



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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February 6, 2019

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 05000456/2018004 AND 05000457/2018004**

Dear Mr. Hanson:

On December 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Braidwood Station, Units 1 and 2. On January 15, 2019, the NRC inspectors discussed the results of this inspection with Site Vice President, Ms. M. Marchionda, and other members of your staff. The results of this inspection are documented in the enclosed report.

Based on the results of this inspection, the NRC has identified two findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that a violation is associated with one of these findings. Because the licensee has initiated actions within their corrective action program to address this issue, the violation is being treated as Non-Cited Violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. The NCV is described in the subject inspection report.

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

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

Hironori Peterson, Chief
Branch 3
Division of Reactor Projects

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

Enclosure:
IR 05000456/2018004; 05000457/2018004

cc: Distribution via LISTSERV®

Letter to Bryan C. Hanson from Hironori Peterson dated February 6, 2019

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION
REPORT 05000456/2018004 AND 05000457/2018004

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Numbers: 50–456; 50–457

License Numbers: NPF–72; NPF–77

Report Numbers: 05000456/2018004; 05000457/2018004

Enterprise Identifier: I–2018–004–019

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: October 1 through December 31, 2018

Inspectors: D. Kimble, Senior Resident Inspector
D. Betancourt, Resident Inspector
P. Smagacz, Resident Inspector
B. Bartlett, Project Engineer
J. Bozga, Senior Reactor Inspector
N. Feliz-Adorno, Senior Reactor Inspector
M. Garza, Emergency Preparedness Inspector
T. Go, Health Physicist
M. Holmberg, Senior Reactor Inspector
M. Porfirio, Illinois Emergency Management Agency
L. Torres, Illinois Emergency Management Agency

Approved by: H. Peterson, Chief
Branch 3
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting an integrated quarterly inspection at Braidwood Station, Units 1 and 2 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. Findings and violations being considered in the NRC's assessment are summarized in the table below.

List of Findings and Violations

Inadequate Weld Preparation Activities Resulted in Blockage of Instrument Sensing Line and Unit Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000456/2018004-01 Opened/Closed	[H.12] – Avoid Complacency	71153
A self-revealed finding of very low safety significance (i.e., Green) was identified for the licensee's failure to have adequately implemented established welding requirements contained in CC-AA-501-1021, <i>Exelon Nuclear Welding Program Repair of Welds and Base Metal</i> , Revision 3. Specifically, plant personnel conducting welding on a steam line for the Unit 1 main turbine welded over and blocked a sensing line for an instrument manifold that, in conjunction with an unrelated failure of a differential pressure switch, led to a turbine/reactor trip on April 30, 2018.			

Failure to Evaluate the Adequacy of a Design Change Resulted in a Feedwater Pump Trip and Manual Reactor Trip Due to Lowering Steam Generator Water Levels			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000456/2018004-02 Opened/Closed	[H.11] – Challenge the Unknown	71153
A self-revealed finding of very low safety significance (i.e., Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," were identified for the licensee's failure to have evaluated the adequacy of main feedwater pump safeguards relay testing as part of the design change process for the development and installation of a new digital control system on Unit 1. This error led to a Unit 1 reactor trip on June 4, 2018.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000456/2018-003-00	Indications on Top Head to Upper Center Disc Weld of Reactor Head Identified Due to New Inspection Standards	71153	Closed
LER	05000456/2018-005-00	Unit Trip on Turbine Anti-Monitoring Circuit Caused by Weld Blockage of Instrument Line with a Failed Differential Pressure Switch Assembly	71153	Closed
LER	05000456/2018-006-00	Manual Trip on Low Steam Generator Level Following Trip of a Turbine Feedwater Pump Due to a Design Issue	71153	Closed
URI	05000456/2012-002-06; 05000457/2012-002-06	Inadequate Safety-Related 4kV Undervoltage Protection	71111.15	Closed

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PLANT STATUS

Unit 1 began the inspection period operating at full power. With the exception of minor reductions in power to support scheduled testing activities or small load changes requested by the transmission system dispatcher, the unit remained operating at or near full power for the entire inspection period.

Unit 2 began the inspection period operating at approximately 91 percent power with end-of-cycle power coast down operations in progress. On October 8, 2018, the unit was shut down for its planned 20th refueling outage (A2R20). Following completion of refueling and other maintenance activities, the reactor was restarted and taken critical on October 31, 2018. The main electrical generator was synchronized to the power grid on November 1, 2018, and the unit reached full power operation on November 8, 2018. With the exception of minor reductions in power to support scheduled testing activities or small load changes requested by the transmission system dispatcher, the unit remained operating at or near full power for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01—Adverse Weather Protection

Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of winter weather conditions during the weeks ending November 17 through December 15, 2018.

Impending Severe Weather (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for an area blizzard warning on during the week ending December 1, 2018.

71111.04—Equipment Alignment

Partial Alignment Verifications (6 Samples)

The inspectors evaluated system configurations during partial equipment alignment verifications of the following systems/trains:

- (1) The Unit 2 Residual Heat Removal System in decay heat removal mode during the weeks ending October 13 through October 27, 2018;
- (2) The Unit 1 and Unit 2 Spent Fuel Pool (SFP) Cooling Trains during the weeks ending October 13 through October 27, 2018;
- (3) The 2A Emergency Diesel Generator (EDG) during a period of elevated shutdown risk with the Unit 2 Reactor Coolant System (RCS) at reduced inventory during the week ending November 3, 2018;
- (4) The 2B EDG during a period of elevated shutdown risk with the Unit 2 RCS at reduced inventory during the week ending November 3, 2018;
- (5) The 2B EDG following return to service after a maintenance work window during the week ending November 24, 2018; and
- (6) The 2A Safety Injection (SI) Train with the 2B SI Train out of service during the weeks ending December 22 through December 29, 2018.

71111.05AQ—Fire Protection Annual/Quarterly

Quarterly Fire Zone Inspections (4 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Unit 2 Containment, Fire Zone 1.2–2 during the week ending October 27, 2018;
- (2) Unit 2 Containment, Fire Zone 1.3–2 during the week ending October 27, 2018;
- (3) Unit 2 Containment, Fire Zone 1.1–2 during the week ending October 27, 2018; and
- (4) Unit 2 Containment Access Facility during the week ending October 27, 2018.

71111.07—Heat Sink Performance

Heat Sink (1 Sample)

The inspectors evaluated the results of tests and inspections conducted on the 2A Auxiliary Feedwater Pump Lube Oil Cooler, as documented in Work Order (WO) 1941474 during the week ending October 27, 2018.

71111.08—In-Service Inspection Activities (1 Sample)

The inspectors assessed the effectiveness of the licensee's programs for monitoring degradation of the reactor coolant system boundary, risk-significant piping system boundaries, and the containment boundary by reviewing the following activities from October 9 to October 19, 2018:

- (1) Ultrasonic (UT) examination of pipe to elbow weld on 2RC–07–08,
UT examination of elbow to sol weld on 2RC–07–09,
UT examination of pipe to elbow weld on 2RC–12–06,
UT examination of pipe to elbow weld on 2RC–12–07,

- UT examination of reactor vessel head center disc weld on 2RV-03 002;
- (2) Liquid Penetrant (PT) examination of weld in peripheral Control Rod Drive Housing Nos. 2RV-03-66, 67, 72, 73 and 78;
- (3) Weld repair on 2SI101A gate valve;
- (4) Visual (VT-3) examination of reactor pressure vessel interior 2RV-01;
- (5) Magnetic Particle (MT) examination of reactor head to flange weld 2RV-03-001;
- (6) Bare Metal Visual (BMV) examinations of the reactor vessel upper head penetrations;
- (7) Review of boric acid evaluations and corrective action records for heat exchanger 2CV02A, diaphragm valve 2CV8399 and SFP valve 2FC027;
- (8) UT examination of pipe to elbow weld on 2CV-20-17;
- (9) PT examination of 3/8" drain line socket weld # 3 on 2RC48AA-3/8", 2RC48AB-3/8" and 2RC48AC-3/8"; and
- (10) Visual (VT-1) examination of pressure retaining bolting of 2RV03 reactor vessel head closure washers and nuts (1 to 54).

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated a crew of licensed operators during comprehensive crew simulator training during the week ending December 1, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated activities in the station's main control room, with an emphasis on operations on Unit 2 involving the A2R20 refueling outage, during the weeks ending October 13 through November 3, 2018.

71111.12—Maintenance Effectiveness

Routine Maintenance Effectiveness (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Activities involving the failure of Unit 2 Control Rod K-14 to insert past 210 steps during a post-refuel digital rod position indicator surveillance as documented in IR 4186542 during the weeks ending October 27 through November 17, 2018; and
- (2) Evaluation of the collective high unavailability associated with Unit 2 EDGs as documented in IR 4196939 during the weeks ending December 8 through December 15, 2018.

71111.13—Maintenance Risk Assessments and Emergent Work Control (7 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Unit 2 A2R20 refueling outage preparations as documented in WO 4698426 during the week ending October 6, 2018;
- (2) Unit 2 main steam safety valve setpoint adjustments as documented in WO 4672988 during the week ending October 6, 2018;
- (3) Unit 2 RCS unidentified leakage discovery and repairs as documented in WO 4816827

- during the weeks ending October 13 through October 27, 2018;
- (4) Post-Accident Neutron Flux Monitor Channel B (2NR13) cable issue and repairs as documented in WO 4655914 during the week ending October 13, 2018;
- (5) Flow changes identified during refueling outage test 2BwOSR 5.5.8.SI-11 as documented in WO 4840548 during the weeks ending October 13 through October 27, 2018;
- (6) Troubleshooting and repairs to Unit 2 Control Rod K-14 as documented in WO 4845187 during the weeks ending October 27 through November 3, 2018; and
- (7) The 2B EDG maintenance work window and 2-year inspections as documented in multiple work orders during the week ending November 17, 2018.

71111.15—Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) The 2B SI cold leg flow imbalance as documented in IR 4182301 during the weeks ending October 13, through November 10, 2018;
- (2) The Unit 2 Charging System injection test flow imbalance as documented in IR 4182301 during the weeks ending October 13, through November 10, 2018;
- (3) The failure of valve 2SI101A to go full open as documented in IR 4182702 during the week ending October 13, 2018;
- (4) Foreign material found in the 2B EDG as documented in IR 4195225 during the week ending November 24, 2018; and
- (5) The impact of a defective electrical lock-out relay found during the A2R20 refuel outage as documented in IR 4185181 during the week ending October 18, 2018.

In addition, the inspectors completed their review of Unresolved Item (URI) 05000456/2012002-06; 05000457/2012002-06: *Inadequate Safety-Related 4kV Undervoltage Protection*. The inspectors' review and closure of this URI did not constitute an inspection sample.

71111.18—Plant Modifications (1 Sample)

The inspectors evaluated the following permanent plant modification:

- (1) Installation of digital positioners on the Unit 2 feedwater regulating valves as documented in Engineering Change (EC) 620240 during the weeks ending October 27 through December 1, 2018.

71111.19—Post Maintenance Testing (9 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Unit 2 control rod timing checkout following refueling as documented in WO 4652658 during the weeks ending October 27 through November 10, 2018;
- (2) The EC 620240 feedwater regulating valve digital upgrade modification tests on Unit 2 as documented in WO 4659611 during the weeks ending October 27 through December 1, 2018;
- (3) Unit 2 automatic rod drop time testing following reactor refueling as documented in WO 4652611 during the weeks ending October 27 through November 10, 2018;
- (4) Visual (VT-2) examination of ASME [American Society of Mechanical Engineers]

Class 2 and 3 components on Unit 2 at normal operating temperature and pressure following reactor refueling as documented in WO 4657092 during the weeks ending October 27 through December 1, 2018;

- (5) Visual (VT-2) examination of ASME Class 1 components on Unit 2 at normal operating temperature and pressure following reactor refueling as documented in WO 4657608 during the weeks ending October 27 through November 10, 2018;
- (6) Low power physics tests for Unit 2, Cycle 21, as documented in WO 464944 during the weeks ending November 3 through November 24, 2018;
- (7) Functional and operational testing of the 2B EDG following a maintenance work window and 2-year inspections as documented in WO 4655963 during the weeks ending November 17 through November 24, 2018;
- (8) Functional and operational testing of applicable components following replacement of 2PL08J, the 2B EDG local control panel, Kilovac relays as documented in WO 4605256 during the weeks ending November 17 through November 24, 2018; and
- (9) Functional and operational testing of applicable components following the replacement of 2SC-DG250B, the 2B EDG governor actuator, as documented in WO 1965825 during the weeks ending November 17 through November 24, 2018.

71111.20—Refueling and Other Outage Activities (1 Sample)

The inspectors evaluated activities associated with the licensee's Unit 2 refueling outage, A2R20, from October 13, 2018 to November 3, 2018.

71111.22—Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (3 Samples)

- (1) Auxiliary feedwater full flow testing on Unit 2 during the weeks ending October 6 through October 13, 2018;
- (2) Simultaneous fast start of 2A and 2B EDGs as documented in 2BwOSR 3.8.1.20 during the week ending November 10, 2018; and
- (3) Control room envelope differential pressure testing as documented in WO 1852858 during the weeks ending December 8 through December 22, 2018.

In-Service (1 Sample)

- (1) Unit 2 main steam safety valve setpoint testing as documented in BwMP 3305-003 during the week ending October 6, 2018.

Containment Isolation Valve (1 Sample)

- (1) The summary of Unit 2 local leak rate testing for Type B and C tests as documented in WO 4716350 during the week ending November 3, 2018.

71114.04—Emergency Action Level and Emergency Plan Changes (1 Sample)

The inspectors completed the evaluation of submitted Emergency Action Level and Emergency Plan changes on October 22, 2018. This evaluation by the inspectors does not constitute NRC approval of the licensee's submittals.

RADIATION SAFETY

71124.02—Occupational As Low As Reasonably Achievable Planning and Controls

Verification of Dose Estimates and Exposure Tracking Systems (1 Sample)

The inspectors evaluated dose estimates and exposure tracking during the week ending October 20, 2018.

71124.05—Radiation Monitoring Instrumentation

Walk Downs and Observations (1 Sample)

The inspectors evaluated radiation monitoring instrumentation as a part of plant walk downs during the week ending October 20, 2018.

Calibration and Testing Program (1 Sample)

The inspectors evaluated the licensee's calibration and testing program during the week ending October 20, 2018.

OTHER ACTIVITIES – BASELINE

71151—Performance Indicator Verification (2 Samples)

The inspectors verified licensee performance indicators submittal listed below:

- (1) BI02: RCS Leak Rate Sample – 2 Samples (1 per unit) from October 1, 2017, through September 30, 2018.

71152—Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program (CAP) for trends that might be indicative of a more significant safety issue:

- (1) Evaluation of a trend involving pressurizer spray valve bypass flows during the weeks ending December 1, 2018, through December 29, 2018.

Annual Follow-Up of Selected Issues (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) NRC Operating Experience Smart Sample 2018/01, *Evaluation of Licensee Actions Taken in Response to 10 CFR Part 21 Notification of the Potential Existence of Defects Related to Control Rod Drive Mechanism Thermal Sleeves*.

71153—Follow-Up of Events and Notices of Enforcement Discretion

Events (2 Samples)

- (1) The inspectors evaluated the licensee's non-emergency report made under the

- requirements of 10 CFR 50.72(b)(3)(ii)(A) for a degraded condition as documented in Event Notice (EN) 53652, *Unit 2 Reactor Coolant System Pressure Boundary Leakage*, during the weeks ending October 27 through November 3, 2018; and
- (2) The inspectors evaluated the licensee's non-emergency report made under the requirements of 10 CFR 50.72(b)(3)(v)(A) for a condition that could have potentially prevented the fulfillment of a safety function as documented in EN 53784, *Inoperable Control Room Envelope*. The inspectors also subsequently reviewed the licensee's retraction of that non-emergency report. The inspectors' reviews of this issue occurred during the weeks ending December 22 through December 29, 2018.

Licensee Event Reports (3 Samples)

The inspectors evaluated the following licensee event reports (LERs) which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

- (1) LER 05000456/2018–003–00, *Indications on Top Head to Upper Center Disc Weld of Reactor Head Identified Due to New Inspection Standards*. The inspectors reviewed the LER during the weeks ending December 22 through December 29, 2018, and determined there were no associated findings or violations. With assistance from their reactor systems vendor, the licensee had developed an analytical evaluation of the indications in accordance with Section XI of the ASME Boiler and Pressure Vessel Code, and submitted this evaluation to the NRC (ADAMS Accession No. ML18348A972). This LER is closed.
- (2) LER 05000456/2018–005–00, *Unit Trip on Turbine Anti-Monitoring Circuit Caused by Weld Blockage of Instrument Line with a Failed Differential Pressure Switch Assembly*. The inspectors reviewed the LER during the week ending November 17, 2018. A finding of very low safety significance (i.e., Green, FIN 05000456/2018004–01) is documented in Section 71153 of this report. There were no associated violations of NRC requirements. This LER is closed.
- (3) LER 05000456/2018–006–00, *Manual Trip on Low Steam Generator Level Following Trip of a Turbine Feedwater Pump Due to a Design Issue*. The inspectors reviewed the LER during the weeks ending December 15 through December 29, 2018. A finding of very low safety significance (i.e., Green) and an associated non-cited violation (NCV 05000456/2018004–02) are documented in Section 71153 of this report. This LER is closed.

INSPECTION RESULTS

71111.15—Operability Determinations and Functionality Assessments

Unresolved Item	05000456/2012002–06 05000457/2012002–06 Closed	Inadequate Safety-Related 4kV Undervoltage Protection	71111.15
<p><u>Description:</u></p> <p>On May 8, 2012, the NRC documented a URI in Inspection Report 05000456/2012002; 05000457/2012002 (ADAMS Accession No. ML12130A123) involving an undervoltage protection design vulnerability that was revealed during the loss of a single phase event, which occurred at Byron Station, Units 1 and 2, on January 30, 2012. The issue was left unresolved pending a determination of NRC actions to resolve the issue.</p> <p>Recognizing the generic implications of this issue, the NRC issued Bulletin 2012–01, <i>Design Vulnerability in Electric Power System</i>, on July 27, 2012, to request, in part, that addressees comprehensively verify their compliance with applicable requirements described therein. Since that time, the industry developed an initiative to address the open phase condition of electric power system. Braidwood Station, Units 1 and 2, notified the NRC of their intention to complete necessary actions as scheduled in this initiative in February 3, 2014, letter titled, <i>Exelon Generation Company, LLC Additional Information Regarding Response to Bulletin 2012-01, "Design Vulnerability in Electric Power System"</i> (ADAMS Accession No. ML14034A179). On March 9, 2017, the Commission issued a Staff Requirements Memorandum in SECY–16–0068 (ADAMS Accession No. ML17068A297) providing direction to the NRC staff regarding this issue. It stated, in part:</p> <p style="padding-left: 40px;"><i>Going forward, the staff should verify that licensees have appropriately implemented the voluntary industry initiative. If the staff determines that a licensee does not adequately address potential OPCs [open phase conditions], including updating the licensing basis to reflect the need to protect against OPCs, the staff should consider the appropriate regulatory mechanism to impose the necessary requirements to protect against OPCs using the current guidance on such matters from the Office of the General Counsel.</i></p> <p>As of October 1, 2018, the licensee was still implementing these actions. Following the licensee's completion of these actions, the NRC may perform a follow-up inspection in accordance with Temporary Instruction 2515/194, <i>Inspection of the Licensee's Implementation of Industry Initiative Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (NRC Bulletin 2012–01)</i>.</p> <p>Based on the above, this URI is closed.</p> <p>Corrective Action Reference: The licensee entered this issue into their CAP as IRs 1570215 and 1570216.</p>			

71152—Problem Identification and Resolution

Observation: Pressurizer Spray Valve Bypass Flows	71152 – Semi Annual Trend Review
<p>The inspectors performed a review of plant issues, particularly those entered into the licensee's CAP, associated with the setting of bypass line flow around the pressurizer spray valves during refueling outages. The bypass flow is used to maintain spray line temperature to preclude thermal shock from occurring when the pressurizer spray function is required.</p> <p>During their review, the inspectors noted that there have been several instances over the past few years where a unit restarting from a refueling has had to have a set of pressurizer backup heaters, which are normally off under steady state plant conditions, in continuous operation to induce additional flow through the pressurizer spray line via the main spray valves in order to maintain spray line temperature. Most recently, Unit 2 (Issue Report (IR) 4193775) returning from its fall 2018 refueling outage (A2R20) and Unit 1 (IR 2734300) returning from its fall 2016 refueling outage (A1R19) have experienced this condition.</p> <p>The licensee has assessed the issue and ascertained that during outage testing related to spray line bypass flow that not allowing for a sufficient amount of time for temperature stabilization within the pressurizer spray line is the likely cause of the problem. The licensee has established actions to enhance their outage procedures to allow for adequate pressurizer spray line temperature stabilization time prior to their next scheduled refueling outage.</p> <p>In reviewing the licensee's need to continuously run a set of pressurizer backup heaters throughout an operating cycle, the inspectors found that this alignment was acceptable from a plant design and operations standpoint; therefore, there was no performance deficiency. Nonetheless, the inspectors also concluded that while acceptable, this condition represented a departure from the plant's standard designed alignment and a distraction for on-watch operators.</p>	
Observation: Potential Existence of Defects Related to Control Rod Drive Mechanism Thermal Sleeves	71152 – Annual Sample Review
<p>The inspectors performed a detailed review of IR 4140602, <i>Westinghouse Part 21 For Control Rod Drive Mechanism Thermal Sleeves</i>, and IR 4141002, <i>Followup Westinghouse Part 21 For Control Rod Drive Mechanism Thermal Sleeves</i>.</p> <p>The sample selected was associated with a 10 CFR Part 21 notification to the NRC (Westinghouse LTR–NRC–18–34, dated May 23, 2018; ADAMS Accession No. ML18143B678). The specific issue was associated with wear of thermal sleeves in the control rod drive mechanism penetration tubes which could have a safety consequence that was not previously considered (see NRC Information Notice 2018–10, <i>Thermal Sleeve Flange Wear Leads to Stuck Control Rod at Foreign Nuclear Plant</i>; ADAMS Accession No. ML18214A710).</p> <p>The review for this sample was conducted in accordance with the NRC Operating Experience Smart Sample 2018/01, <i>Evaluation of Licensee Actions Taken in Response to 10 CFR Part 21 Notification of the Potential Existence of Defects Related to Control Rod Drive Mechanism Thermal Sleeves</i> (ADAMS Accession No. ML18263A261), to evaluate the licensee's use of operating experience and ensure that this issue was adequately evaluated for applicability, and applicable lessons learned communicated to appropriate organizations and implemented.</p>	

The inspectors concluded that the licensee had taken appropriate actions to address this issue.

No findings or violations were identified.

71153—Follow-Up of Events and Notices of Enforcement Discretion

Inadequate Weld Preparation Activities Resulted in Blockage of Instrument Sensing Line and Unit Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000456/2018004-01 Opened/Closed	[H.12] – Avoid Complacency	71153
<p>A self-revealed finding of very low safety significance (i.e., Green) was identified for the licensee's failure to have adequately implemented established welding requirements contained in CC-AA-501-1021, <i>Exelon Nuclear Welding Program Repair of Welds and Base Metal</i>, Revision 3. Specifically, plant personnel conducting welding on a steam line for the Unit 1 main turbine welded over and blocked a sensing line for an instrument manifold that, in conjunction with an unrelated failure of a differential pressure switch, led to a turbine/reactor trip on April 30, 2018.</p>			
<p><u>Description:</u></p> <p>On April 30, 2018, Unit 1 tripped from approximately 48 percent power as a result of a "turbine motoring" generator trip. The cause of the event was determined to have been due to a welded over sensing inlet line from the turbine exhaust piping, in combination with a failed differential pressure switch assembly. This particular pressure instrument sensing line was common to three differential pressure switches that fed a 2 out of 3 turbine trip logic for the anti-motoring circuit. When one of the three differential pressure switches developed a bellows leak, the volume created by the inadvertently plugged sensing line pressurized and caused the trip logic to be satisfied. A Unit 1 reactor trip from the turbine trip signal followed.</p> <p>The sensing line was determined to have been blocked in 2015 when a welder performing a repair failed to adequately implement the requirements in the applicable licensee procedure, CC-AA-501-1021, <i>Exelon Nuclear Welding Program Repair of Welds and Base Metal</i>, Revision 3. Specifically, steps 4.2.1 through 4.2.4 of this procedure required that any identified base metal defects be removed prior to performing weld repairs. Had this been performed, it would have been revealed that an area described as a pit prior to the repair was, in fact, a pipe inlet and the welding over the sensing line would have been prevented.</p> <p>Corrective Actions: A plant modification was installed to bypass the "turbine motoring" generator trip, which was deemed to have been redundant to other trips associated with the turbine generator unit, and repairs to the instrument sensing line were scheduled for the unit's next refueling outage. Additionally, the qualifications for the craft personnel involved in welding over the instrument sensing line were revoked pending remediation.</p> <p>Corrective Action Reference: The licensee entered this issue into their CAP as IR 4132550.</p>			

Performance Assessment:

Performance Deficiency: The failure to execute required weld preparation activities as prescribed by CC-AA-501-1021, *Exelon Nuclear Welding Program Repair of Welds and Base Metal*, was a performance deficiency. Specifically, steps 4.2.1 through 4.2.4 required the elimination of any identified base metal defects prior to performing weld repairs. Had this been adequately performed, it would have been revealed that the area described as a pit was, in fact, a pipe inlet and the welding over of the pressure sensing line would have been prevented.

Screening: The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the welded over and blocked a sensing line for an instrument manifold, in conjunction with an unrelated failure of a differential pressure switch, led to a turbine/reactor trip.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Attachment 4, "Initial Characterization of Findings," dated October 7, 2016; and IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," dated June 19, 2012. Using Exhibit 1, "Initiating Events Screening Questions," the inspectors determined that the finding was of very low safety significance (i.e., Green) because the performance deficiency did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: The inspectors determined that the finding involved the cross-cutting aspect of Avoid Complacency under the area of Human Performance. From 2015 through 2018 there were multiple opportunities for the licensee to have recognized the inherent risk of the configuration associated with the blocked pressure sensing line. In particular, due to the belief that the blocked sensing line was only a control room indication issue, the fact that the configuration had introduced a single point vulnerability for a turbine/reactor trip was missed. [H.12]

Enforcement:

Since the affected components were not safety-related, the inspectors did not identify any violations of regulatory requirements associated with this finding.

Failure to Evaluate the Adequacy of a Design Change Resulted in a Feedwater Pump Trip and Manual Reactor Trip Due to Lowering Steam Generator Water Levels

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000456/2018004-02 Opened/Closed	[H.11] – Challenge the Unknown	71153

A self-revealed finding of very low safety significance (i.e., Green) and an associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," were identified for the licensee's failure to have evaluated the adequacy of main feedwater pump safeguards relay testing as part of the design change process for the development and installation of a new digital control system on Unit 1. This error led to a Unit 1 reactor trip on June 4, 2018.

Description:

On June 4, 2018, Unit 1 was manually tripped by the on-watch operating crew from full power due to lowering steam generator water levels. The lowering steam generator water levels occurred when the 1C Turbine-Driven Feedwater Pump unexpectedly tripped during the performance of surveillance 1BwOSR 3.3.2.8–621A, *Unit 1 ESFAS [Engineered Safety Features Actuation System] Instrumentation Slave Relay Surveillance (Train A Feedwater Pump Trip, SG level Hi-Hi K621)*. The cause of the event was determined to be a deficiency in the design of the distribution control system (DCS) interface for the relay test circuitry.

During the most recent Unit 1 spring 2018 refueling outage (A1R20), a modification of the turbine-driven feedwater pump control circuitry was implemented. These alterations were described in EC 404360, *Westinghouse Ovation Digital Upgrade for Turbine Drive Feedwater Pump Cabinets 1FW36J and 1FW37J*. The inclusion of a digital input model affected only the safeguards testing function of the circuitry. In particular, a DCS interface modification removed an existing relay and incorporated a digital input model into the turbine-driven feedwater pump control circuitry. However, this impact was not identified as a design input per the design input and configuration change management screening procedure. As a result, the impact of the module on the circuit's electrical impedance was not evaluated and the design error was not discovered during the subsequent evaluation and testing for the design change. This change to the circuit caused an unexpected loss of the 1C Turbine-Driven Feedwater Pump during surveillance testing.

Corrective Actions: Principal corrective actions planned by the licensee include implementing changes to eliminate the design deficiency associated with the testing of the feedwater pump control circuitry, and revising the design input and configuration change impact procedure to include consideration of changes to circuits for electrical impacts to the circuit, such as impedance.

Corrective Action Reference: The licensee entered this issue into their CAP as IR 4144070.

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to verify the adequacy of the design change performed on the feedwater pump safeguards testing function to ensure that it could provide for individually blocking actuation associated with the feedwater pumps, as specified by Updated Final Safety Analysis Report (UFSAR) Section 7.3.2.2.5, was contrary to the requirements set forth in 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency.

Screening: The inspectors determined that the performance deficiency was more than minor because it was associated with the Design Control attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as

power operations. Specifically, the licensee's failure to verify the adequacy of the design change that was performed led to a reactor trip.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Attachment 4, "Initial Characterization of Findings," dated October 7, 2016; and IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," dated June 19, 2012. Using Exhibit 1, "Initiating Events Screening Questions," the inspectors determined that the finding was of very low safety significance (i.e., Green) because the performance deficiency did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: The inspectors determined that the finding involved the cross-cutting aspect of Challenge the Unknown under the area of Human Performance. Within their causal evaluation, the licensee identified that their personnel had accepted the use of modification processes that utilized the least technically comprehensive reviews and had accepted documentation developed by a vendor that did not meet licensee process procedures. [H.11]

Enforcement:

Violation: Appendix B to 10 CFR Part 50, Criterion III, "Design Control," requires, in part, that the licensee provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculation methods, or by the performance of a suitable testing program. Section 7.3.2.2.5 of the UFSAR states, in part, that: "Those few final actuation devices that cannot be designed to be actuated during plant operation (discussed in subsection 7.1.2.6) have been assigned to slave relays for which additional test circuitry has been provided to individually block actuation to a final device." Revision 2 of EC 404360, *Westinghouse Ovation Digital Upgrade for Turbine Drive Feedwater Pump Cabinets 1FW36J and 1FW37J*, was specified by the licensee as modifying the control circuitry described in the UFSAR.

Contrary to the above, on April 29, 2018, the licensee failed to verify the adequacy of design change performed on the feedwater pump safeguards testing function. Specifically, when the licensee modified the K621 slave relay test circuitry by removing an existing relay and incorporating a digital input model into the turbine-driven feedwater pump control circuitry they did not verify that the K621 slave relay test circuitry provided for actuation blocking.

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

EXIT MEETINGS AND DEBRIEFS

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

- On January 15, 2019, the inspectors presented the quarterly integrated inspection results to the Site Vice President, Ms. M. Marchionda, and other members of the licensee staff;
- On October 19, 2018, the inspectors presented the results of the Unit 2 A2R20 refueling outage in-service inspection activities to the Site Vice President, Ms. M. Marchionda, and other members of the licensee staff;

- On October 19, 2018, the inspectors presented the radiation protection program inspection results to the Site Vice President, Ms. M. Marchionda, and other members of the licensee staff; and
- On October 24, 2018, the inspectors presented the emergency preparedness program inspection results to the Emergency Preparedness Manager, Ms. M. Spillie, and other members of the licensee staff via telephone.

DOCUMENTS REVIEWED

71111.01 — Adverse Weather Protection

Action Requests/Issue Reports:

- 4197155; Winter Readiness – Roll-Up IR for 0BwOS XFT-A2B Deficiencies; 11/23/2018
- 4197487; Entry Into 0BwOA ENV-1, 1BwOA ENV-1, and 2BwOA ENV-1; 11/25/2018
- 4197521; Momentary Loss of 345 KV Switchyard Line 0103; 11/26/2018
- 4197539; Loss of 345 KV Switchyard Line 0104 – Adverse Weather; 11/26/2018
- 4200610; U1 RWST Heat Trace Beacon Not Lightning; 12/06/2018

Procedures:

- 0BwOA ENV-1; Adverse Weather Conditions Unit 0; Revision 123
- OP-AA-102-102; General Area Checks and Operator Field Rounds; Revision 15
- OP-AA-108-107-1001; Station Response to Grid Capacity Conditions; Revision 7
- OP-AA-108-111-1001; Severe Weather and Natural Disaster Guidelines; Revision 17
- OP-BR-102-102-1001; Augmented Operator Field Rounds; Revision 3
- WC-AA-107; Seasonal Readiness; Revision 20

Other:

- 2019 Winter Readiness Certification; 12/14/2018

71111.04 — Equipment Alignment

Procedures:

- BwOP FC-1; Fuel Pool Cooling System Start Up; Revision 28
- BwOP FC-E2; Electrical Lineup – Unit 2, Revision 1E1
- BwOP FC-M2; Operating Mechanical Lineup – Unit 2; Revision 7
- BwOP RH-E2; Electrical Lineup – Unit 2 Operating; Revision 8
- BwOP RH-M3; Operating Mechanical Lineup – Unit 2 2A RH Train; Revision 10
- BwOP RH-6; Placing the RH System in Shutdown Cooling; Revision 59
- BwOP DG-M4; Operating Mechanical Lineup – Unit 2 2B DG; Revision 16
- BwOP DG-M3; Operating Mechanical Lineup – Unit 2 2A DG; Revision 15
- BwOP DG-E4; Electrical Lineup – Unit 2 2B DG; Revision 7
- BwOP DG-E4; Electrical Lineup – Unit 2 2A DG; Revision 7
- BwOP SI-M2; Operating Mechanical Lineup; Revision 24
- BwOP SI-E2; Electrical Lineup – Unit 2 Operating; Revision 10

71111.05 — Fire Protection

Procedures:

- BwAP 1110-1; Fire Protection Program System Requirements; Revision 41
- BwAP 1110-3; Plant Barrier Impairment Program; Revision 38
- BwOP PBI-1; Plant Barrier Impairment Program Pre-Evaluated Barrier Matrix; Revision 2

- CC-AA-201; Plant Barrier Control Program; Revision 12
- 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 15
- OP-AA-201-008; Pre-Fire Plan Manual; Revision 4
- OP-AA-201-009; Control of Transient Combustible Material; Revision 20
- OP-MW-201-007; Fire Protection System Impairment Control; Revision 7

Pre-Fire Plans:

- No. 3, Fire Zone 1.1-2; Containment 377' – 0" Elevation, Unit 2 Containment Missile Shield; Revision 0
- No. 4, Fire Zone 1.1-2; Containment 401' – 0" Elevation, Unit 2 Containment Missile Shield; Revision 0
- No. 7, Fire Zone 1.2-2; Containment 377' – 0" Elevation, Unit 2 Annular Area; Revision 1
- No. 8, Fire Zone 1.2-2; Containment 401' – 0" Elevation, Unit 2 Annular Area; Revision 1
- No. 10, Fire Zone 1.3-2; Containment 426' – 0" Elevation, Unit 2 Containment Upper Area; Revision 2
- No. 257, Fire Zone N/A; Outside 401' Elevation, Unit 2 Containment Access Facility; Revision 0

71111.07 — Heat Sink Performance

Work Orders:

- 1941474; LR-2AF01AA Eddy Current Testing/Trending; 10/13/2018

71111.08 — In-Service Inspection Activities

Action Requests/Issue Reports:

- 4183474; 2AF05003V on Line 2AF02DC-4" Exceeds +/-5% Tolerance; 10/14/2018
- 4183476; 2AF03029X Recordable Indication on Line 2SXB7A-8"; 10/14/2018
- 4183330; OSP-X A2R20: Snubber Operational Test Failure 2SI10031S; 10/13/2018
- 4182245; OSP-X 2B S/G EOC Inspection - 3/32 Inch Rounded Indication; 10/10/2018
- 4182247; OSP-X 2A S/G EOC Inspection - 1/32 Inch Rounded Indication; 10/10/2018

Procedures:

- ER-AA-335-003; Magnetic Particle (MT) Examination; Revision 8
- ER-AA-335-010; Guidelines for ASME Code Allowable Flaw Evaluation and ASME Code Coverage Calculations; Revision 6
- ER-AA-335-031; Ultrasonic Examination Austenitic Piping Welds; Revision 8
- ER-AA-335-1008; Code Acceptance & Recording Criteria for Nondestructive (NDE) Surface Examination; Revision 5
- ER-AA-355-002; Liquid Penetrant (PT) Examination; Revision 10
- ER-AP-331-1002; Boric Acid Corrosion Control Program Identification, Screening and Evaluation; Revision 10
- ER-AP-335-001; Bare Metal Visuals for Nickel Alloy Materials; Revision 6
- EXE-PDI-UT-2; Ultrasonic Examination of Austenitic Piping Welds in Accordance with PDI-UT-2; Revision 8
- WDI-STD-O88; Underwater Remote Visual Examination of Reactor Vessel Internals; Revision 14
- WPS 8-8-GTSM; Welding Procedure Specification; Revision 6

Work Orders:

- 4838931; Cut Out and Replace 2D Steam Generator Bowl Line; 10/11/2018
- 4640786; 2CV8399 Diaphragm Valve Leaking from Diaphragm; 05/22/2017
- 4623642; Dry Boric Acid Flange of Seal Water Heat Exchanger 2CV02A; 04/08/2017

Other:

- Analysis No. EMD-060715; Reactor Coolant System 2RC90A, B, C and D; Revision 00F0
- Report No. A2R20-BMV-001; Bare Metal Visual of Top Head; 10/17/2018

71111.11 — Licensed Operator Requalification Program

Procedures:

- OP-AA-101-111-1001; Operations Standards and Expectations; Revision 21
- OP-AA-101-113; Operator Fundamentals; Revision 12
- OP-AA-101-113-1006; 4.0 Crew Critique Guidelines; Revision 9
- OP-AA-103-102; Watch-Standing Practices; Revision 18
- OP-AA-103-102-1001; Strategies for Successful Transient Mitigation; Revision 2
- 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 11
- OP-AA-111-101; Operating Narrative Logs and Records; Revision 14
- OP-AA-300; Reactivity Management; Revision 12
- TQ-AA-10; Systematic Approach to Training Process Description; Revision 5
- TQ-AA-150; Operator Training Programs; Revision 16
- TQ-AA-155; Conduct of Simulator Training and Evaluation; Revision 8

- TQ-AA-201; Examination Security and Administration; Revision 17
- TQ-AA-306; Simulator Management; Revision 9
- TQ-BR-201-0113; Braidwood Training Department Simulator Examination Security Actions; Revision 22

71111.12 — Maintenance Effectiveness

Action Requests/Issue Reports:

- 4186542; Unit 2 Control Rod K-14 Stuck at 210 Steps During DRPI Surveillance; 10/22/2018
- 4188177; Foreign Material Identified in K-14 Rod Cluster Control Assembly; 10/26/2018
- 4196939; Unit 2 EDG Exceeds MR Unavailability; 11/21/2018
- 4144483; 1A EDG Is Maintenance Rule (A)(2) at Risk Unavailability; 06/05/2018
- 4154909; 2A EDG Is Maintenance Rule (A)(2) at Risk Unavailability; 07/09/2018
- 4154313; 2B EDG Is Maintenance Rule (A)(2) at Risk Unavailability; 07/09/2018

Procedures:

- ER-AA-310; Implementation of the Maintenance Rule; Revision 11
- 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 14

71111.13 — Maintenance Risk Assessments and Emergent Work Control

Action Requests/Issue Reports:

- 4177307; Unit 2 RCS Leak Rate Deviation Action Level II Exceeded; 09/26/2018
- 4181129; OSP-A: Through Wall Leak on 2D Steam Generator Bowl Drain Line; 10/08/2018
- 4181892; Work Order No. 4655914 Gaps – 2NR13EA; 10/09/2018
- 4182245; OSP-X: 2B Steam Generator Extent of Condition Inspection – 3/32 Inch Rounded Indication; 10/10/2015
- 4182247; OSP-X: 2A Steam Generator Extent of Condition Inspection – 1/32 Inch Rounded Indication; 10/10/2015
- 4182263; OSP-X: 2B Safety Injection Cold Leg Flow Unbalance 2BwOSR 5.5.8.SI-11; 10/10/2018
- 4182301; OSP-X: 2B Safety Injection Cold Leg Flow Unbalance Follow-Up; 10/11/2018
- 4182698; OSP-X: 2B Safety Injection Pump Recirculation Flow Anomaly; 10/11/2018
- 4182783; OSP-A: 2B Safety Injection Pump Recirculation Line Restriction; 10/12/2018
- 4183360; 2SI8822B Inspection Results FME; 10/14/2018
- 4183593; Inspection Results of 2B Safety Injection Pump Recirculation Line FME; 10/15/2018
- 4183978; OSP-X: Low Flow Observed on 2B Safety Injection Cold Leg During 2B Safety Injection Pump Runs; 10/16/2018
- 4186542; Unit 2 Control Rod K-14 Stuck at 210 Steps During DRPI Surveillance; 10/22/2018
- 4188177; Foreign Material Identified in K-14 Rod Cluster Control Assembly; 10/26/2018
- 4194676; 2B Diesel Generator Window: Broken Terminal Stud on New Kilovac Relay; 11/14/2018
- 4194741; 2B Diesel Oil Storage Tank – 2DO01TB – Coating Inspection Results; 11/14/2018
- 4195225; 2B EDG – 2DG01EA – Foreign Material Found in Generator; 11/15/2018
- 4195921; 2B Diesel Generator Requires Additional Mechanical Governor Compensation; 11/17/2018
- 4196601; NRC ID'd: Improper Temporary Chemical Permit; 11/20/2018

Procedures:

- ER-AA-330-009; ASME Section XI Repair/Replacement Program; Revision 15
- ER-AA-335-015-2003; VT-2 Visual Examination in Accordance with ASME 2001 Edition, 2003 Addenda; Revision 2
- ER-AA-600; Risk Management; Revision 7
- ER-AA-600-1042; On-Line Risk Management; Revision 11
- OP-AA-108-117; Protected Equipment Program; Revision 5
- WC-AA-101-1006; On-Line Risk Management and Assessment; Revision 2
- WC-AA-104; Integrated Risk Management; Revision 25
- BwMP 3100-022; Diesel Generator 2 Year Inspection; Revision 38
- BwMP 3100-086; Diesel Generator Governor Actuator Replacement; Revision 6
- BwMP 3305-003; Main Steam Safety Valve Testing Using Setpoint Verification Device; Revision 1
- MA-AA-793-044; Inspection/Certification of Portable Pressure Test Equipment; Revision 5
- MA-BR-EM-4-09070; Diesel Generator Electrical Inspection; Revision 16
- 2BwOSR 5.5.8.SI-11; Comprehensive In-service Testing (IST) Requirements For Unit 2 Safety Injection Pumps and Safety Injection System Check Valve Stroke Test; Revision 11

Work Orders:

- 1965825; 2DG250B – Replace Diesel Generator Governor Actuator; 11/12/2018
- 4605256; 2PL08J – Replace Diesel Generator Local Control Panel Kilovac Relays; 11/06/2018
- 4654511; 2DG01EB – Diesel Generator Exciter Inspection (2B Diesel Generator); 11/11/2018
- 4655914; PANM Channel B (2NR13) Cable Issue; 09/26/2018
- 4655963; 2DG01KB – 24 Month Inspection; 11/12/2018
- 4672988; Main Steam Safety Valve Operability Testing; 10/03/2018
- 4698426; Unit 2 Pre-Outage Work; 09/24/2018
- 4816827; Unit 2 RCS Unidentified Leakage Issue; 10/07/2018
- 4838931; Cut Out and Replace 2D Steam Generator Bowl Line; 10/11/2018
- 4839129; Extent of Condition Inspection Required on 2RC48AC; 10/14/2018
- 4839130; Extent of Condition Inspection Required on 2RC48AB; 10/14/2018
- 4839131; Extent of Condition Inspection Required on 2RC48AA; 10/13/2018
- 4840548; Flow Change During 2BwOSR 5.5.8.SI-11; 10/11/2018
- 4655963; 2DG01KB – 24 Month Inspection; 11/12/2018
- 4845187; Troubleshoot and Repair K14 Rod Cluster Control Assembly; 10/25/2018

Drawings/Prints:

- 3NC008, Sheet 1; Specification L-2761 – 6" x 10" 1500# - 300# Safety Valves; Revision 13

71111.15 — Operability Evaluations and Functionality Assessments

Action Requests/Issue Reports:

- 4182263; OSP-X: 2B Safety Injection Cold Leg Flow Unbalance 2BwOSR 5.5.8.SI-11; 10/10/2018
- 4182301; OSP-X: 2B Safety Injection Cold Leg Flow Unbalance Follow-Up; 10/11/2018
- 4182307; 2BwOSR 5.5.8.CV-8 – Unit 2 IST CV System Test Results for A2R20; 10/11/2018
- 4182698; OSP-X: 2B Safety Injection Pump Recirculation Flow Anomaly; 10/11/2018
- 4182702; Valve 2SI101A Will Not go Full Open; 10/11/2018
- 4182783; OSP-A: 2B Safety Injection Pump Recirculation Line Restriction; 10/12/2018
- 4183360; 2SI8822B Inspection Results FME; 10/14/2018
- 4183402; 2SI8810D Inspection Results FME; 10/14/2018
- 4183593; Inspection Results of 2B Safety Injection Pump Recirculation Line FME; 10/15/2018

- 4183978; OSP-X: Low Flow Observed on 2B Safety Injection Cold Leg During 2B Safety Injection Pump Runs; 10/16/2018
- 4185832; IST Pump Evaluation Required for 2B AF Pump; 10/20/2018
- 4185847; Evaluate Pre-Conditioning for 2B AF Pump Monthly; 10/20/2018
- 4195225; 2B EDG – 2DG01EA – Foreign Material Found in Generator; 11/15/2018
- 4185181; OSP-X WL Lock-out Relays Potentially Defective in A2R20; 10/18/2018

Procedures:

- ER-AA-321; Administrative Requirements for In-service Testing; Revision 13
- ER-AA-600-1012; Risk Management Documentation; Revision 14
- ER-AA-600-1045; Risk Assessments of Missed or Deficient Surveillances; Revision 7
- OP-AA-106-101-1006; Operational Decision Making Process; Revision 20
- OP-AA-108-111; Adverse Condition Monitoring and Contingency Planning; Revision 12
- OP-AA-108-115; Operability Determinations (CM-1); Revision 21
- 2BwOSR 5.5.8.CV-8; Comprehensive In-service Testing (IST) Requirements For Unit 2 Charging Pumps and Safety Injection System Charging Check Valve Stroke Test; Revision 10
- 2BwOSR 5.5.8.SI-11; Comprehensive In-service Testing (IST) Requirements For Unit 2 Safety Injection Pumps and Safety Injection System Check Valve Stroke Test; Revision 11
- 2BwOSR 5.5.8.SI-3A; Train A Unit Two Safety Injection System SVAG Valve Stroke Surveillance; Revision 6
- 2BwEP-3; Steam Generator Tube Rupture; Revision 300

Work Orders:

- 4840548; Flow Change During 2BwOSR 5.5.8.SI-11; 10/11/2018

Engineering Changes/Technical Evaluations:

- 385013; Add Redundant Isolation Valves in Series with 2SI8801A/B; Revision 0
- 625953; Evaluate Impact on Safety Analyses Due to As-Found ECCS Flow Rates; Revision 0
- 626065; Lost Parts Evaluation for Foreign Materials – Foreign Material in Safety Injection Cold Leg 2SI8822B/2SI8810D – A2R20; Revision 0

71111.18 — Plant Modifications

Action Requests/Issue Reports:

- 4182898; EC 620240 Modification Anomalies Identified; 10/12/2018
- 4183981; Main Feedwater Regulating Valve Positioner Instrument Air Tubing Issues for EC 620240; 10/16/2018
- 4184859; OSP-X: 2FW520 Main Feedwater Regulating Valve Instrument Air Tubing Not Secured for EC 620240; 10/18/2018
- 4190742; Digital Feedwater Regulating Valve Controlling with Integral Function; 11/01/2018
- 4190871; Feedwater Regulating Valve Integral Function on Unit 1 – Extent of Condition; 11/02/2018
- 4194064; Unit 2 Digital Feed Regulating Valves Datasets Changed From EC 620240; 11/12/2018

Work Orders:

- 4659611; Install EC 620240: Upgrade Feedwater Regulatory Valve Positioner to Digital; 09/24/2018

Engineering Changes/Technical Evaluations:

- 620240; Upgrade Feedwater Regulating Valve Positioner to Digital; Revisions 1 and 2

71111.19 — Post-Maintenance Testing

Action Requests/Issue Reports:

- 4186615; 12 Drops Per Minute from Cap Downstream of Valve 2RH029A; 10/23/2018
- 4190742; Digital Feedwater Regulating Valve Controlling with Integral Function; 11/01/2018
- 4190871; Feedwater Regulating Valve Integral Function on Unit 1 – Extent of Condition; 11/02/2018
- 4195822; 2B Diesel Generator Incomplete Sequence Post Maintenance; 11/16/2018
- 4195903; 2B Diesel Generator Air Butterfly Valve Did Not Close at Overspeed; 11/17/2018
- 4195921; 2B Diesel Generator Requires Additional Mechanical Governor Compensation; 11/17/2018
- 4195968; 2B Fast Start Time > 7.5 Seconds; 11/17/2018

Procedures:

- BwIS 500-1.b; Rod Drive CRDM Timing Checkout (Following Refueling); Revision 9
- BwISR 3.1.4.3.a; Rod Drop Time (Automatic); Revision 10
- BwVS 500-6; Low Power Physics Test Program; Revision 44
- ER-AA-330-001; Section XI Pressure Testing; Revision 16
- ER-AA-335-015-2003; VT-2 Visual Examination in Accordance with ASME 2001 Edition, 2003 Addenda; Revision 2
- 2BwOS DG-2B; 2B Diesel Generator Overspeed Trip Test; Revision 4
- 2BwOSR 3.8.1.2-2; Unit 2 – 2B Diesel Generator Operability Surveillance; Revision 44
- 2BwOSR 3.8.1.14-2; Unit 2 – 2B Diesel Generator 24 Hour Endurance Run; Revision 10
- BwVS 500-6; Low Power Physics Test Program; Revision 44

Work Orders:

- 1965825; 2DG250B – Replace Diesel Generator Governor Actuator; 11/12/2018
- 4605256; 2PL08J – Replace Diesel Generator Local Control Panel Kilovac Relays; 11/06/2018
- 4652611; Automatic Rod Drop Time Surveillance; 10/21/2018
- 4652658; Control Rod System Checkout Following Refueling; 10/22/2018
- 4655963; 2DG01KB – 24 Month Inspection; 11/12/2018
- 4657092; VT-2 Exam on Unit 2 Class 2 and 3 Components – Outage Mode 3 Ascending; 10/22/2018
- 4657608; VT-2 Exam on Unit 2 Class 1 Components – Outage Mode 3 Ascending; 10/22/2018
- 4658198; 2B Diesel Generator Overspeed Trip Test; 11/17/2018
- 4659611; Install EC 620240: Upgrade Feedwater Regulatory Valve Positioner to Digital; 09/24/2018
- 4842151; 2B Diesel Generator Operability Monthly; 11/17/2018
- 4644944; Low Power Physics Test Program with Dynamic Rod Worth Measurement; 10/31/2018

Engineering Changes/Technical Evaluations:

- 619205; Evaluation of Relevant Conditions for Class 1, 2, and 3 System Leakage Tests in Containment for Units 1 and 2 (IWB-3522.1); Revision 0

71111.20 — Outage Activities

Action Requests/Issue Reports:

- 4181978; OSP-A: Erratic Indication on Unit 2 N31 During A2R20; 10/10/2018
- 4186040; NRC ID: During Mode 4 Containment Walkdown; 10/21/2018
- 4188191; OPS ID: Lots of Debris in Unit 1 Condensate Pit; 10/26/2018
- 4188196; OPS ID: Lots of Debris On and Around 1C Feedwater Pump; 10/26/2018

- 4189644; NRC ID – Floor Plug Not Seated Uniformly in Containment; 10/30/2018

Procedures:

- BwAP 1450-1; Access to Containment; Revision 44
- BwVS 500-6; Low Power Physics Test Program; Revision 44
- BwVS TRM 3.1.h.1; Core Reload Sequence and Verification; Revision 21
- HU-BR-1211; Pre-Job Briefings; Revision 0
- MA-AA-716-008-1008; Reactor Services: Refuel Floor FME Plan; Revision 13
- OP-AA-108-108; Unit Restart Review; Revision 20
- OP-AA-108-110; Evaluation of Special Tests or Evolutions; Revision 3
- 2BwGP 100-1; Plant Heatup; Revision 38
- 2BwGP 100-2; Plant Startup; Revision 35
- 2BwGP 100-3; Power Ascension 5% to 100%; Revision 76
- 2BwGP 100-5; Plant Shutdown and Cooldown; Revision 53
- 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 20
- 2BwOSR 3.1.8.2; Special Test Exceptions – Reactor Coolant System T_{AVE} 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

Other:

- BR2C20-08.0; Unit 2 Cycle 20 Coastdown Reactivity Plan; 09/13/2018
- PORC-18-028; Unit 2 Restart Review; 10/29/2018

71111.22 — Surveillance Testing

Action Requests/Issue Reports:

- 4192786; 2A Diesel Generator Slow to Reach Rated Speed and Voltage; 11/07/2018
- 4201374; Failed Acceptance Criteria – CRE Pressurization Testing; 12/07/2018
- 4201503; 0VC07C Fan Switch Found Tripped; 12/09/2018
- 4201072; M&TE Delays Surveillance Testing for VC; 12/07/2018

Procedures:

- BwOP DG-1; Diesel Generator Alignment to Standby Condition; Revision 30
- BwOP DG-11; Diesel Generator Startup and Operation; Revision 50
- BwOP DG-12; Diesel Generator Shutdown; Revision 30
- 2BwOSR 3.8.1.20; 2A and 2B Diesel Generator Simultaneous Start; Revision 5
- 2BwOSR 5.5.8.AF-4A; Unit 2 Comprehensive In-service Testing (IST) Requirements for 2A Auxiliary Feedwater Pump; Revision 14
- 2BwOSR 5.5.8.AF-4B; Unit 2 Comprehensive In-service Testing (IST) Requirements for 2B Auxiliary Feedwater Pump; Revision 18
- 2BwVSR 3.6.1.1.25; Summation of Type “B” & “C” Tests for Acceptance Criteria; Revision 10
- BwMP 3305-003; Main Steam Safety Valve Testing Using Setpoint Verification Device; Revision 1
- MA-AA-793-044; Inspection/Certification of Portable Pressure Test Equipment; Revision 5

Work Orders:

- 1793447; 2A and 2B Diesel Generators Simultaneous Start; 11/06/2018
- 4672988; Main Steam Safety Valve Operability Testing; 10/03/2018

- 4700443; Operations Full Flow Testing and Equipment Response Time of Auxiliary Feedwater Pumps; 10/05/2018
- 4716350; Unit 2 LLRT Summation for Type B & C Tests; 10/26/2018
- 1852858; A-Train Control Room Envelope Differential Pressure Verification; 12/10/18

Drawings/Prints:

- 3NC008, Sheet 1; Specification L-2761 – 6" x 10" 1500# - 300# Safety Valves; Revision 13
- UFSAR Figure 6.4-6; Simplified Control Room HVAC System Diagram Emergency Operation

71114.04 — Emergency Action Level and Emergency Plan Changes

Procedures:

- EP-AA-1001, Addendum 3; Emergency Action Levels for Braidwood Station; Revisions 2 and 3
- EP-AA-1001; Exelon Nuclear Radiological Emergency Plan Annex for Braidwood Station; Revisions 33 and 34

Other:

- Evaluation No. 17-69; 50.54(q) Program Evaluation/Assessment Review; 08/23/2017
- Evaluation No. 17-96; 50.54(q) Program Evaluation/Assessment Review; 09/27/2017

71124.02 — Occupational As Low As Reasonably Achievable Planning and Controls

Action Requests/Issue Reports:

- 4181369; A2R20 PCE Level 1: Insulator / U-2 Walkdown; 10/08/2018

Procedures:

- RP-AA-401; Operation ALARA Planning and Controls; Revision 22
- RP-AA-700-1005; Removing Items from the Spent Fuel Pool, Reactor Cavity, and Equipment Pit; Revision 2

Radiation Work Permits:

- BW-02-18-00610; A2R20 Shutdown Mode 3 Walkdown and ALARA Plan; Revision 0
- BW-02-18-00614; A2R20 Remove and Reinstall Reactor Head and Upper Internals and ALARA Plan; Revision 0
- BW-02-18-00614; Reactor Head and Upper Internals Move and ALARA Plan; Revision 0

Other:

- Self-Assessment AR 3986556-16: Radiological Hazard Assessment and Exposure Control; 12/08/2017

71124.05 — Radiation Monitoring Instrumentation

Procedures:

- BwIP 2505-008; Calibration of GA Technologies Area Radiation Monitors; Revision 12
- RP-AA-700-1209; 2018 Shepherd-89 Calibration; 07/22/2018
- RP-AA-700-1235; Operation and Calibration of the PM-12 Gamma Portal Monitor; Revision 5
- RP-AA-700-1239; Operation and Calibration of the Model SAM-12 Small Articles Monitor; Revision 4
- RP-AA-700-1240; Operation and Calibration of the Canberra ARGOS-5 Personnel Contamination Monitors; Revision 6

Work Orders:

- 1316793; OR-AR061: Auxiliary Building Elevation 426' – Radiation Monitor Loop; 06/17/2017
- 1600866; OR-AR060: Auxiliary Building Elevation 401' – Radiation Monitor Loop; 08/10/2016

Other:

- Calibration of the Canberra Fastscan WBC System at the Exelon Generating Station by Mirion Technologies; dated 02/27/2018
- Exelon Gamma Spectrum Analysis; Elevation 377' IMB R-23 PCE Follow-up 0329; 10/08/2018
- Exelon Gamma Spectrum Analysis; Elevation 377' IMB R-23 PCE Follow-up 0217; 10/08/2018

71151 — Performance Indicator Verification

Procedures:

- LS-AA-2001; Collecting and Reporting of NRC Performance Indicator Data; Revision 15
- LS-AA-2100; Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage; Revision 5

Other:

- Monthly Performance Indicator Data compiled by the licensee from October 2017 through September 2018

71152 — Identification and Resolution of Problems

Action Requests/Issue Reports:

- 1567935; Unit 1 Variable Heater/Spray Flow Operation; 10/04/2013
- 2734300; 1D Pressurizer Spray Bypass Flow Does Not Maintain Spray Line Temperature; 10/29/2016
- 4140602; Westinghouse Part 21 For Control Rod Drive Mechanism Thermal Sleeves; 05/23/2018
- 4140999; Westinghouse Part 21 For CRDM Thermal Sleeves; 05/24/2018
- 4141002; Followup Westinghouse Part 21 For Control Rod Drive Mechanism Thermal Sleeves; 05/23/2018
- 4156217; NSAL-18-1, TS Flange Wear Leads to Stuck Control Rod; 07/10/2018
- 4172030; MRP 2018-027 NEI 03-08 Needed Guidance Issued; 08/30/2018
- 4172031; NRC IN 2018-10 Issued for CRDM Thermal Sleeve Flange Wear; 08/28/2018
- 4193775; 2RY8051 2C Pressurizer Spray Bypass Flow Insufficient to Maintain Temperature; 11/11/2018
- 4195625; U2 SAC Potentially Degraded; 11/16/2018
- 4195675; Instrument Air Dryer Vulnerability; 11/16/2018
- 4196545; NRC ID Metrology Error CRDM Thermal Sleeves; 11/20/2018
- 4202972; 1B Diesel Generator Low Output Voltage; 12/13/2018

Procedures:

- NO-AA-10; Quality Assurance Topical Report (QATR); Revision 94
- PI-AA-120; Issue Identification and Screening Process; Revision 8
- PI-AA-125; Corrective Action Program (CAP) Procedure; Revision 6
- PI-AA-125-1001; Root Cause Analysis Manual; Revision 3

Engineering Changes/Technical Evaluations:

- 624381; Thermal Sleeve Evaluation; Revision 0

71153 — Follow-Up of Events and Notices of Enforcement Discretion

Action Requests/Issue Reports:

- 4129240; OSP - 1RC01R NDE Results for 1RV-03-002 Reactor Head Weld; 04/20/2018
- 4132550; Unit Trip on Turbine Anti-Motoring Circuit during A1R20 Power Ascension; 04/30/2018
- 4144070; Unit 1 Manual Reactor Trip; Revision 5
- 4144124; Numerous Radiation Monitor Alarms Following Unit 1 Reactor Trip; 06/04/2018
- 4144143; Unit 1 Steam Generator PORVs Opened Post Trip; 06/04/2018
- 4144206; Unintended Actuation During 1BwOSR 3.3.2.8-621A; 06/04/2018
- 4144267; Surveillance 1BwOSR 3.3.2.8-621A Not Completed; 06/04/2018
- 4144298; 7300 Ovation Modification Deficiency Causes Unit 1 Trip; 05/05/2018
- 4144499; Steam Generator Water Level Control During A1F39 Start-Up; 06/05/2018
- 4144951; Determine the Cause of Divergent Steam Generator Water Levels During Condensate/Feedwater Runback; 06/06/2018
- 4181129; OSP-A: Through Wall Leak on 2D Steam Generator Bowl Drain Line; 10/08/2018
- 4182245; OSP-X: 2B Steam Generator Extent of Condition Inspection – 3/32 Inch Rounded Indication; 10/10/2015
- 4182247; OSP-X: 2A Steam Generator Extent of Condition Inspection – 1/32 Inch Rounded Indication; 10/10/2015

Procedures:

- 1BwOA ELEC-3; Loss Of 4KV ESF Bus; Revision 102
- 1BwOSR 3.8.1.11-1; 1A Diesel Generator Loss of ESF Bus Voltage With No SI Signal; Revisions 16 - 19
- CC-AA-102; Design Input and Configuration Change Impact Screening; Revision 30