive materials in the environment to evaluate the relationship between quantities of radioactive material released in effluents and resultant radiation doses to individuals from principal pathways of exposure. This was an NRC-identified finding for the failure to implement and maintain the licensee's radiological environmental monitoring program (REMP) by collecting representative samples from the highest deposition coefficient (D/Q) quadrant locations during annual REMP sampling and collections of food products in 2015. On May 25, 2016, during a review of the station's annual radiological environmental operating report for 2015, the inspectors noted that the licensee documented missed samples in three out of four quadrants where the principal food pathways were grown within the 10 kilometers from the station and missed milk samples. The licensee captured this issue in their CAP as IR 4002540. Licensee corrective actions included, but were not limited to, revising the applicable REMP procedures and investigating the possibility of growing the principal food pathways on the licensee's owner controlled area or other approved licensee property within the 10 kilometer site radius.

The performance deficiency was determined to be more than minor because it was associated with the Program and Process attribute of the Public Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of the public from radiation. Specifically, the licensee failed to implement effective sample collection from sample locations for food products from three of the major quadrants during annual REMP sampling and collections in 2015. The licensee's Offsite Dose Calculation Manual (ODCM), as written, did not meet 10 CFR Part 50, Appendix I, which requires the licensee to establish and provide data on measurable levels of radiation and radioactive materials in the site environs. The finding was determined to be of very low safety significance in accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," because it only involved the licensee's REMP. The inspectors determined that this finding had a

cross-cutting component in the area of human performance, change management aspect, because the licensee did not use a systematic process for evaluating and implementing changes in their REMP sampling and collection program. [H.3] (Section 2RS7.1.b)

## **REPORT DETAILS**

### **Summary of Plant Status**

#### **Unit 1**

Unit 1 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 transmission system operator (TSO), the unit remained operating at or near full power for the entire inspection period.

#### **Unit 2**

Unit 2 began the inspection period at approximately 99 percent power with planned power coast down operations in preparation for a scheduled RFO in progress. On April 24, 2017, the unit was shut down for its 19th RFO (see Section 1R20). In the early morning hours on May 20, 2017, the reactor was taken critical and Unit 2 began its 20th operating cycle. The main electrical generator was synchronized to the power grid later that same day, and the unit reached full power operation on May 23, 2017. Unit 2 continued operating at or near full power for the remainder of the inspection period.

### **1. REACTOR SAFETY**

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

#### **1R01 Adverse Weather Protection (71111.01)**

##### **.1 Readiness of Offsite and Alternate Alternating Current Power Systems**

##### **a. Inspection Scope**

During the weeks ending June 10, 2017 and June 24, 2017, the inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the TSO and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included, but were not limited to:

- Coordination between the TSO and the plant during off-normal or emergency events;
- Explanations for the events;
- Estimates of when the offsite power system would be returned to a normal state; and
- Notifications from the TSO to the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain availability and reliability of both the offsite AC power system and the onsite

alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the procedures addressed the following:

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

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

These reviews by the inspectors constituted a single summer readiness of offsite and alternate AC power systems 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 2 Train B (2B) Auxiliary Feedwater (AF) Train following system maintenance during the week ending May 20, 2017;
- The Unit 1 Train B (1B) Containment Spray (CS) Train with the Unit 1 Train A (1A) CS Train unavailable during the week ending June 10, 2017; and
- The Unit 2 Train A (2A) Diesel Fuel Oil Train during 2B Diesel Fuel Oil Transfer Pump testing during the week ending June 24, 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 Updated Final Safety Analysis Report (UFSAR), TS requirements, work orders (WOs), IRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible

portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization.

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 April 29, 2017; May 20, 2017; June 3, 2017; June 10, 2017; and June 24, 2017, the inspectors performed a complete system alignment inspection of the station's essential service water (SX) system to verify the functional capabilities of the system. This system was selected because SX is considered both important to safety and risk-significant in 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 weeks ending April 8, 2017, through May 27, 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 2 Auxiliary Electrical Equipment Room (Fire Zone 5.5–2);
- The Unit 2 Lower Cable Spreading Room (Fire Zone 3.2B–2);
- The Unit 2 Lower Cable Spreading Room (Fire Zone 3.2C–2);
- The Unit 2 Lower Cable Spreading Room (Fire Zone 3.2D–2);
- The Unit 2 Upper Cable Spreading Room (Fire Zone 3.3A–2);
- The Unit 2 Upper Cable Spreading Room (Fire Zone 3.3B–2);
- The Unit 2 Upper Cable Spreading Room (Fire Zone 3.3C–2);
- The Unit 2 Upper Cable Spreading Room (Fire Zone 3.3D–2); and
- The Unit 2 Containment Upper Area (Fire Zone 1.3–2).

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 nine quarterly fire protection zone inspection tour samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

.1 Annual Heat Sink Performance

a. Inspection Scope

During the course of the licensee’s 19th RFO, the inspectors reviewed the licensee’s inspection, cleaning, and testing of the 2A Charging Pump oil cooler to verify the following:

- That potential deficiencies did not mask the licensee’s ability to detect heat exchanger/cooler degraded performance;
- That any common cause issues that had the potential to increase risk were being identified; and
- That the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk.

The inspectors compared the licensee’s observations with acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of

instrument inaccuracies on test results. The inspectors also verified that test acceptance criteria considered differences between test conditions and design conditions.

This review by the inspectors constituted a single annual heat sink performance inspection sample as defined in IP 71111.07–05.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

From April 24, 2017, through May 4, 2017, the inspectors conducted a review of the implementation of the licensee’s inservice inspection (ISI) program for monitoring degradation of the Unit 2 reactor coolant system (RCS), emergency feedwater systems, risk-significant piping and components, and containment systems.

The reviews described in Sections 1R08.1, 1R08.2, 1R08.3, 1R08.4, and 1R08.5 below constitute a single inspection sample as defined in IP 71111.08.

.1 Piping Systems Inservice Inspection

a. Inspection Scope

The inspectors observed the following non-destructive examination (NDE) required by the American Society of Mechanical Engineers (ASME) Section XI Code, and/or 10 CFR Part 50.55a to evaluate compliance with the ASME Code, Section XI, and Section V requirements, and if any indications and defects were detected, to determine whether these were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement:

- Ultrasonic testing (UT) for examination of the reactor vessel head penetrations;
- UT for examination of the containment spray system welds 2CS–05–02, 2CS–05–04–73, 2CS–05–04–74;
- UT for examination of the residual heat removal system welds 2RH–08–47, 2RH–08–50, 2RH–08–55;
- UT for examination of the feedwater system welds 2FW–01–04, 2FW–01–05, 2FW–12–21, 2FW–12–22, 2FW–12–23, 2FW–12–24; and
- Magnetic particle testing for examination of the feedwater system pipe-to-penetration weld 2FW–12–25/25A.

The inspectors observed the following NDE conducted as part of the licensee’s industry initiative inspection program for thermal fatigue cracking to determine if the examination was conducted in accordance with the licensee’s augmented inspection program and associated licensee examination procedures and if any indications and defects were detected, to determine if these were dispositioned in accordance with approved procedures and NRC requirements:

- UT for examination of the RCS drain line pipe bends 2RC14AA, 2RC14AB, 2RC14AC, and 2RC14AD to meet MRP–146, “Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines”; and

- UT for examination of the residual heat removal system welds 2RH-03-26 and 2RH-03-27 to meet MRP-192, "Assessment of Residual Heat Removal Mixing Tee Thermal Fatigue in Pressurized Water Reactor Plants."

The inspectors reviewed the following examination records with relevant/recordable conditions/indications identified by the licensee to determine if acceptance of these indications for continued service was in accordance with the ASME Code Section XI or an NRC-approved alternative:

- UT reports for examination of Unit 2 containment liner degraded areas that were evaluated by the licensee in IR 1657945 and Engineering Change No. 398857, "Unit 2 Containment Moisture Barrier Class MC [Metal Containment] Degraded Areas Found in A2R17."

The inspectors reviewed records of the following risk-significant pressure boundary ASME Code Section XI Class 1 welds fabricated since the beginning of the last refueling outage to determine if the licensee applied the pre-service NDE and acceptance criteria required by the construction Code and the ASME Code Section XI. Additionally, the inspectors reviewed the welding procedure specification and supporting weld procedure qualification records to determine if the weld procedure was qualified in accordance with the requirements of the construction code and the ASME Code Section IX:

- Welds fabricated during replacement of the 2D Steam Generator (SG) channel head drain line (2RC48AD) – WO 1792632.

b. Findings

No findings were identified.

.2 Reactor Pressure Vessel Upper Head Penetration Inspection Activities

a. Inspection Scope

For the Unit 2 vessel head, a bare metal visual examination was not required and a non-visual examination of the head penetration nozzles was required pursuant to 10 CFR 50.55a(g)(6)(ii)(D).

The inspectors observed the non-visual examinations conducted on a sample of the reactor vessel head penetration nozzles to determine if the activities were conducted in accordance with the requirements of ASME Code Case N-729 and 10 CFR 50.55a(g)(6)(ii)(D). In particular, the inspectors confirmed that:

- The required examination scope (volumetric and surface coverage) was achieved and limitations (if applicable) were recorded in accordance with the licensee procedures;
- The UT equipment and procedures used were demonstrated by blind demonstration testing;
- If indications or defects were identified, the licensee documented the conditions in examination reports and/or entered this condition into the CAP and implemented appropriate corrective actions; and

If indications were accepted for continued service the licensee evaluation and acceptance criteria were in accordance with the ASME Section XI Code, 10 CFR 50.55a(g)(6)(ii)(D) or an NRC-approved alternative.

Based upon the licensee's examination, no relevant indications were accepted for continued service and no new welded repairs were required for the Unit 2 vessel head penetrations. Therefore, no NRC review was completed for these inspection procedure attributes.

b. Findings

No findings were identified.

.3 Boric Acid Corrosion Control

a. Inspection Scope

The inspectors performed an independent walkdown, on portions of the RCS and connected systems within containment which had received a recent licensee boric acid walkdown, to determine if the licensee's visual examinations had effectively identified boric acid leakage that potentially degraded safety-related components.

The inspectors reviewed the following licensee evaluation of an RCS component with boric acid deposits to determine if degraded components were documented in the corrective action system and for degraded components that the planned or completed corrective actions met the construction code, ASME Section XI Code, and/or an NRC-approved alternative.

- Boric Acid Corrosion Control Evaluation – IR 2575440, "Boric Acid on 2CV8123 Bolted Connection."

The inspectors reviewed the following corrective actions related to evidence of boric acid leakage to determine if the corrective actions completed were consistent with the requirements of the ASME Code Section XI and 10 CFR Part 50, Appendix B, Criterion XVI.

- IR 2585236; 2CV224 Pipe Cap Leak;
- IR 2636354; 2RH02AB Heat Exchanger Flange Leak; and
- IR 2638591; 2CV8355C Packing Leak.

b. Findings

No findings were identified.

.4 Steam Generator Tube Inspection Activities

a. Inspection Scope

The inspectors observed acquisition of eddy current testing (ECT) data, observed ECT data analysis, installation of SG tube plugs in the Unit 2 SGs and reviewed procedures implementing the SG ISI program to determine if:

- The numbers and sizes of SG tube flaws/degradation identified was bounded by the licensee's previous outage operational assessment predictions;
- The SG tube ECT examination scope and expansion criteria were sufficient to meet the TS, and the Electric Power Research Institute 1003138, "Pressurized Water Reactor SG Examination Guidelines;"
- The SG tube ECT examination scope included potential areas of tube degradation identified in prior outage SG tube inspections and/or as identified in NRC generic industry operating experience applicable to these SG tubes;
- The licensee identified new tube degradation mechanisms and implemented adequate extent of condition inspection scope and repairs for the new tube degradation mechanism;
- The licensee implemented repair methods which were consistent with the repair processes allowed in the plant TS requirements and implemented at appropriate tube locations;
- Qualified depth sizing methods were applied to degraded tubes accepted for continued service;
- The licensee implemented an inappropriate "plug on detection" tube repair threshold (e.g., no attempt at sizing of flaws to confirm tube integrity);
- The licensee primary-to-secondary leakage (e.g., SG tube leakage) was below 3 gallons-per-day or the detection threshold during the previous operating cycle;
- The ECT probes and equipment configurations as documented on the examination technique specification sheets used to acquire/analyze data from the SG tubes were qualified to detect and/or size the known/expected types of SG tube degradation in accordance with Appendix H and I, "Performance Demonstration for ECT Examination," of Electric Power Research Institute 1003138, "Pressurized Water Reactor SG Examination Guidelines;" and
- The licensee performed secondary side SG inspections for location and removal of foreign materials.

The licensee did not perform in-situ pressure testing of SG tubes. Therefore, no NRC review was completed for this inspection attribute.

b. Findings

No findings were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI/SG-related problems entered into the licensee's CAP and conducted interviews with licensee staff to determine if:

- The licensee had established an appropriate threshold for identifying ISI/SG-related problems;
- The licensee had identified issues related to excessive deposit buildup on the SG tube bundle and/or excessive SG tube wear indicative of fluid-elastic instability within the SG tube bundle;
- The licensee had performed a root cause (if applicable) and taken appropriate corrective actions; and

- The licensee had evaluated operating experience and industry generic issues related to ISI and pressure boundary integrity.

The inspectors performed these reviews to evaluate compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements.

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 June 6, 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 the licensee's 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 selected portions of the Unit 2 shutdown and RCS cooldown as the unit entered RFO A2R19 during the week ending April 29, 2017;
- Operations shift crew performance and reactivity manipulations during Unit 1 load following operations during the week ending May 6, 2017;
- Unit 2 draining and operation with reduced RCS inventory during the week ending May 20, 2017;
- Operations shift crew performance, reactivity manipulations, and overall coordination of plant activities during Unit 2 reactor startup from RFO A2R19 and synchronization of the main electrical generator to the power grid during the week ending May 20, 2017; and
- Reactivity manipulations and selected portions of the Unit 2 power escalation to 100 percent with fuel conditioning limits in place during the week ending May 27, 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.

## 1R12 Maintenance Effectiveness (71111.12)

### .1 Routine Quarterly Evaluations

#### a. Inspection Scope

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

- The Unit 1 and Unit 2 SX system during the weeks ending April 22, 2017, through June 30, 2017; and
- Issues with valve leakage from the circulating water system blowdown line during the weeks ending June 17, 2017, through June 30, 2017.

The inspectors reviewed events such as where 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 SSCs/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

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

The sample documented above related to the Unit 1 and Unit 2 SX system, together with the inspection samples related to the SX system and SX performance issues documented in Sections 1R04.1, 1R13.1, 1R15.1, 1R19.1, and 4OA2.4 of this report, constituted a vertical slice review as discussed in IP 71111.12-03.

These maintenance effectiveness review activities conducted by the inspectors constituted two maintenance effectiveness samples as defined in IP 71111.12-05.

#### b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

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

- Emergent maintenance activities associated with repairs to a pinhole leak on the 2B Auxiliary Feedwater (AF) Pump essential service water (SX) return line during the weeks ending April 29, 2017, through May 13, 2017;
- Planned activities associated with the replacement of the 2B Reactor Coolant Pump (RCP) and motor during the week ending May 6, 2017, and May 13, 2017;
- Unplanned corrective maintenance activities associated with the replacement of the guide funnel for Penetration No. 67 on the Unit 2 reactor vessel closure head during the week ending May 13, 2017;
- Planned activities associated with lifting and setting the Unit 2 reactor vessel closure head onto the reactor vessel during the week ending May 20, 2017; and
- Maintenance activities associated with the hydraulic locking/binding of the Unit 2 Main Feedwater Isolation Valves (2FW009A/B/C/D) on plant startup during the weeks ending May 27, 2017, and June 3, 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 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 five 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 technical evaluation of the testing failure for a snubber in the Unit 2 RC system (2RC17058S) during the weeks ending May 6, 2017, and May 13, 2017, as documented in IR 4003105;
- The evaluation of SX system and 2B AF Train operability following discovery of a small leak on the 2B AF Train SX return line during the weeks ending April 29, 2017, through May 6, 2017, as documented in IR 4001297;
- The technical evaluation of the testing failure for a snubber in the Unit 2 charging system (2CV09063S) during the week ending May 13, 2017, as documented in IR 4003105;
- The impact of an issue with the diesel-driven AF pump remote starting surveillance (1/2BwOS AF-1) on pump operability during the week ending May 13, 2017, as documented in IR 4002512;
- The acceptability of deferrals associated with flexible hose replacement on the 2B AF Pump during the week ending May 13, 2017, as documented in IR 4007901; and
- The acceptability of deferrals associated with Unit 2 Source Range Nuclear Instrument N32 discriminator plateau determination and calibration during the weeks ending May 6, 2017, through May 27, 2017, as documented in IR 4009050.

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 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 six inspection samples as defined in IP 71111.15-05.

b. Findings

(1) Failure to Adequately Implement Surveillance Frequency Program for the Deferral of a Technical Specification Surveillance

Introduction

The inspectors identified a finding of very low safety significance (Green), and an associated NCV of TS 5.5.19.b, "Surveillance Frequency Program," for the licensee's failure to implement the requirements of the TS surveillance frequency control program. Specifically, in the course of deferring a scheduled Unit 2 RFO surveillance activity for a source range nuclear instrument, the licensee incorrectly utilized a process for changing the frequency of preventive maintenance activities instead of the appropriate process for revising TS SRs. As a result, the specified frequency for TS SR 3.3.1.11 was altered in a non-conservative manner.

Description

The requirements of TS SR 3.3.1.11, "Reactor Trip Instrumentation Channel Calibration," apply to instrument channel calibration for the source range, intermediate range, and power range neutron detectors. Per the TS Bases, the calibration consists of "...obtaining the detector plateau or preamp discriminator curves, evaluating those curves, and comparing those curves to the manufacturer's data."

During the station's Unit 2 RFO (A2R19), the inspectors reviewed several planned and scheduled activities that the licensee elected to defer for various reasons. During this review the inspectors noted that PMA-17-0101927, "Source Range N32 Discriminator Plateau Due Date Adjustment," appeared to be deferring the completion of TS SR 3.3.1.11 until the next scheduled Unit 2 RFO (A2R20) in late 2018. The licensee's justification for this deferral indicated that the postponement was needed due to technical difficulties in obtaining the requisite stable source range indication required for completion of the surveillance. Additionally, the licensee's justification within PMA-17-0101927 indicated that the personnel completing the N32 discriminator plateau due date adjustment believed that this element of the source range nuclear instrument calibration was not related to the TS SR 3.3.1.11 requirement. These personnel incorrectly concluded that Source Range Channel N32 could be successfully calibrated using detector plateau data obtained from the previous Unit 2 RFO (A2R18) in 2015.

In assessing the issue, the inspectors reviewed licensee procedure BwISR 3.3.1.11-102, "Source Range Discriminator Plateau Determination and Calibration for N32," and the Bases for TS SR .3.1.11. As noted above, the TS Bases discussed the purpose of TS SR 3.3.1.11 as "...obtaining the detector plateau or preamp discriminator curves, evaluating those curves, and comparing those curves to the manufacturer's data." From this, the inspectors concluded that the procedure's purpose was to determine the discriminator plateau for the specific purpose of calibrating the source range nuclear instrument, and that successful performance of the procedure was needed in order to satisfy TS SR 3.3.1.11.

Because the licensee personnel performing the deferral had incorrectly concluded that the N32 discriminator plateau measurement was not required by TS SR 3.3.1.11, the wrong station process to effect the change was utilized. Licensee personnel utilized the station process for revising the frequency of a planned maintenance activity when, in

fact, the station's process for the control of a TS surveillance frequency should have been used. Specifically, since the change was essentially a change to the TS SR 3.3.1.11 frequency the provisions of TS 5.5.19.b, "Surveillance Frequency Program," should have been applied. The requirements of TS 5.5.19.b specify that changes listed to the frequencies in the station's surveillance frequency control program shall be made in accordance with Nuclear Energy Institute (NEI) Document 04-10, "Risk-Informed Method for Control of Surveillance Frequencies," Revision 1. In addition, the inspectors also noted that the deferral had not been reviewed by either the station's operations or regulatory assurance departments as specified by licensee procedure WC-AA-120, "Preventive Maintenance (PM) Database Revision Requirement," for changes involving a revision to a regulatory-related activity (e.g., a change to a TS surveillance).

Following engagement with licensee operations, regulatory assurance, and engineering personnel at multiple levels, the licensee concluded that PMA-17-0101927 had utilized an incorrect process and that the frequency for TS SR 3.3.1.11 had been inappropriately changed. The licensee entered this issue into their CAP as IR 4009050. Immediate corrective actions by the licensee included adding the performance of the surveillance back into the scope for their Unit 2 RFO (A2R19) and restoration of the frequency for the surveillance back to an 18-month periodicity.

### Analysis

The inspectors determined the licensee's failure to properly utilize the surveillance frequency control program when making a change to the specified frequency of TS SR 3.3.1.11 was contrary to the requirements of TS 5.5.19.b, "Surveillance Frequency Program," and constituted a performance deficiency that was reasonably within the licensee's capability to have foreseen and that should have been avoided.

The performance deficiency was determined to be of more than minor because if left uncorrected it could have led to a more significant safety concern. Specifically, changes to the frequencies of TS surveillances without using the requisite program could improperly extend surveillance frequencies to the point where they no longer support equipment operability.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on October 7, 2016. Because the finding impacted the Mitigating Systems Reactor Safety Cornerstone, the inspectors screened the finding through IMC 0609, Appendix A, Attachment 1, "The Significance Determination Process (SDP) for Findings at Power," issued on June 19, 2012, using Exhibit 2, "Mitigating System Screening Questions." The inspectors answered "No" to each of the questions in Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as having very low safety significance (Green) because it did not result in the loss of operability or functionality of any SSC.

The inspectors determined that this finding had a cross-cutting component in the area of human performance, work management aspect, because the licensee failed to utilize a work process that included proper coordination with different groups or job activities. Specifically, licensee personnel conducting the PMA-17-0101927 deferral did not coordinate the activity with personnel in either the operations or regulatory assurance departments. Knowledgeable personnel in either of these station organizations could have identified that the wrong process for deferral was being utilized. [H.5]

## Enforcement

The requirements of TS 5.5.19.b, "Surveillance Frequency Program," state, in part, that changes listed to the frequencies listed in the surveillance frequency control program shall be made in accordance with NEI 04–10, "Risk-Informed Method for Control of Surveillance Frequencies," Revision 1.

Contrary to these requirements, on May 3, 2017, the licensee failed to implement the elements specified in the surveillance frequency control program when making a change to a specified frequency. Specifically, the licensee completed a deferral of TS SR 3.3.1.11 on Unit 2 without implementing the provisions of the station's surveillance frequency program.

Corrective actions planned and completed by the licensee included changing the frequency of TS SR 3.1.1.11 back to an 18-month periodicity and successfully performing the surveillance prior to Unit 2 restart from outage A2R19. Because this violation was of very low safety significance and had been entered into the licensee's CAP as IR 4009050, it is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000456/2017002–01; 05000457/2015002–01: Failure to Adequately Implement Surveillance Frequency Program for the Deferral of a Technical Specification Surveillance)**

### (2) Failure to Adequately Implement Technical Specification Surveillance Frequency Requirements into Implementing Procedures

#### Introduction

The inspectors identified a finding of very low safety significance (Green), and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to have an appropriate implementing procedure for TS SR 3.9.3.2. Specifically, procedure BwIS NR–203, "Post Accident Neutron Monitoring System Discriminator Adjustment," did not provide for determining and checking the discriminator voltage for the instruments at the required 18-month frequency, but specified a staggered 18-month frequency that effectively implemented a 36-month periodicity for each instrument channel.

#### Description

The requirements of TS 3.9.3, "Nuclear Instrumentation," specified that two source range neutron flux monitors must be operable in order to determine changes in core reactivity when a unit is in Mode 6. On June 2, 1999, TS Amendment No. 102 was issued for the station. The Gamma-Metrics post-accident neutron monitors (PANMs) were added as an option to satisfy the requirements of TS 3.9.3. Specifically, the amendment allowed a PANM to be credited in place of a Westinghouse source range nuclear instrument. However, the amendment also specified that in order for the PANM to be considered operable that it needed to meet the same TS surveillance requirements as the Westinghouse source range nuclear instrument.

A channel calibration was required every 18 months per TS SR 3.9.3.2. The channel calibration included obtaining detector discriminator curves, evaluating those curves, and comparing the curves to the manufacturer's data. The licensee accomplished this SR for the PANM via procedure BwIS NR–203. As part of the inspection efforts related to

the improper deferral of TS SR 3.3.1.11 (discussed in detail in Section 1R15.1.b(1) above), the inspectors determined that the licensee's implementing procedure BwIS NR-203 did not support the requirements of TS SR 3.9.3.2 for the PANMs since it allowed for the surveillance to be performed every other refueling outage, 36-month frequency as opposed to every refueling outage, 18-month frequency.

The licensee entered the issue into their CAP as IR 4010147. Corrective actions taken by the licensee included a review of the last three years of surveillance records to verify that the PANMs were not credited in lieu of the Westinghouse source range nuclear instruments in Mode 6 while core alteration were in progress. The licensee's review did not identify any instances where this had occurred. Additionally, the licensee also initiated a revision to the procedure to correct the specified frequency.

### Analysis

The inspectors determined that the licensee's failure to have established and maintained surveillance procedures that appropriately implemented the requirements of TS SR 3.9.3.2 was contrary to the requirements of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and constituted a performance deficiency that was reasonably within the licensee's capability to have foreseen and that should have been avoided.

The performance deficiency was determined to be of more than minor because it was associated with the Procedure Quality attribute of the Mitigating Systems Reactor Safety Cornerstone and adversely impacted the cornerstone objective. Specifically, TS SR 3.9.3.2 implementing procedures did not support the operability of the PANMs through calibration of the instruments at an appropriate 18-month frequency.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on October 7, 2016. Because the finding impacted the Mitigating Systems Reactor Safety Cornerstone and was related exclusively to operation of the plant while shutdown in Mode 6, the inspectors screened the finding through IMC 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process, Phase 1 Initial Screening and Characterization of Findings," issued on May 9, 2014, using Exhibit 3, "Mitigating System Screening Questions." The inspectors answered "No" to each of the questions in Exhibit 3, "Mitigating Systems Screening Questions," and the finding screened as having very low safety significance (Green) because it did not result in the loss of operability or functionality of any SSC.

Because the original occurrence of the issue stemmed from the licensee's adoption of TS Amendment No. 102 on June 2, 1999, the inspectors determined that it was historical in nature and not indicative of current licensee performance. As a result, no cross-cutting component was associated with this finding.

### Enforcement

Criterion V of 10 CFR Part 50, Appendix B, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances.

Contrary to this requirement, from June 2, 1999, until corrected as a result of the inspectors having identified this issue, licensee procedure BwIS NR-203, "Post Accident Neutron Monitoring System Discriminator Adjustment," was not appropriate for the circumstances in that it did not provide for determining and checking the discriminator voltage for the PANM instruments at the required 18-month frequency.

Corrective actions taken by the licensee included a review of the last three years of surveillance records to verify that the PANMs were not credited in lieu of the Westinghouse source range nuclear instruments in Mode 6 while core alteration were in progress. The licensee's review did not identify any instances where this had occurred. Additionally, the licensee also initiated a revision to the procedure to correct the specified frequency. Because this violation was of very low safety significance and had been entered into the licensee's CAP as IR 4010147, it is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy.

**(NCV 05000456/2017002-02; 05000457/2015002-02: Failure to Adequately Implement Technical Specification Surveillance Frequency Requirements into Implementing Procedures)**

1R18 Plant Modifications (71111.18)

.1 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following permanent engineering changes (ECs) to the facility during the weeks ending May 6, 2017 through May 13, 2017:

- Westinghouse Ovation™ digital upgrade for digital electrohydraulic control system and turbine control system infrastructure modifications;
- Unit 2 reactor floor drain (RF) sump level instrumentation modification; and
- Installation of cables and cameras in Unit 2 containment to monitor reactor coolant pump bearing oil levels.

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation documents against the design basis, the UFSAR, and the TSs, as applicable, to verify that these permanent changes to the facility did not affect the operability or availability of any safety-related systems, or systems important to safety. The inspectors observed ongoing and completed work activities to ensure that the modifications were installed as directed and consistent with applicable design control documents; that the modifications operated as expected; and that operation of the modifications did not adversely impact the operability of any interfacing systems. The inspectors verified that relevant procedure, design, and licensing documents were properly updated. Finally, the inspectors discussed the plant modifications with operations, engineering, and training department personnel to ensure that the individuals were aware of how plant operation with these modifications in place could impact overall plant performance.

The inspectors' reviews of these plant modifications constituted three inspection samples as defined in IP 71111.18-05.

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:

- NDE and PMTs for temporary leak repairs and permanent ASME Code repairs associated with a pinhole leak on the 2B AF Pump SX return line during the weeks ending April 29, 2017, through May 13, 2017;
- Functional and operational testing of the 2B Reactor Coolant Pump following replacement of the pump and motor during the weeks ending May 13, 2017, and May 20, 2017;
- Unit 2 Cycle 20 reactor core verification activities following refueling during the week May 20, 2017;
- Unit 2 control rod drop time testing following refueling activities during the week May 20, 2017;
- Unit 2 RCS pressure testing and visual examination of ASME Section XI Class 1, 2, and 3 mechanical components following refueling during the week May 20, 2017;
- Low power physics testing of the Unit 2 reactor core following refueling during the week May 20, 2017;
- Valve stroke of Unit 2D SG power operated relief valve (PORV) following replacement of hydraulic actuator fluid during the week ending June 10, 2017;
- Functional testing of the circulating water system blowdown isolation valves (OCW260A/B) following repair activities during the weeks ending June 24, 2017, and June 30, 2017; and
- Functional and operational testing of the Unit 0 Station Air Compressor (OSA01C) following an annual planned maintenance work window during the week ending July 1, 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 PMTs 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 nine PMT inspection samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the licensee's comprehensive outage plan, shutdown defense-in-depth plan, and contingencies for the 19th RFO on Unit 2 (A2R19), which began on April 24, 2017, and ended on May 20, 2017, when the unit's main generator was synchronized to the electrical power grid. These reviews were performed to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During portions of the inspection, the inspectors observed elements of the RCS cooldown to cold shutdown and the establishment of refueling conditions, reactor refueling, RCS heatup and pressurization from cold shutdown, reactor startup and low power core physics testing, main turbine roll up, synchronization of the main generator to the electrical power grid, escalation to full plant power, and monitored licensee controls over the outage activities listed below:

- Licensee configuration management, including maintenance of defense-in-depth commensurate with the shutdown defense-in-depth plan for key safety functions and compliance with the applicable TS when taking equipment out of service;
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing;
- Installation and configuration of RCS pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error;
- Controls over the status and configuration of electrical systems to ensure that TS and shutdown defense-in-depth plan requirements were met, and controls over switchyard activities;
- Monitoring of decay heat removal processes, systems, and components;
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system;
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss;
- Controls over activities that could affect reactivity;
- Maintenance of containment and associated ventilation systems, as required by TS;
- Licensee fatigue management, as required by 10 CFR Part 26, Subpart I;
- Refueling activities, including fuel handling, and spent fuel assembly inspections; and
- Licensee identification and resolution of problems related to RFO activities.

These activities by the inspectors constituted a single RFO inspection sample as defined in IP 71111.20-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

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

- Emergency Diesel Generator (EDG) 1B semiannual performance testing during the week ending April 22, 2017 (Routine);
- Local leak rate testing of containment isolation valves 2VQ016/017/018/019 during the week ending April 29, 2017 (Containment Isolation Valve);
- Cumulative Type B and C local leak rate testing results for 10 CFR Part 50, Appendix J, during the weeks ending April 29, 2017, through May 26, 2017 (Containment Isolation Valve); and
- Unit 2 emergency core cooling system (ECCS) full flow testing during the weeks ending April 29, 2017, through May 6, 2017 (Inservice Testing (IST)).

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

- Did preconditioning occur;
- Were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- Were acceptance criteria clearly stated, sufficient to demonstrate operational readiness, and consistent with the system design basis;
- Was plant equipment calibration correct, accurate, and properly documented;
- Were as-left setpoints within required ranges; and was the calibration frequency in accordance with TSs, the UFSAR, plant procedures, and applicable commitments;
- Was measuring and test equipment calibration current;
- Was the test equipment used within the required range and accuracy and were applicable prerequisites described in the test procedures satisfied;
- Did test frequencies meet TS requirements to demonstrate operability and reliability;
- Were tests performed in accordance with the test procedures and other applicable procedures;
- Were jumpers and lifted leads controlled and restored where used;
- Were test data and results accurate, complete, within limits, and valid;
- Was test equipment removed following testing;

- Where applicable for IST activities, was testing performed in accordance with the applicable version of Section XI of the ASME Code, and were reference values consistent with the system design basis;
- Was the unavailability of the tested equipment appropriately considered in the performance indicator (PI) data;
- Where applicable, were test results not meeting acceptance criteria addressed with an adequate operability evaluation, or was the system or component declared inoperable;
- Where applicable for safety-related instrument control surveillance tests, was the reference setting data accurately incorporated into the test procedure;
- Was equipment returned to a position or status required to support the performance of its safety function following testing;
- Were 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
- Where applicable, were alarm response procedure entry points and actions consistent with the plant design and licensing documents.

These activities conducted by the inspectors constituted a single routine surveillance testing inspection sample, a single IST inspection sample, and two containment isolation valve inspection samples as defined in 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

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

- June 6, 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 note 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**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

.1 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors assessed the licensee's current and historic isotopic mix, including alpha emitters and other hard-to-detect radionuclides. The inspectors evaluated whether survey protocols were reasonable to identify the magnitude and extent of the radiological hazards.

The inspectors determined if there had been changes to plant operations since the last inspection that may have resulted in a significant new radiological hazard for onsite individuals. The inspectors evaluated whether the licensee assessed the potential impact of these changes and implemented periodic monitoring, as appropriate, to detect and quantify the radiological hazard. The inspectors reviewed the last two radiological surveys from selected plant areas and evaluated whether the thoroughness and frequency of the surveys were appropriate for the given radiological hazard.

The inspectors conducted walkdowns of the facility, including radioactive waste processing, storage, and handling areas to evaluate material conditions and performed independent radiation measurements as needed to verify conditions were consistent with documented radiation surveys.

The inspectors assessed the adequacy of pre-work surveys for select radiologically risk-significant work activities.

The inspectors evaluated the radiological survey program to determine if hazards were properly identified. The inspectors discussed procedures, equipment, and performance of surveys with radiation protection staff and assessed whether technicians were knowledgeable about when and how to survey areas for various types of radiological hazards.

The inspectors observed work in potential airborne areas to assess whether air samples were being taken appropriately for their intended purpose and reviewed various survey records to assess whether the samples were collected and analyzed appropriately. The inspectors also reviewed the licensee's program for monitoring contamination that had the potential to become airborne.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.01-05.

b. Findings

No findings were identified.

.2 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors reviewed select radiation work permits used to access high radiation areas and evaluated the specified work control instructions or control barriers. The inspectors also assessed whether workers were made aware of the work instructions and area dose rates.

The inspectors reviewed electronic alarming dosimeter dose and dose rate alarm setpoint methodology. For selected electronic alarming dosimeter occurrences, the inspectors assessed the worker's response to the alarm, the licensee's evaluation of the alarm, and any follow-up investigations.

The inspectors reviewed the licensee's methods for informing workers of changes in plant operations or radiological conditions that could significantly impact their occupational dose.

The inspectors reviewed the labeling of select containers of licensed radioactive material that could cause unplanned or inadvertent exposure to workers.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.01-05.

b. Findings

No findings were identified.

.3 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

The inspectors observed locations where the licensee monitors material leaving the radiologically controlled area and assessed the methods used for control, survey, and release of material from these areas. As available, the inspectors observed health physics personnel surveying and releasing material for unrestricted use.

The inspectors observed workers leaving the radiologically controlled area and assessed their use of tool and personal contamination monitors and reviewed the licensee's criteria for use of the monitors.

The inspectors assessed whether instrumentation was used at its typical sensitivity levels based on appropriate counting parameters or whether the licensee had established a de facto release limit.

The inspectors selected several sealed sources from the licensee's inventory records and assessed whether the sources were accounted for and verified to be intact. The inspectors also evaluated whether any transactions, since the last inspection, involving nationally tracked sources were reported in accordance with 10 CFR Part 20.2207.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.01-05.

b. Findings

No findings were identified.

.4 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors evaluated ambient radiological conditions during tours of the facility. The inspectors assessed whether the conditions were consistent with applicable posted surveys, radiation work permits, and worker briefings.

The inspectors evaluated the adequacy of radiological controls, such as required surveys, radiation protection job coverage, and contamination controls. The inspectors evaluated the licensee's use of electronic alarming dosimeters in high noise areas as high radiation area monitoring devices.

The inspectors assessed whether radiation monitoring devices were placed on the individual's body consistent with licensee procedures. The inspectors assessed whether the dosimeter was placed in the location of highest expected dose or that the licensee properly employed an NRC-approved method of determining effective dose equivalent.

The inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel in work areas with significant dose rate gradients.

For select airborne area radiation work permits, the inspectors reviewed airborne radioactivity controls and monitoring, the potential for significant airborne levels, containment barrier integrity, and temporary filtered ventilation system operation.

The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials stored within pools and assessed whether appropriate controls were in place to preclude inadvertent removal of these materials from the pool.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.01-05.

b. Findings

No findings were identified.

.5 High Radiation Area and Very High Radiation Area Controls (02.06)

a. Inspection Scope

The inspectors observed posting and physical controls for high radiation areas and very high radiation areas to assess adequacy.

The inspectors conducted a selective inspection of posting and physical controls for high radiation areas and very high radiation areas to assess conformance with performance indicators.

The inspectors reviewed procedural changes to assess the adequacy of access controls for high and very high radiation areas to determine whether procedural changes substantially reduced the effectiveness and level of worker protection.

The inspectors assessed the controls the high radiation areas greater than 1 rem/hour and areas with the potential to become high radiation areas greater than 1 rem/hour for compliance with TS and procedures.

The inspectors assessed the controls for very high radiation areas and areas with the potential to become very high radiation areas. The inspectors also assessed whether individuals were unable to gain unauthorized access to these areas.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.01-05.

b. Findings

No findings were identified.

.6 Radiation Worker Performance and Radiation Protection Technician Proficiency (02.07)

a. Inspection Scope

The inspectors observed radiation worker performance and assessed their performance with respect to radiation protection work requirements, the level of radiological hazards present, and radiation work permit controls.

The inspectors assessed worker awareness of electronic alarming dosimeter set points, stay times, or permissible dose for radiologically significant work as well as expected response to alarms.

The inspectors observed radiation protection technician performance and assessed whether the technicians were aware of the radiological conditions and radiation work permit controls and whether their performance was consistent with training and qualifications for the given radiological hazards.

The inspectors observed radiation protection technician performance of radiation surveys and assessed the appropriateness of the instruments being used, including calibration and source checks.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.01-05.

b. Findings

No findings were identified.

.7 Problem Identification and Resolution (02.08)

a. Inspection Scope

The inspectors assessed whether problems associated with radiological hazard assessment and exposure controls were being identified at an appropriate threshold and were properly addressed for resolution. For select problems, the inspectors assessed the appropriateness of the corrective actions. The inspectors also assessed the licensee's program for reviewing and incorporating operating experience.

The inspectors reviewed select problems related to human performance errors and assessed whether there was a similar cause and whether corrective actions taken resolve the problems.

The inspectors reviewed select problems related to radiation protection technician error and assessed whether there was a similar cause and whether corrective actions taken resolve the problems.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.01–05.

b. Findings

No findings were identified.

2RS2 Occupational As-Low-As-Reasonably-Achievable Planning and Controls (71124.02)

.1 Implementation of As-Low-As-Reasonably-Achievable and Radiological Work Controls (02.04)

a. Inspection Scope

The inspectors assessed the involvement of as-low-as-reasonably-achievable licensee staff with emergent work activities during maintenance and, when possible, attended in-progress review discussions, outage status meetings, and/or as-low-as-reasonably-achievable committee meetings.

The inspectors' reviews constituted a partial inspection sample as defined in IP 71124.02–05.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (71124.07)

.1 Site Inspection (02.02)

a. Inspection Scope

The inspectors observed the collection and preparation of environmental samples from select environmental media to determine if environmental sampling was representative

of the release pathways specified in the ODCM and if sampling techniques were in accordance with procedures.

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

These activities supplemented those documented in NRC Inspection Report (IR) 5000456/2016002; 5000457/2016002 (ADAMS Accession No. ML16209A139) and constituted a single complete inspection sample as defined in IP 71124.07-05.

b. Findings

(1) Failure to Adequately Implement and Maintain the Radiological Environmental Monitoring Program by Collecting Representative Samples from the Principal Food Pathways

Introduction

A finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix I, Section IV(B) were identified by the inspectors for the licensee's failure to establish an appropriate surveillance and monitoring program in order to provide data on measurable levels of radiation and radioactive materials in the environment. This failure prohibited the ability to evaluate the relationship between quantities of radioactive material released in effluents and resultant radiation doses to individuals from principal pathways of exposure. This was an NRC-identified finding for failure to implement and maintain the licensee's REMP by collecting representative samples from the highest deposition coefficient (D/Q) quadrants locations during the annual REMP sampling and collections of food products in 2015.

Description

On May 25, 2016, during a routine inspection of the licensee's REMP the inspectors identified that the licensee failed to implement and maintain their REMP by collecting representative samples of ingestion pathways. Specifically, during a review of the licensee's annual radiological environmental operating report for 2015, the inspectors noted the reported missed samples of three out of four quadrants where the principal food pathways grow within the 10 kilometers from the station and, in addition, missed milk samples.

The importance of food product sampling during nuclear plant normal operation stems from the fact that the station can release small amounts of airborne radioactivity such as iodine, particulate, and tritium that could enter to the food chain through deposition on vegetation. This deposition on the vegetation can be ingested by persons who consume the vegetation or who consume products (i.e., milk, meat, etc.) of animals that have fed on the contaminated vegetation. Thus, it is important during normal plant operation that the licensee collects food products (i.e., vegetation) from all four quadrants relative to the plant or, at minimum, from a quadrant with one of the highest radionuclide deposition

factors to evaluate the relationship between quantities of radioactive material released in effluents and the resultant radiation doses to individuals from the principal pathways of exposure.

During 2015 food product collections, the licensee only collected samples from the lowest deposition factors area at sample location BD-2 in Quadrant No. 2 located between East-South-East and South-South-West. In this quadrant the licensee also sampled only one milk location. This milk sampling location was located at the lowest radionuclide deposition area and not indicative of food ingestion pathway dose. Therefore, the performance issue during 2015 REMP sampling program was missed sampling of important food products in that the licensee did not meet the minimum requirement of food product sampling of the required highest deposition factors. Thus, the licensee missed the required verification analysis of the food pathways doses.

The samplings of milk animals and gardens producing broad leaf vegetation is based on the requirement in the Appendix I of 10 CFR Part 50 to "Identify changes in the use of unrestricted areas (e.g., for agricultural purposes) to permit modifications in monitoring programs for evaluating doses to individuals from principal pathway of exposure." Samples from milk animals are considered a better indicator of radioiodine in the environment than vegetation. If milk from animals were not available for sampling, then vegetation must be sampled. In addition, the option to consider the garden to be broad leaf vegetation at the site boundary in the sector with the highest D/Q and that location maybe used to calculate doses due to radioactive effluent releases.

The inspectors recognized that this issue had been entered into the licensee's CAP as IR 2614924. However, the inspectors further noted that this document was closed without action to restore compliance with NRC requirements; consequently, this issue has been characterized as NRC-identified because the inspectors had identified inadequacies in the licensee characterization or evaluation of the issue of concern.

An acceptable minimum radiological monitoring program was set forth in an NRC Branch Technical Position dated November 1979, and stipulated that food products including milk samples be collected and analyzed according to Table-1 of NUREG-1301. The licensee's staff indicated in discussions with the inspectors that they were unable to find root or broad leaf vegetation food products or milk samples at those areas of the highest D/Q. The licensee documented these missed samples in the station's annual radiological environmental operating report for 2015. The NRC Branch Technical Position discussed above acknowledged that there could be occasions when sample(s) could not be collected by licensee. Examples included hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment, and other legitimate reasons. However, the NRC also stated an expectation that every effort be made to complete corrective action prior to the end of the next sampling period. The inspectors determined that simply reporting the deviations in the subsequent annual report was neither a corrective action nor a timely evaluation. The inspectors identified that other broadleaf vegetation was available near the designated sample locations; however, the licensee's sampling program owner was unaware that the alternative samples could have and should have been collected to satisfy the sample requirements. The inspectors noted that the sampling program owner was recently assigned to the position when the samples were no longer available.

Corrective actions taken by the licensee included reestablishing collection through the land use census program in 2016 and the establishment of a vegetable garden within 10 kilometers from the station. The licensee entered this issue into their CAP as IR 4002540.

### Analysis

The inspectors determined that this issue constituted a performance deficiency because the licensee failed to effectively implement a minimum acceptable program. Specifically, the licensee failed to sample food product indicators associated with the licensee's REMP ingestion pathway by collecting representative samples from the principal food pathways grown within 10 kilometers from the station and in locations of the highest food ingestion pathways dose factors. The inspectors noted that this issue had been identified in the licensee CAP as IR 2614924 on January 20, 2016, but that no action were taken in third and fourth quarters of 2015 to identify suitable sampling locations. The inspectors determined that the cause of the performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented.

The inspectors determined that this finding was of more than minor safety significance in accordance with NRC IMC 0612, as the finding was associated with the Program and Process attribute of the Public Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of the public from radiation. Specifically, the licensee failed to implement effective sample collection from locations of food products from three of the major quadrants during annual REMP sampling in 2015. The inspectors reviewed the station's bases for site specific dose pathways for airborne and liquid effluent receptors to assess the impact of these missed samples. The inspectors determined that there was no clear connection as to whether the intended ingestion pathway samples that included milk and food product samples were designed to validate the airborne effluent control program or liquid effluent control pathway.

The finding was assessed using IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," and was determined to be of very low safety significance (Green) because it only involved the licensee's environmental monitoring program.

As discussed above, the licensee's program owner for the REMP was relatively new to the position and did not recognize that replacement samples were available. Consequently, the inspectors concluded that the issue involved a cross-cutting component in the area of human performance, change management aspect, because the licensee did not use a systematic process for evaluating and implementing a change in their REMP sampling and collection program. [H.3]

### Enforcement

The requirements of 10 CFR Part 50, Appendix I, Section IV(B), set forth an appropriate surveillance and monitoring program in order to provide data on measurable levels of radiation and radioactive materials in the environment to evaluate the relationship between quantities of radioactive material released in effluents and resultant radiation doses to individuals from principal pathways of exposure.

Contrary to these requirements, the licensee failed to implement and maintain their REMP with representative samples of principal food pathways grown in the highest nuclide depositions in 2015. The licensee did not have sufficient information to support changes to the REMP and/or ODCM, nor did they have appropriate analyses or evaluations justifying the changes. Specifically, the licensee was not able to collect vegetation samples at the highest radionuclide D/Q; thus, the licensee missed the potential analysis of food pathways doses.

The failure to implement and maintain the licensee's REMP by collecting representative samples from the principal food pathways grown in the highest nuclide depositions in 2015 was of very low safety significance. Corrective actions were established as described above, and the issue was entered into the licensee's CAP as IRs 2614924, 2674553, and 4002540. Because this violation was of very low safety significance and had been entered into the licensee's CAP, it is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000456/2017002-03; 05000457/2015002-03: Failure to Adequately Implement and Maintain the Radiological Environmental Monitoring Program by Collecting Representative Samples from the Principal Food Pathways)**

#### 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 Safety System Functional Failures

###### a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures Performance Indicator (PI) for the period from April 2016 through March 2017 for Units 1 and 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance WOs, IRs, event reports and NRC integrated inspection reports for the period of April 2016 through March 2017 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

The inspectors' reviews of this PI data constituted two Safety System Functional Failure inspection samples as defined in IP 71151-05.

###### b. Findings

No findings were identified.

## .2 Mitigating Systems Performance Index—Emergency Alternating Current Power System

### a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) – Emergency AC Power System PI for the period from April 2016 through March 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 Document 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, IRs, event reports and NRC integrated IRs for the period of April 2016 through March 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 issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

The inspectors' reviews of this PI data constituted two MSPI – Emergency AC Power System inspection samples as defined in IP 71151–05.

### b. Findings

No findings were identified.

## .3 Mitigating Systems Performance Index—High Pressure Injection Systems

### a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI – HPI Systems performance for the period from April 2016 through March 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 Document 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 IRs for the period of April 2016 to March 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 issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

The inspectors' reviews of this PI data constituted two MSPI – HPI System inspection samples as defined in IP 71151–05.

### b. Findings

No findings were identified.

#### .4 Occupational Exposure Control Effectiveness

##### a. Inspection Scope

The inspectors sampled licensee submittals for the Occupational Exposure Control Effectiveness PI for the period from the first quarter 2016 through the first quarter 2017. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's assessment of the PI for occupational radiation safety to determine if indicator related data was adequately assessed and reported. To assess the adequacy of the licensee's PI data collection and analyses, the inspectors discussed with radiation protection staff, the scope and breadth of its data review and the results of those reviews. The inspectors independently reviewed electronic personal dosimetry dose rate and accumulated dose alarms and dose reports and the dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized occurrences. The inspectors also conducted walkdowns of numerous locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas.

The inspectors' reviews of this PI data constituted a single Occupational Exposure Control Effectiveness inspection sample as defined in IP 71151-05.

##### b. Findings

No findings were identified.

#### 4OA2 Identification and Resolution of Problems (71152)

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

##### a. Inspection Scope

As part of the various baseline 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.

.3 Follow-Up Sample for In-Depth Review: Application of Corrective Actions to Address System Inoperabilities

a. Inspection Scope

The inspectors performed an in-depth review of corrective actions that were related to safety-related systems inoperabilities covering the last three years to assess the effectiveness of those actions. Specifically, the inspectors' review included twenty-four IRs written for several conditions that led to various safety-related components being rendered inoperable.

As applicable, the inspectors verified the following attributes during their review:

- Complete and accurate identification of the problem in a timely manner commensurate with its safety significance and ease of discovery;
- Consideration of the extent of condition, generic implications, common cause, and previous occurrences;
- Evaluation and disposition of operability/functionality;
- Classification and prioritization of the resolution of the problem commensurate with safety significance;
- Identification of corrective actions, which were appropriately focused to correct the problem; and
- Completion of corrective actions in a timely manner commensurate with the safety significance of the issue.

The inspectors' activities constituted a single follow-up/in-depth review inspection sample as defined in IP 71152-05.

b. Observations

The inspectors' review compared the licensee's identified corrective actions with the criteria set forth in licensee procedures PI-AA-125, "Corrective Action Program (CAP) Procedure," and PI-AA-120, "Issue Identification and Screening Process." Overall, the inspectors found that in all cases an appropriate corrective action was taken. However, the inspectors did note some examples where the corrective actions were not explicitly taken as part of the IR. Stated differently, the inspectors noted four instances (IRs 1604876, 1646790, 1686097, and 2420401) wherein the corrective action was not specified in the actions taken as part of the IR, but were instead documented as work requests. This practice is contrary to the specified requirements in procedures PI-AA-120 and PI-AA-125. However, since the actions stemming from the work requests accomplished the same end result as would have been achieved by formal corrective actions integral to the IRs, the inspectors concluded that these examples of procedure noncompliance were of minor safety significance and not subject to formal enforcement action in accordance with the NRC's Enforcement Policy.

In addition, the inspectors also noted one case (IR 1582946) in which the inoperability of a diesel generator was recorded as a significance level 4. Per procedure, conditions adverse to quality are classified as significance level 1-3, and are assigned a formal corrective action. In this particular case an action tracking item was assigned instead of a formal corrective action. Action tracking items, per the licensee's CAP procedures, are meant to be enhancements and not be used to correct conditions adverse to quality. The inspectors concluded that the action tracking item accomplished the same end result as a formal corrective action in this case; thus, the issue was determined to be of minor safety significance and not subject to formal enforcement in accordance with the NRC's Enforcement Policy.

c. Findings

No findings were identified.

.4 Semi-Annual Trend Review: Issues Associated with Degradation of Essential Service Water Piping

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspectors CAP item screening discussed in Section 4OA2.1 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the six-month period of January 1 through June 30, 2017, although examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, Quality Assurance audit/surveillance reports, self-assessment reports, and maintenance rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP

trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

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

b. Observations

During the course of their review for this inspection sample, the inspectors noted a number of issues involving the degradation of SX piping (i.e., pipe wall thinning, pinhole leaks, etc.) and a potential longstanding adverse trend. A majority of these issues have involved the phenomenon of microbiologically influenced corrosion (MIC). The following is taken from NRC Information Notice No. 94-79, "Microbiologically Influenced Corrosion of Emergency Diesel Generator Service Water Piping," and provides some background into this phenomenon:

*Stagnant or intermittent-flow conditions, as in the case of EDG service water supply headers, are conducive to the growth of microorganisms that can accelerate corrosion rates. Service water supply lines to emergency diesel generators are stagnant because motor-operated isolation valves are normally maintained shut (except during monthly surveillance testing). Crevices such as those in piping welds that lack penetration can enhance microbiologically influenced corrosion attack by giving a place for deposits and, therefore, for the bacteria to collect. Microbial films form when aerobic species, such as iron-oxidizing bacteria, create anaerobic conditions underneath them for microorganisms, such as sulfate-reducing bacteria, to accumulate at the metal surface. Sulfate-reducing bacteria attack the metal surface, produce corrosive chemicals, and cause deep pitting.*

*Microbiologically influenced corrosion on carbon steel will increase general corrosion, through-wall pitting, and the formation of tubercles. Tubercles consist of corrosion products, microbes, and debris. Tubercle growth could restrict cooling water flow to equipment.*

Specific items associated with this trend that were reviewed by the inspectors included, but were not limited to:

- August 1, 2013: A through-wall leak was identified on 1SX27DA-10" downstream of valve 1SX057A associated with the 1A EDG. The primary cause was identified by the licensee as MIC. (IR 1542372)
- May 12, 2014: A pinhole leak was identified on 1SX25AA-6" upstream of valve 1AF017A associated with the 1A AF Pump. The primary cause was identified by the licensee as MIC. (IR 1659136) The licensee initiated a formal equipment apparent cause evaluation on August 28, 2014. (IR 2546103) Multiple actions stemmed from this evaluation, including the risk ranking of SX piping sections regarding susceptibility to MIC.
- March 13, 2015: A through-wall leak was identified on 1SX27DA-10" downstream of valve 1SX169A associated with the 1A EDG. The primary cause was identified by the licensee as MIC. (IR 1542372)

- March 23, 2015: A through-wall leak was identified on 0SXB8AA–3/4". (IR 2472922)
- May 17, 2015: A through-wall leak was identified on a flange of valve 1SX007 associated with the Unit 1 component cooling water system. The primary cause was identified by the licensee as cavitation damage. (IR 2501820)
- August 25, 2015: A pinhole leak was identified on the 2A SX Strainer Backwash Line (2SX93AA–8"). (IR 2546103)
- November 19, 2015: Significant external corrosion and a degraded protective coating were identified on a drain line (0SXH2AA–6") associated with the Unit 0 Train A SX Return Valve (0SX165A). Although no active leakage was identified, the licensee initiated a formal root cause evaluation as the potential impact of a failure of this line would have been a 72-hour action requiring the shutdown of both units. The licensee re-examined previous corrective actions to address SX piping issues as part of this root cause evaluation. (IR 2589930)
- April 22, 2017: A pinhole leak was identified on 2SXA9A–6" downstream of valve 2SX178 associated with the 2B AF Pump. The primary cause was identified by the licensee as MIC. The licensee initiated a formal equipment causal evaluation and determined that the tool previously used to risk rank SX piping sections regarding susceptibility to MIC had non-conservatively classified the susceptibility of this section of piping with respect to this phenomenon. (IR 4001297)

In discussions with licensee engineering and management personnel, it appeared that the licensee has an overall understanding of the issue of MIC and its impact on SX piping. Additionally, the licensee had taken a number of preemptive actions to repair/replace degraded SX piping before the degradation reached a critical point. However, as evidenced by the number of issues going back several years, the licensee's success in dealing with the issue has been problematic. Although these issues individually have not resulted in any significant consequences, the risk to the overall health of the station's SX system, and therefore to the various safety-related systems that it supports, continues to linger. The licensee's own probabilistic risk assessment model identified the SX system as a very key equipment contributor with a large impact on the station's baseline core damage frequency. As such, re-examination and re-prioritization of the actions necessary to address this trend may be warranted.

c. Findings

No findings were identified.

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

.1 Event Notification No. 52802: Offsite Notification for Discharge of Circulating Water

The inspectors reviewed the response of the licensee's staff to a June 11, 2017, discovery that a portion of a permitted liquid release of low-level radioactive water containing tritium had been inadvertently pumped to the ground outside the station's circulating water blowdown valve house during planned maintenance activities. Per the requirements of 10 CFR 50.72(b)(2)(xi), the licensee reported the condition to the NRC via telephone at 1:35 p.m. on June 11, 2017, due to the licensee having notified the State of Illinois Environmental Protection Agency of the issue.

Following licensee review of the issue, it was determined that the pumping took place intermittently between May 28, 2017, and June 11, 2017, with approximately 35,000 gallons of low-level radioactive water containing tritium being pumped out of the building's sump onto the ground surrounding the building. This area is adjacent to the site's circulating water discharge point to the Kankakee River, which is a permitted discharge outfall.

Inspectors responding to this issue verified that the pumping activities outside the circulating water blowdown valve house had been halted, and the NRC augmented the station's assigned resident inspectors with radiation protection inspectors from the NRC Region III Office in Lisle, Illinois, in order to conduct additional detailed reviews of the issue. The inspectors reviewed the station's exposure pathways, sample analysis, and the resultant licensee dose calculations to members of the public, and determined that this release did not exceed any NRC regulatory limits or constitute any impact to public health and safety.

The licensee entered this issue into their CAP as IR 4020644. Corrective actions taken by the licensee included, but were not limited to:

- The establishment of monitoring wells and collection of water and soil samples adjacent to the circulating water blowdown valve house;
- The establishment of two remediation wells in the area adjacent to the spill location to collect water containing tritium from the soil; and
- The initiation of a formal root cause investigation into the circumstances surrounding the event.

At the end of the inspection period the licensee's root cause investigation was still in progress, with a target completion date of early July 2017. At the end of the inspection period, this issue remained under review by the inspectors pending receipt and review of the licensee's root cause report.

This event follow-up review constituted a single inspection sample as defined in IP 71153-05.

#### 40A5 Other Activities

##### .1 (Closed) Unresolved Item 05000456/2016002-03; 05000457/2016002-03: Missed Radiological Environmental Monitoring Sampling

The station's annual radiological environmental operating report for 2015 identified missed food samples in three out of four quadrants where food products were required by the licensee's ODCM. The inspectors also noted that this issue had been entered into the licensee's CAP as IR 2614924 on January 20, 2016, but that no action was taken by the licensee in 2015 to identify suitable alternative sampling locations.

The assessment of the issue was not completed during a prior inspection period in 2016. The licensee's ODCM is a site specific document that includes the radioactive effluent controls and the associated radiological environmental monitoring activities used to validate those controls. At the end of the prior inspection period, the inspectors had not had the opportunity to review the bases documents for the station's ODCM to better understand the site specific dose pathways for airborne and liquid effluent receptors or the opportunity to assess the impact of missed samples. Subsequently, inspectors

received and reviewed documents related to past ODCM submissions dating back to September 1991, and concluded that there was not a clear nexus as to whether the intended food product samples were designed to validate the airborne effluent control program or the liquid effluent control pathway. The issue was reviewed by the inspectors and determined to constitute a violation of regulatory requirements (see Section 2RS7.1). This unresolved item is closed.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On July 6, 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 Site Vice President, Ms. M. Marchionda, and other members of the licensee staff on April 28, 2017; and
- The results of inspections in the area of ISI with the Site Vice President, Ms. M. Marchionda, and other members of the licensee staff on May 4, 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  
B. Currier, Engineering Director  
K. Dovas, Operations Training Director  
B. Finlay, Security Manager  
M. Gorga, Chemistry Supervisor  
R. Hall, Chemical Environment & Radwaste Manager  
T. Leaf, Operations Director  
P. Rausch, Work Management Director  
S. Reynolds, Regulatory Assurance Manager  
R. Schliessmann, NRC Coordinator  
G. Smith, Emergency Preparedness Manager

#### U.S. Nuclear Regulatory Commission

E. Duncan, Chief, Reactor Projects Branch 3

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000456/2017002-01; 05000457/2017002-01	NCV	Failure to Adequately Implement Surveillance Frequency Program for the Deferral of a Technical Specification Surveillance (Section 1R15.1.b(1))
05000456/2017002-02; 05000457/2017002-02	NCV	Failure to Adequately Implement Technical Specification Surveillance Frequency Requirements into Implementing Procedures (Section 1R15.1.b(2))
05000456/2017002-03; 05000457/2017002-03	NCV	Failure to Adequately Implement and Maintain the Radiological Environmental Monitoring Program by Collecting Representative Samples from the Principal Food Pathways (Section 2RS7.1.b)

### Closed

05000456/2017002-01; 05000457/2017002-01	NCV	Failure to Adequately Implement Surveillance Frequency Program for the Deferral of a Technical Specification Surveillance (Section 1R15.1.b(1))
05000456/2017002-02; 05000457/2017002-02	NCV	Failure to Adequately Implement Technical Specification Surveillance Frequency Requirements into Implementing Procedures (Section 1R15.1.b(2))
05000456/2017002-03; 05000457/2017002-03	NCV	Failure to Adequately Implement and Maintain the Radiological Environmental Monitoring Program by Collecting Representative Samples from the Principal Food Pathways (Section 2RS7.1.b)
05000456/2016002-03; 05000457/2016002-03	URI	Missed Radiological Environmental Monitoring Sampling (Section 4OA5.1)

### Discussed

None

## LIST OF DOCUMENTS REVIEWED

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

### 1R01 Adverse Weather Protection

#### Action Requests/Issue Reports:

- 4019110; NRC ID'd Gasket Mispositioned on 2MP05E Bus Duct "B" Phase; June 6, 2017
- 4003991; Unplanned Entry Into 0BWOA ELEC-1 – Unit 2 Only; April 28, 2017
- 3998175; Fan 5 of SAT 142-2 Did Not Operate in Manual Control; April 14, 2017
- 4016958; 2017 Summer Readiness – 4 Work Items Not Complete; May 31, 2017

#### Procedures:

- OP-AA-108-107; Switchyard Control; Revision 4
- OP-AA-108-107-1001; Station Response to Grid Capacity Conditions; Revision 7
- OP-AA-108-107-1002; Interface Procedure Between BGE/COMED/PECO and Exelon Generation for Transmission Operations; Revision 10
- 0BWOA ENV-1; Adverse Weather Conditions Unit 0; Revision 122

### 1R04 Equipment Alignment

#### Action Requests/Issue Reports:

- 4016570; 1A SX Pump Significantly Weaker than 1B SX Pump; May 31, 2017
- 4019471; NRC ID'd – PCRA to BwOP CS-E1; June 6, 2017
- 4001297; OSP-A 2B AF Pump SX Return Piping Leak; April 22, 2017
- 3951430; 1FI-SX094 Has a Plugged Sensing Line; December 9, 2016
- 4024290; 0.5% Level Rise in 2DO01TA Level During 2B DG Run; June 21, 2017

#### Procedures:

- BwOP AF-M2; Operating Mechanical Lineup, Auxiliary Feedwater, Unit 2; Revision 18
- BwOP AF-E2; Electrical Lineup – Unit 2 Operating; Revision 11
- BwOP CS-M1; Operating Mechanical Lineup Unit 1; Revision 12
- BwOP CS-E1; Electrical Lineup – Unit 1 Containment Spray System Electrical Lineup; Revision 3
- BwOP SX-E1; Electrical Lineup – Unit 1 Essential Service Water System Operating; Revision 11
- BwOP SX-E2; Electrical Lineup – Unit 2 Essential Service Water System; Revision 13
- BwOP SX-M1; Operating Mechanical Lineup Unit 1; Revision 33
- BwOP SX-M2; Operating Mechanical Lineup Unit 2; Revision 37
- 1BwOS XLE-R1; Unit One Locked Equipment Surveillance; Revision 32
- 2BwOS XLE-R1; Unit Two Locked Equipment Surveillance; Revision 26
- BwOP DO-M10; Operating Mechanical Lineup Unit 2 D/G Fuel Oil Storage; Revision 2
- BwOP DO-M12; Operating Mechanical Lineup Unit 2 D/G 2A Fuel Oil; Revision 4

#### Drawings/Prints

- M-122; Diagram of Auxiliary Feedwater Unit 2; Revision BG
- M-46; Sheet 1A; Diagram of Containment Spray Unit 1; Revision AW
- M-42; Sheet 1A; Diagram of Essential Service Water Units 1 & 2; Revision BL

- M-42; Sheet 1B; Diagram of Essential Service Water Units 1 & 2; Revision BD
- M-130; Sheet 1A; Diagram of Diesel Oil and Fuel Oil Supply Unit 2; Revision BN
- M-130; Sheet 1B; Diagram of Diesel Oil and Fuel Oil Supply Unit 2; Revision BM

### 1R05 Fire Protection

#### Action Requests/Issue Reports:

- 3994306; CB & I Worker Tailgated on Security Door 512; April 5, 2017
- 3995196; Missed Hourly Fire Watch Round Due to Security Door Violation; April 6, 2017
- 4004982; OSP-A: Unexpected Alarm 0-39-A4, "Unit 2 Area Fire," 2D-6; May 1, 2017
- 4009062; CAPE Rejected at MRC Due to Number of Changes (IR No. 3995196); May 10, 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 38
- 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 13
- OP-AA-201-008; Pre-Fire Plan Manual; Revision 3
- OP-AA-201-009; Control of Transient Combustible Material; Revision 18
- OP-MW-201-007; Fire Protection System Impairment Control; Revision 7

#### Pre-Fire Plans:

- No. 10; Fire Zone 1.3-2: Containment 426' – 0" Elevation Unit 2, Containment Upper Area; Revision 1
- No. 23; Fire Zone 3.2B-2: CSR 439' Lower Cable Spreading Room, Zone B-2; Revision 1
- No. 24; Fire Zone 3.2C-2: CSR 439' Lower Cable Spreading Room, Zone C-2; Revision 1
- No. 26; Fire Zone 3.2D-2: CSR 439' Lower Cable Spreading Room, Zone D-2; Revision 1
- No. 30; Fire Zone 3.3A-2: CSR 463' Upper Cable Spreading Room, Zone A-2; Revision 1
- No. 32; Fire Zone 3.3B-2: CSR 463' Upper Cable Spreading Room, Zone B-2; Revision 1
- No. 34; Fire Zone 3.3C-2: CSR 463' Upper Cable Spreading Room, Zone C-2; Revision 1
- No. 36; Fire Zone 3.3D-2: CSR 463' Upper Cable Spreading Room, Zone D-2; Revision 1
- No. 50; Fire Zone 5.5-2: SWGA 451' Unit 2 Auxiliary Electrical Equipment Room; Revision 0

### 1R07 Heat Sink

#### Work Orders:

- 1865840; LR PM Cooler Inspection 2B CV PP Oil Cooler

## 1R08 Inservice Inspection Activities

### Action Requests/Issue Reports:

- 4001297; OSP AF Pump SX Return Piping Leak; April 22, 2017
- 3992319; Tendon D5-12 Grease Moisture Content Acceptance Criteria Exceeded; March 31, 2017
- 3977635; Vendor Documentation for RCP Flywheel Examination Incomplete; February 22, 2017
- 3976217; Unable to Flush 2B SX Oil Cooler Inlet Piping; February 20, 2017
- 2728481; 1CV015B VT-2 Incorrectly Cancelled; October 15, 2016
- 2723079; Loss of FME Integrity During SG Inspection; October 2, 2016
- 2688273; Byron RCR for Action at Braidwood; July 1, 2016
- 2684644; Additional Degradation of Unit 2 Containment Dome Coating; June 22, 2016
- 2683968; Section XI R/R Review Missed; June 21, 2016
- 2614345; Bolting for 2CV8123 Relief Valve Not Replaced in A2R18; January 19, 2016
- 2571599; PT Examination Indications Found SG B Channel Head; October 15, 2015
- 1657945; Additional Scope Added to Containment Liner Inspection/Repair; May 7, 2014
- 1247747; Recoat Unit 2 Containment in 2013; August 4, 2011

### Procedures:

- ER-AA-335-031; Ultrasonic Examination of Austenitic Piping Welds; Revision 8
- ER-AA-335-003; Magnetic Particle (MT) Examination; Revision 7
- ER-AP-331-1001; BACC Inspections, Implementation and Inspection Guidelines; Revision 9
- ER-AP-331-1002; BACC Program Identification, Screening and Evaluation; Revision 9
- 54-ISI-604-013; AREVA Automated UT Examination of Open Tube RPV Closure Head Penetrations; Revision 13
- 54-ISI-603-008; AREVA Automated UT Examination of RPV Closure Head Penetrations Containing Thermal Sleeves; Revision 8
- 54-ISI-460-004; Multi-frequency Eddy Current Examination of Nozzle Welds and Regions; Revision 4
- 54-ISI-494-000; Multi-Frequency Eddy Current Array Probe Examination of Vent Line and RVLIS Nozzle Bores; Revision 0
- EXE-PDI-UT-2; Ultrasonic Examination of Austenitic Piping Welds in Accordance with PDI-UT-2; Revision 8
- EXE-PDI-UT-1; Ultrasonic Examination of Ferritic Piping Welds in Accordance with PDI-UT-1; Revision 8
- MRS 2.4.2 GEN-35; Eddy Current Inspection of Pre-Service and Inservice Heat Exchanger Tubing; Revision 18
- ER-MW-335-1003; Steam Generator Eddy Current Data Analysis Guidelines for Braidwood and Byron Stations Unit 2; Revision 9
- ER-AP-420-002; Steam Generator Eddy Current Activities; Revision 14
- ER-AP-420-0051; Conduct of Steam Generator Management Program Activities; Revision 21

### Work Orders:

- 1792632; Replace 2RC48AD SG D Channel Head Bowl Drain

### Engineering Changes/Technical Evaluations:

- EC 398857; Unit 2 Containment Moisture Barrier Class CC Degraded Areas Found in A2R17; Revision 0

Other:

- Calculation (Westinghouse) SE-SG-C-83-001; Range of Steam Generator Tube ID and Mechanical Plug Expander Translation Limits; April 18, 1983
- EPRI PDQS-717 – Procedure 54-ISI-604-011; September 17, 2015
- EPRI PDQS-682 – Procedure 54-ISI-603-005; February 9, 2015
- EPRI PDQS-858 – Procedure PDI-UT-1; July 25, 2016
- EPRI PDQS-859 – Procedure PDI-UT-2; July 25, 2016
- ETSS: CDE-0001-0417, 0.610" Bobbin Coil at 80IPS; April 25, 2017
- ETSS: CDE-0002-0417, 0.610" Bobbin Coil at 40IPS; April 25, 2017
- ETSS: CDE-0003-0417, 0.590" Bobbin Coil at 24IPS; April 25, 2017
- ETSS: CCE-0004-0417, 0.610" 3-coil+PT, Non-mag Biased, High Speed; April 25, 2017
- ETSS: CDE-0005-0417, 0.610" 3-coil +PT, non-mag Biased, Reduced Speed; April 25, 2017
- ETSS: CDE-0006-0417, 0.590" 3-coil +PT, Non-mag Biased, Reduced Speed; April 25, 2017
- ETSS: CDE-0007-0417, 0.610" 3-coil+PT, Mag Biased, High Speed; April 25, 2017
- ETSS: CDE-0008-0417, 0.580" 1-coil +PT (Ubend Design) Non-mag Biased; April 25, 2017
- ETSS: CDE-0009-0417, 0.580" 1-coil+PT (Ubend Design) Mag Biased; April 25, 2017
- ETSS: CDE-0010-0417, 0.610" / 0.590" GHENT - Mag Biased G3/G4; April 25, 2017
- ETSS: CDE-0011-0417, 0.610" Array (X-probe) with Bobbin Coil; April 25, 2017
- ETSS: CDE-0012-0417, 0.610" 3-coil+PT, Non-mag Biased, WEAR SIZING; April 25, 2017
- MRS-TRC-2321; Use of Appendix H&I Qualified Techniques for Braidwood A2R19; Revision 1
- PQR 761; April 27, 2005
- Report PT-909061-B-08; Liquid Penetrant Examination, SG B Channel Head Drain; October 15, 2015
- Report PT-909061-B-09; Liquid Penetrant Examination, SG B Channel Head Drain; October 16, 2015
- Reports A2R17-061, 62, 63, 113, 114, 115, 116, 117, 180, 196, 197, 209, 224; Ultrasonic Examination of the Unit 2 Containment Liner; May 7–10, 2014.
- SG-SGMP-17-7; Braidwood Unit 2 A2R19 Steam Generator Degradation Assessment; Revision 0
- Westinghouse Site Approved Inspection Techniques; April 26, 2017
- WCAP-12999; Alloy 690 Tapered Mechanical Plug Summary Qualification Report; December 1989
- WPS 143/52 MN-GTAW/SMA1-1; Revision 0

1R11 Licensed Operator Requalification Program

Action Requests/Issue Reports:

- 4001626; REMA Key Parameter; April 24, 2017

Procedures:

- BwVS 500-6; Low Power Physics Test Program; Revision 41
- BwVS TRM 3.1.h.1; Core Reload Sequence and Verification; Revision 20
- 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-108-107-1002; Interface Procedure Between BGE/COMED/PECO and Exelon Generation (Nuclear/Power) for Transmission Operations; Revision 10

- OP-AA-111-101; Operating Narrative Logs and Records; Revision 12
- OP-AA-300; Reactivity Management; Revision 11
- TQ-AA-10; Systematic Approach to Training Process Description; Revision 5
- TQ-AA-150; Operator Training Program; Revision 14
- TQ-AA-155; Conduct of Simulator Training and Evaluation; Revision 6
- TQ-AA-306; Simulator Management; Revision 8
- TQ-BR-201-0113; Braidwood Training Department Simulator Examination Security Actions; Revision 19
- 2BwGP 100-1; Plant Heatup; Revision 36
- 2BwGP 100-2; Plant Startup; Revision 34
- 2BwGP 100-3; Power Ascension 5% to 100%; Revision 73
- 2BwGP 100-5; Plant Shutdown and Cooldown; Revision 51
- 2BwGP 100-8; Generic Reactor Control Guidance; Revision 31
- 2BwOS RD-3; Shutdown Rod Insertion Limit During Approach to Criticality Surveillance; Revision 1
- 2BwOSR 3.1.8.2; Special Test Exceptions – Reactor Coolant System T<sub>AVE</sub> During Physics Test Surveillance; Revision 1
- 2BwOSR 3.1.8.3; Special Test Exceptions – Physics Tests Thermal Power Hourly Surveillance; Revision 1
- 2BwOSR 3.1.8.4; Unit 2: Shutdown Margin Verification During Physics Tests; Revision 1

Work Orders:

- 1873054; Low Power Physics Test Program with Dynamic Rod Worth Measurement
- 1873193; Shutdown Rod Insertion Limit During Approach to Criticality Surveillance
- 1874492; Unit 2: Shutdown Margin Verification During Physics Tests
- 1877120; Reload Startup Physics Tests Following Refueling

1R12 Maintenance Effectiveness

Action Requests/Issue Reports:

- 1459240; Packing Leak on 0CW260A; January 6, 2013
- 1470662; 1 gpm Leak in River Screen House Blowdown House Under 0CW260A; February 2, 2017
- 1535295; Suspect 0CW260A Valve Separated from Body; July 13, 2013
- 1630708; Packing Leak 0CW260A; March 8, 2014
- 2401493; 0CW260A Is Leaking at the River Screen House Blowdown House; October 26, 2014
- 2582269; Packing Leak on 0CW260A; November 4, 2015
- 2608666; Packing on 0CW260A/B/C; January 6, 2016
- 2715867; Packing Leak Has Significantly Increased – 0CW260A; September 14, 2016
- 4015855; 0TY-CW046 Recorder Drift; May 28, 2017
- 4016413; CWBD Temperature Probe Concerns; May 30, 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
- 4021972; Excavation Permit at River Screen House Required to Support Remediation; June 14, 2017
- 4022805; Possible CWBD House and Vacuum Breaker Enhancements; June 16, 2017
- 4022887; Pin Hole Leaks ID'd CW Blowdown Piping Downstream of 0CW260A/B
- 4023452; Potential Improvements/Modifications in CWBD House; June 19, 2017
- 4023678; Need to Clarify Leak Template Question on Leak Containment; June 20, 2017

Procedures:

- BwOP WX-902; Use of Portable Sump Pumps for Non-Installed Sump Pump Application; Revision 0
- EN-AA-103; Environmental Review; Revision 6
- EN-AA-103-F-02; Environmental Screening Checklist; Revision 1
- EN-AA-103-F-03; Environmental Evaluation; Revision 0
- EN-AA-103-0001; Environmental Evaluations; Revision 7
- 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
- EN-AA-407; Response to Inadvertent Releases of Licensed Materials to Groundwater, Surface Water, Soil, or Engineered Structures; Revision 8
- 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 3

Work Orders:

- 1895525; Packing on 0CW260A/B

1R13 Maintenance Risk Assessments and Emergent Work Control

Action Requests/Issue Reports:

- 3977635; Vendor Documentation for RCP Flywheel Exam Incomplete; February 23, 2017
- 4001297; OSP 2B AF Pump SX Return Piping Leak; April 22, 2017
- 4002345; OSP A2R19 BPRWP; SX Extent of Condition Location Work Order Request (2SXA9A-6-2-A); April 25, 2017
- 4002351; OSP A2R19 BPRWP; SX Extent of Condition Location Work Order Request (2SXA9A-6-3-A); April 25, 2017
- 4002353; A2R19 BPRWP; SX Extent of Condition Location Work Order Request (2SXA9A-6-5-B); April 25, 2017
- 4005818; UT Readings Below 87.5% on 2SXA9A-6"; May 2, 2017

Drawings/Prints:

- M-126: Sheet 1; Essential Service Water System – Unit 2; Revision BP
- M-544: Sheet 20; Auxiliary Building Elevation 383' 0" Essential Service Water; Revision AA

Procedures:

- CC-AA-404; Maintenance Specification: Application Selection, Evaluation, and Control of Temporary Leak Repairs; Revision 8
- CC-AA-501-1003; Exelon Nuclear Welding Program: Visual Weld Acceptance Criteria; Revision 5
- CC-AA-501-1008; Exelon Nuclear Welding Program: Welding General Requirements; Revision 9
- CC-AA-501-1025; Exelon Nuclear Welding Program: Weld End Preparation and Joint Details; Revision 5
- CC-AA-501-1026; Exelon Nuclear Welding Program: Purging Techniques; Revision 4
- ER-AA-330-009; ASME Section XI Repair/Replacement Program; Revision 13
- ER-AA-600; Risk Management; Revision 7

- ER-AA-600-1042; On-Line Risk Management; Revision 10
- 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
- WPS 1-1-GTSM-PWHT; ASME Welding Procedure Specification Record (QW-482); Revision 2

Work Orders:

- 1854706; 2SX2102 Would Not Operate
- 1897536; 2B RCP Pump/Motor Replacement in A2R19
- 4630109; 2B Auxiliary Feedwater Pump SX Return Piping Leak

1R15 Operability Evaluations

Action Requests/Issue Reports:

- 4001297; OSP 2B AF Pump SX Return Piping Leak; April 22, 2017
- 4002345; OSP A2R19 BPRWP; SX Extent of Condition Location Work Order Request (2SXA9A-6-2-A); April 25, 2017
- 4002351; OSP A2R19 BPRWP; SX Extent of Condition Location Work Order Request (2SXA9A-6-3-A); April 25, 2017
- 4002353; A2R19 BPRWP; SX Extent of Condition Location Work Order Request (2SXA9A-6-5-B); April 25, 2017
- 4002512; 1/2BwOS AF-1 Need to be Revised; April 25, 2017
- 4003090; NRC Questions on N-513-4 Application to 2SXA9A Leak Evaluation; April 26, 2017
- 4003105; OSP-A A2R19 Snubber Failure 2RC17058S; April 26, 2017
- 4005101; OSP NDE Welds Associated with 2RC22AB-1.5" Snubber; May 1, 2017
- 4007320; Snubber 2CV09063S Exceeds DWG Criteria; May 3, 2017
- 4007901; Bridging Strategy for Aux Feed Diesel Hose Replacement; May 8, 2017
- 4009050; OSP-A 2N32 Discriminator Plateau Needs to be Performed; May 10, 2017
- 4010147; Use of Gamma Metrics PANM to Satisfy LCO 3.9.3 (Legacy); May 12, 2017

Procedures:

- OP-AA-108-115; Operability Determinations (CM-1); Revision 19
- BwISR 3.3.1.1-102; Source Range Discriminator Plateau Determination and Calibration for N32; Revision 6
- BwIS NR-203; Post Accident Neutron Monitoring System Discriminator Adjustment; Revision 3
- WC-AA-120; Preventive Maintenance Database Revision Requirements; Revision 3
- WC-AA-111; Surveillance Program Requirements; Revision 5
- 1BwOS AF-1; Verification of Unit 1 Diesel Driven Auxiliary Feedwater Pump Remote Start Capability; Revision 3
- 2BwOS AF-1; Verification of Unit 2 Diesel Driven Auxiliary Feedwater Pump Remote Start Capability; Revision 2

Engineering Changes/Technical Evaluations:

- PMA-17-001927; A2R19 – Source Range Discriminator Plateau Due Date Adjustment
- PMA-17-000448; A2R19 – Aux Feed Diesel 12-year Inspection Frequency Deferral
- PMC-17-001660; A2R19 – PM Change Multiple PMs Previously Considered EQ and Adjust Online Performance
- PMA-17-01926; A2R19 – Post Accident Neutron Monitoring 2N11 Discriminator Deferral
- MPR-2383; Independent Technical Evaluation of Main Bearing Lube Oil Hose Degradation and Maintenance Interval; Revision 1

Drawings/Prints:

- 20E-2-4030AF12; Auxiliary Building Pump 2B (Diesel-Driven) Engine Start Up Panel 2AF01J; Revision AB
- 20E-2-4030AF12; Auxiliary Building Pump 2B (Diesel-Driven) Engine Start Up Panel 2AF01J; Revision AC
- 20E-2-4469D; Internal/External Wiring Diagram Auxiliary Feedwater Pump 2B (Diesel-Driven) Engine Start Up Panel 2AF01J Part 5; Revision J
- 20E-2-4469D; Internal/External Wiring Diagram Auxiliary Feedwater Pump 2B (Diesel-Driven) Engine Start Up Panel 2AF01J Part 5; Revision K

Work Orders:

- 1820706; 2N-8032 Cal of NIS Source Range Channel
- 1737950; 2N-8031 Source Range Discriminator Plateau Determination and Calibration
- 1829753; 1N-8032 Source Range Discriminator Plateau Determination and Calibration
- 7953516; Verification of Unit 2 Diesel Driven Auxiliary Feedwater Pump Remote Start Capability
- 1434436; Verification of Unit 1 Diesel Driven Auxiliary Feedwater Pump Remote Start Capability
- 1864040; Post Accident Neutron Monitoring System Discriminator
- 1874022; Source Range Discriminator Plateau Determination and Calibration

1R18 Plant Modifications

Action Requests/Issue Reports:

- 4004204; 7300: Ovation – 2PA22J-2-FLTR2 and 2PA22J-52-FLTR2 Miswired: April 29, 2017
- 4004307; 7300: Ovation, 2CX13J Cabinet Anomalies Identified; April 29, 2017
- 4004352; Ovation – Demolition Steps Missed; April 29, 2017
- 4006412; A2R19LL – Infrastructure Modification Test: Unable to Complete Section 8.8; May 4, 2017

Engineering Changes/Technical Evaluations:

- EC 400919; Braidwood Unit 2 Westinghouse Ovation Digital Upgrade for DEH (N - 1 Outage); Revision 3
- EC 400920; Westinghouse Ovation Digital Upgrade for Infrastructure Components (N - 1 Outage), Unit 2; Revision 3
- EC 406359; Unit 2 RF Sump Level Instrumentation Modification; Revision 1
- EC 618409; Evaluate Electrical cables and Cameras in Unit 2 Containment; Revision 0

Procedures:

- CC-AA-102; Design Input and Configuration Change Impact Screening; Revision 29
- CC-AA-107, Configuration Change Acceptance Testing Criteria; Revision 9
- CC-AA-107, Attachment 1: Configuration Change Acceptance Testing Criteria for WO 01805662; Revision 1
- CC-AA-112; Temporary Configuration Changes; Revision 25
- RP-BR-871; Temporary Installation of Video and Monitoring Equipment; Revision 5

Work Orders:

- 1805662; Ovation Upgrade for Infrastructure Components Per EC 400920
- 1805658; Westinghouse Ovation U1805658 Upgrade for DEH Per EC 400919
- 1945683; 2LT-PC002 Level Instrument Modification
- 1945664; 2LT-PC003 Level Instrument Modification

## 1R19 Post Maintenance Testing

### Action Requests/Issue Reports:

- 2608666; Packing on 0CW260A/B/C; January 6, 2016
- 2715867; Packing Leak Has Significantly Increased – 0CW260A; September 14, 2016
- 4001297; OSP: 2B AF Pump SX Return Piping Leak; April 22, 2017
- 4009363; 2B RCP Motor Uncoupled Run; May 11, 2017
- 4015855; 0TY-CW046 Recorder Drift; May 28, 2017
- 4016413; CWBD Temperature Probe Concerns; May 30, 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 Enhancements; June 16, 2017
- 4023452; Potential Improvements/Modifications in CWBD House; June 19, 2017
- 4023678; Need to Clarify Leak Template Question on Leak Containment; June 20, 2017
- 4025432; Rising Trend in Vibes for U0 SAC; June 25, 2017

### Procedures:

- BwISR 3.1.4.3.a; Rod Drop Time (Automatic); Revision 10
- BwOP SA-1; Startup and Operation of Station Air Compressors; Revision 43
- BwVS 500-6; Low Power Physics Test Program; Revision 41
- BwVS TRM 3.1.h.1; Core Reload Sequence and Verification; Revision 20
- CC-AA-501-1003; Exelon Nuclear Welding Program: Visual Weld Acceptance Criteria; Revision 5
- CC-AA-501-1008; Exelon Nuclear Welding Program: Welding General Requirements; Revision 9
- 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
- NF-AP-531; Setup of the Advanced Digital Reactivity Computer; Revision 14
- 2BwOSR 3.1.8.2; Special Test Exceptions – Reactor Coolant System T<sub>AVE</sub> During Physics Test Surveillance; Revision 1
- 2BwOSR 3.1.8.3; Special Test Exceptions – Physics Tests Thermal Power Hourly Surveillance; Revision 1
- 2BwOSR 3.1.8.4; Unit 2: Shutdown Margin Verification During Physics Tests; Revision 1
- 2BwOSR 3.6.3.5.MS-1; Main Steam System Containment Isolation Valve Stroke Surveillance; Revision 15

### Work Orders:

- 1760862; 2MS018D Replace Actuator Hydraulic Fluid
- 1798582; 0SA01A After Cooler Detailed Clean and Inspect
- 1826393; 0SA01A: Replace After Cooler with New Stainless Steel Design
- 1870411; Physical Reactor Inventory Prior to Installing Reactor Head Upon Completion
- 1873054; Low Power Physics Test Program with Dynamic Rod Worth Measurement
- 1874024; Rod Drop Time (Automatic)
- 1874492; Unit 2: Shutdown Margin Verification During Physics Tests
- 1877120; Reload Startup Physics Tests Following Refueling
- 1894690; VT-2 Exam Unit 2 Class 1 Components – Outage Mode 3 Ascending
- 1894696; VT-2 Exam Unit 2 Class 2 and 3 Components – Outage Mode 3 Ascending
- 1895525; Packing on 0CW260A/B

- 1897536; 2B RCP Pump/Motor Replacement in A2R19
- 1945002; OSA01C: Sample and Change Oil in Motor Bearing Reservoirs
- 4593301; Change Out Air Side Gear Case Oil Type on Unit 0 SAC
- 4630109; 2B Auxiliary Feedwater Pump SX Return Piping Leak

## 1R20 Outage Activities

### Action Requests/Issue Reports:

- 4001575; OSP-A: Unit 2 Startup Feedwater Pump Tripped During Unit Shutdown; April 24, 2017
- 4001626; REMA Key Parameter; April 24, 2017
- 4003823; A2R19 – Fire Extinguisher Found in Cold Reheat Piping; April 28, 2017
- 4005472; A2R19 Lessons Learned: Infrequently Performed Activity Requirements of HU-AA-1211 Not Met; May 2, 2017
- 4006583; Fatigue Assessment/Waiver – WHR; May 4, 2017
- 4006891; Foreign Material in 2B Steam Generator Channel Head – A2R19; May 5, 2017
- 4008739; OSP-A: Thermal Sleeve Funnel P-67 Fell Off During Peening; May 9, 2017
- 4009503; OSP-R: Actuator Packing Leaking Air on 2SD054D; May 11, 2017
- 4009747; OSP-R: 2B RCP Delay, Back Leakage into Seal Area; May 11, 2017
- 4006176; Tech Spec Surveillance Test Interval Change Request; May 3, 2017
- 4001606; 2BwOA RCP-1 Entry Due to 2B RCP Seal Leak off; April 24, 2017
- 4001023; 2AF005G Showed Dual with Full Closed Demand Signal; April 21, 2017
- 4001583; OSP: Unit 2 Generator did not Trip Following Turbine Trip; April 24, 2017
- 4001579; NR80S1B Displays Unexpectedly High Reading; April 24, 2017
- 4001588; Steam Leak from 2MS5008A Drain Line; April 24, 2017
- 4009442; Foreign Objects Found in 2A Steam Generator Secondary Side – A2R19; May 11, 2017
- 4009446; Foreign Objects Found in 2B Steam Generator Secondary Side – A2R19; May 11, 2017
- 4009453; Foreign Objects Found in 2C Steam Generator Secondary Side – A2R19; May 11, 2017
- 4009466; Foreign Objects Found in 2D Steam Generator Secondary Side – A2R19; May 11, 2017
- 4011154; Containment Coating A2R19 Inspection Results; May 15, 2017

### Procedures:

- BwAP 1450-1; Access to Containment; Revision 44
- BwVS 500-6; Low Power Physics Test Program; Revision 41
- BwVS TRM 3.1.h.1; Core Reload Sequence and Verification; Revision 20
- HU-AA-1211; Pre-Job Briefings; Revision 11
- MA-AA-716-008-1008; Reactor Services: Refuel Floor FME Plan; Revision 12
- OP-AA-108-110; Evaluation of Special Tests or Evolutions; Revision 3
- 2BwGP 100-1; Plant Heatup; Revision 36
- 2BwGP 100-2; Plant Startup; Revision 34
- 2BwGP 100-3; Power Ascension 5% to 100%; Revision 73
- 2BwGP 100-5; Plant Shutdown and Cooldown; Revision 51
- 2BwOS RD-3; Shutdown Rod Insertion Limit During Approach to Criticality Surveillance; Revision 1
- 2BwOS TRM 2.5.b.1; Unit 2: Containment Loose Debris Inspection; Revision 17
- 2BwOSR 3.1.8.2; Special Test Exceptions – Reactor Coolant System T<sub>AVE</sub> During Physics Test Surveillance; Revision 1

- 2BwOSR 3.1.8.3; Special Test Exceptions – Physics Tests Thermal Power Hourly Surveillance; Revision 1
- 2BwOSR 3.1.8.4; Unit 2: Shutdown Margin Verification During Physics Tests; Revision 1

Work Orders:

- 1870411; Physical Reactor Inventory Prior to Installing Reactor Head Upon Completion
- 1873054; Low Power Physics Test Program with Dynamic Rod Worth Measurement
- 1873193; Shutdown Rod Insertion Limit During Approach to Criticality Surveillance
- 1874492; Unit 2: Shutdown Margin Verification During Physics Tests
- 1877120; Reload Startup Physics Tests Following Refueling
- 1877150; Inspect Reactor Cavity Sump / Under Reactor Vessel
- 1894690; VT-2 Exam Unit 2 Class 1 Components – Outage Mode 3 Ascending
- 1894696; VT-2 Exam Unit 2 Class 2 and 3 Components – Outage Mode 3 Ascending

Other:

- Unit 2 Cycle 19 Coastdown Reactivity Plan; March 24, 2017
- Unit 2 Cycle 19 MS TREVI and Aux Feed Full Flow Testing Reactivity Plan
- OP-AA-108-108; A2R19 Restart Review

1R22 Surveillance Testing

Action Requests/Issue Reports:

- 4003767; WO # 01884034-03 SI Full Flow Test OOT; April 28, 2017
- 4003275; 2BwOSR 5.5.8.SI-11 – U2 IST SI System Test Results; April 27, 2017
- 4006015; OSP 2B SI Pump Vibration Data in Alert Range; April 29, 2017

Procedures:

- BwOP DG-11; Diesel Generator Startup and Operation; Revision 47
- 1BwOSR 3.8.1.2-2; Unit 1 – 1B Diesel Generator Operability Surveillance; Revision 40
- 2BwVSR 3.6.1.1.25; Summation of Type “B” & “C” Tests for Acceptance Criteria; Revision 9
- 2BwOSR 3.6.1.1-7; Primary Containment Type C Local Leakage Rate Test of ILRT Test Valves; Revision 7
- ER-AA-380; Primary Containment Leakrate Testing Program; Revision 11

Work Orders:

- 4594385; 1B Diesel Generator Operability Semiannual Surveillance
- 4619568; LR-IST-1B Diesel Generator Operability Monthly
- 1877813; IST Stroke Test of B Train RH Check Valves
- 1877768; 2RH8730B Closure Test
- 1877769; 2RH8730A Closure Test
- 4635081; IST-2SI8905A-D/2SI8949B/D/2SI8922A/B – SI Hot Leg Check Valves
- 1891697; IST Requirements for Unit 2 Charging Pumps
- 1873005; IST – 2SI8905A-D/2SI8949B/D/2SI8922A/B – SI Hot Leg Check Valves
- 1897910; U2 LLRT Summation for Type B & C Tests
- 1867971; IST-LT-2VQ016/017/018/019 – U1 LLRT ILRT Test

Engineering Changes/Technical Evaluations:

- EC 406445; Appendix J Scope Reduction for Local Leak Rate Testing Evaluation Details, Revision 0

## 1EP6 Drill Evaluation

### 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

## 2RS1 Radiological Hazard Assessment and Exposure Controls

### Action Requests/Issue Reports:

- 4003028; Level 1 PCE, AREVA Tech Performing Peening Project Setup; April 26, 2017
- 4003192; A2R19 Forced Oxidation Co-59 Peak Higher than Predicted; April 24, 2017
- 4003192; A2R19 Forced Oxidation Co-58 Peak Higher than Predicted; April 24, 2017
- 4003706; A2R19 Dose Rates Spare Penetration Greater than Briefed by RP; April 24, 2017
- 4002027; Radioactive Shipment Meant for Braidwood Delivered to STC; April 24, 2017
- 4001882; Level 1 PCE on CB&I Supervisor Doing Scaffold Walkdowns; April 24, 2017
- 2714011; Deficiencies in General Atomics' Shipment of Calibrated Source Inside RD-10B Area Radiation Detectors on Site; September 9, 2016

### Procedures:

- RP-AA-210; Dosimetry Issue, Usage, and Control; Revision 27
- RP-AA-800; Control, Inventory, and Leak Testing of Radioactive Sources; Revision 7
- RP-AA-800-001; Nationally Tracked Source Program; Revision 2
- RP-AA-800-001; Nationally Tracked Source Program; 2017 Annual Inventory Reconciliation; January 18, 2017
- RP-AA-460; Control for High and Locked High Radiation Areas; Revision 29
- RP-AA-460-001; Control for Very high Radiation Areas; Revision 6
- RP-AA-461; Radiological Controls for Contaminated Water Diving Operations; Revision 7
- RP-AA-203; Exposure Control and Authorization; Revision 5

### Radiation Work Permits (RWPs):

- BW-02-17-00619; Nuclear Instrumentation Under-Vessel Incore Sump; Revision 1
- BW-02-17-00618; Transfer Canal Blind Flange and LLRT Work; Revision 0
- BW-02-17-00534; Reactor Head Peening Project; Revision 0
- BW-02-17-00502; Containment and Auxiliary Building ISI Exams/Weld Prep; Revision 0
- BW-02-17-00613; Reactor Head Disassembly/Reassembly; Revision 2
- BW-02-17-00506; Containment/Auxiliary Building Outage Snubbers; Revision 1
- BW-02-17-00503; Containment/Auxiliary Building Outage Insulation; Revision 0
- BW-02-17-00711; Steam Generator Remove and Install Secondary Closures and Handholes; Revision 0

### Other:

- Leak Test and Inventory of All Required Radioactive Sources; February 2, 2017
- Radiation Survey Map of 364' Aux. Building U-2 Curved Wall Area; April 26, 2017
- Radiation Survey Map of U-2 Containment 377' Inside the Missile Barrier (IMB); April 26, 2017

## 2RS2 Occupational As-Low-As-Reasonably-Achievable Planning and Controls

### As-Low-As-Reasonably-Achievable (ALARA) Plans:

- RWP BW-02-17-00619; ALARA Plan: Nuclear Instrumentation Under-Vessel Incore Sump; Revision 1
- RWP BW-02-17-00618; ALARA Plan: Transfer Canal Blind Flange and LLRT Work; Revision 0
- RWP BW-02-17-00534; ALARA Plan: Reactor Head Peening Project; Revision 0
- RWP BW-02-17-00502; ALARA Plan: Containment and Auxiliary Building ISI Exams/Weld Preparation; Revision 0
- RWP BW-02-17-00613; ALARA Plan: Reactor Head Disassembly/Reassembly; Revision 2
- RWP BW-02-17-00506; ALARA Plan: Containment/Auxiliary Building Outage Snubbers; Revision 1
- RWP BW-02-17-00503; ALARA Plan: Containment/Auxiliary Building Outage Insulation; Revision 0
- RWP BW-02-17-00711; ALARA Plan: Steam Generator Remove and Install Secondary Closures and Handholes; Revision 0

### Other:

- ALARA Briefing and Attendance; Removing Filters from Shielded Drums to HIC in Rad Waste Area; April 26, 2017
- ALARA Briefing and Attendance; Transfer Canal Blind Flange and LLRT Work; April 25, 2017

## 2RS7 Radiological Environmental Monitoring Program

### Action Requests/Issue Reports:

- 4002540; NRC Identified: Broadleaf Vegetation Not Sampled in 2015 – Review and Revise ODCM; April 25, 2017
- 2674553; 2016 REMP Broad Leaf Vegetation Open Issue; May 26, 2016
- 2614924; Missed REMP Samples Third and Fourth Quarters of 2015; January 20, 2016
- 2654277; REMP Air Sampler BD-3 Has No Power; April 12, 2016
- 2654264; ODCM Samples of River Dredging Spoil Piles for REMP; April 12, 2016
- 2650610; February 2016 REMP Missed Samples and Anomalies; April 4, 2016
- 2625470; January 2016 REMP Missed Samples and Anomalies; February 12, 2016
- 2605789; REMP Sample Anomaly at BD-22 Wilmington Water Facility on December 24, 2015; December 30, 2015
- 2523082; Second Quarter 2015 RGPP Samples MW-103 and OWM-31P were Missed Due to Tornado Damage; July 2, 2015
- 2511588; Missed 2015 REMP Water Samples BD-25, BD-38, BD-55, BD-56 Due to Winter Seasonal Weather Condition; June 8, 2015
- 2503554; Vacuum Breaker VB-1 Remediation Review Due to Contamination of VB-1 Compositor from a Reversed Flow of the Blowdown Line; May 19, 2015

### Other:

- BwAP 1205-3T1: Braidwood On-Site Review and Investigation Report; OSR Number 91-101; Update to TS Change Radioactive TS: NRC Generic Letter 89-01 RETS/ODCM; Revision 1; September 25, 1991
- Braidwood Station Unit 1 and 2 Annual Radiological Environmental Operating Report as Prepared by Teledyne Brown Engineering Environmental Services; 2015

#### 40A1 Performance Indicator Verification

Procedures:

- LS-AA-2001; Collecting and Reporting of NRC Performance Indicator Data; Revision 14

Other:

- Performance Indicators Data Compiled by the Licensee from January 2016 through March 2017

#### 40A2 Problem Identification and Resolution

Action Requests/Issue Reports:

- 1542372; SX Piping Leak – 1SX27DA; August 1, 2013
- 1544673; Scope Expansion Inspection to 2SX27DA-10”; August 8, 2013
- 1582946; 2VD01CA Tripped/Auto-Restarted During Diesel Generator Run; November 8, 2013
- 1604876; 2RY8028 Primary Water to Pressurizer Relief Tank Containment Isolation Valve Body to Bonnet Leak; January 7, 2014
- 1646790; 0VC08Y Opened Unexpectedly; April 13, 2014
- 1659136; Pinhole Upstream of 1AF017A; May 12, 2014
- 1686097; 2MS018C Shows Dual Indication; July 28, 2014
- 1697622; Initiate EACE for Through-Wall Leak on 1SX25AA; August 28; 2014
- 2420401; 0A VC Chiller Tripped on Low Evaporator Refrigerant Temperature – 0WO01CA; December 3, 2014
- 2468066; Through-Wall Leak on 1SX27DA Line Downstream of 1SX169A; March 13, 2015
- 2479832; 1SX26AA-10” Minimum Wall Less Than Freeze Seal Requirement; April 4, 2015
- 2482749; OSP-A: Wall Thickness Below ASME Code Limit on 1SX27DB; April 9, 2015
- 2501820; Through-Wall Leak Downstream 1SX007; May 17, 2015
- 2503332; Pipe and Valve Inspection Results Following SX Pipe Leak; May 20, 2015
- 2507433; SX System Material Condition Risk Concerns; May 29, 2015
- 2546103; 2SX93AA Has Pinhole Leak; August 25, 2015
- 2568788; Pre Freeze NDE Found Unacceptable Thickness (2SX93BB-8”); October 10, 2015
- 2589930; Heavy General Corrosion on 0SXH2AA-6” in 0SX165A Pit; November 19, 2015
- 2738569; Pre-Freeze UT Results; November 8, 2016
- 3976217; Unable to Flush 2B SX Oil Cooler Inlet Piping; February 20, 2017
- 3980757; UT Exam Reading Below Administrative Limit on 1WER7AA-3 (1A SX Strainer Drain); March 2, 2017
- 4001297; OSP-A: 2B AF SX Return Piping Leak; April 22, 2017
- 4003090; NRC Questions on N-513-4 Application to 2SXA9A Leak Evaluation; April 26, 2017
- 4003971; NRC SRI Walk Down Comments; April 28, 2017
- 4004095; 1B AF Control Cable Flexible Conduit COA12Z0 is Split Open; April 28, 2017
- 4004101; Bad and Missing Bolts on 0WO01CB Purge Unit; April 28, 2017
- 4004412; OSP-A: Pre-Freeze NDE Rejectable Condition Line 2SX67AA-1.5; April 29, 2017
- 4005818; OSP-A: UT Readings Below 87.5% on 2SXA9A-6”; May 2, 2017
- 4008816; 2SX01JA Stuck in Backwash; May 10, 2017
- 4009062; CAPE Rejected at MRC Due to Number of Changes (IR No. 3995196); May 10, 2017
- 4022438; NRC Identified Wasps and Door Damage at River Screen House Blowdown House; June 15; 2017

Procedures:

- AD-AA-106; Corrective Action Program (CAP) Procedure; Revision 1

- LS-AA-120; Issue Identification and Screening Process; Revision 1
- LS-AA-125; Corrective Action Program (CAP) Procedure; Revisions 0 - 5
- NO-AA-10; Quality Assurance Topical Report; Revisions 90 - 91
- NSP-AP-4004; Corrective Action Program Procedure; Revisions 0 - 4
- PI-AA-120; Issue Identification and Screening Process; Revisions 6 - 7
- PI-AA-125; Corrective Action Program (CAP) Procedure; Revisions 4 - 5
- PI-AA-125-1001; Root Cause Analysis Manual; Revision 3

#### 4OA3 Event Followup

##### Action Requests/Issue Reports:

- 2715867; Packing Leak Has Significantly Increased – 0CW260A; September 14, 2016
- 4015855; 0TY-CW046 Recorder Drift; May 28, 2017
- 4016413; CWBD Temperature Probe Concerns; May 30, 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

##### Procedures:

- BwOP WX-902; Use of Portable Sump Pumps for Non-Installed Sump Pump Application; Revision 0
- EN-AA-103; Environmental Review; Revision 6
- EN-AA-103-F-02; Environmental Screening Checklist; Revision 1
- EN-AA-103-F-03; Environmental Evaluation; Revision 0
- EN-AA-103-0001; Environmental Evaluations; Revision 7
- EN-AA-407; Response to Inadvertent Releases of Licensed Materials to Groundwater, Surface Water, Soil, or Engineered Structures; Revision 8
- 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 3
- LS-AA-1110; Safety (SAF); Revision 24
- LS-AA-1110; Radiation (RAD); Revision 20
- LS-MW-1320; Mid-West Radiation (RAD); Revision 4

## LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agencywide Document Access Management System
AF	Auxiliary Feedwater
ALARA	As-Low-As-Is-Reasonably-Achievable
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	<i>Code of Federal Regulations</i>
CS	Containment Spray
D/Q	Deposition Coefficient
EC	Engineering Change
ECCS	Emergency Core Cooling System
ECT	Eddy Current Testing
EDG	Emergency Diesel Generator
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
ISI	Inservice Inspection
IST	Inservice Testing
LLRT	Local Leak Rate Testing
MIC	Microbiologically Influenced Corrosion
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NDE	Nondestructive Examination
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PANM	Post-Accident Neutron Monitor
PI	Performance Indicator
PMT	Post-Maintenance Testing
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
RF	Reactor Floor Drain
RFO	Refueling Outage
SDP	Significance Determination Process
SG	Steam Generator
SR	Surveillance Requirement
SSC	System, Structure, and Component
SX	Essential Service Water
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UT	Ultrasonic Testing
WO	Work Order