



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

May 1, 2017

EA-16-126

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

**SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION
REPORT AND EXERCISE OF ENFORCEMENT DISCRETION 05000456/2017001
AND 05000457/2017001**

Dear Mr. Hanson:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Braidwood Station, Units 1 and 2. On April 28, 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.

A violation of the licensee's current site-specific licensing basis for tornado-generated missile protection was identified. Because this violation was identified during the discretionary period discussed in Enforcement Guidance Memorandum 15-002, "Enforcement Discretion for Tornado Missile Protection Noncompliance," Revision 1, and because the licensee implemented interim compensatory measures and has planned final corrective actions, the NRC is exercising enforcement discretion by not issuing an enforcement action for the underlying 10 CFR Part 50 Appendix B, Criterion III, "Design Control" violation. Discretion for continued operation has previously been permitted on an interim basis and is discussed in NRC Inspection Report 05000456/2016002; 05000457/2016002.

The NRC inspectors did not identify any additional findings or violations of more than minor significance.

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

Enclosure:
IR 05000456/2017001; 05000457/2017001

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Letter to Byran Hanson from Eric Duncan dated May 1, 2017

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION
REPORT AND EXERCISE OF ENFORCEMENT DISCRETION 05000456/2017001
AND 05000457/2017001

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Linda Linn
DRPIII
DRSIII
ROPreports.Resource@nrc.gov

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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: 05000456/2017001; 05000457/2017001

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: January 1 through March 31, 2017

Inspectors: D. Kimble, Senior Resident Inspector
D. Betancourt, Resident Inspector
J. Benjamin, Senior Reactor Inspector
T. Go, Health Physicist
D. Sargis, Reactor Engineer

Approved by: E. Duncan, Chief
Branch 3
Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report (IR) 05000456/2017001; 05000457/2017001; 01/01/2017 – 03/31/2017; Braidwood Station, Units 1 and 2; Routine Quarterly Integrated Inspection Report.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6, dated July 2016.

NRC-Identified and Self-Revealed Findings

None.

Licensee-Identified Violations

A violation of the licensee's current site-specific licensing basis for tornado-generated missile protection was identified. Because this violation was identified during the discretionary period discussed in Enforcement Guidance Memorandum 15-002, "Enforcement Discretion for Tornado Missile Protection Noncompliance," Revision 1, and because the licensee implemented interim compensatory measures and has planned final corrective actions, the NRC is exercising enforcement discretion by not issuing an enforcement action for the underlying 10 CFR Part 50 Appendix B, Criterion III, "Design Control" violation. This violation is discussed in Section 4OA3.2.

REPORT DETAILS

Summary of Plant Status

Unit 1

The unit 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

The unit began the inspection period operating at full power. On March 28, 2017, the unit reached the end of the nuclear fuel cycle and entered planned power coast down operations in preparation for the 19th refueling outage (RFO). The unit was at approximately 99 percent power at the end of the inspection period with power coast down operations continuing.

1. REACTOR SAFETY

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

1R01 Adverse Weather Protection (71111.01)

.1 Readiness for Impending Adverse Weather Condition—Severe Thunderstorm and High Wind Conditions

a. Inspection Scope

During the week ending on March 10, 2017, the licensee's facility experienced periods of severe thunderstorms and high winds. The inspectors observed the licensee's preparations and planning for the onset of the adverse weather. The inspectors reviewed licensee procedures and discussed potential compensatory measures with control room personnel. The inspectors focused on plant management's actions for implementing the station's procedures for ensuring adequate personnel for safe plant operation and emergency response would be available. The inspectors conducted a visual inspection of the site, including walkdowns of various plant structures and systems to check for maintenance or other apparent deficiencies that could affect system operations during the severe weather conditions. The inspectors also reviewed corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures.

These reviews by the inspectors constituted a single readiness for impending adverse weather condition 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:

- Residual Heat Removal Train 2B following scheduled maintenance during the week ending January 21, 2017;
- Essential Service Water (SX) Train 2B with SX Train 2A out-of-service (OOS) for Inservice Testing (IST) during the week ending February 4, 2017;
- Component Cooling (CC) Water Trains 2A and 2B with the common CC heat exchanger OOS and unavailable for planned maintenance during the week ending March 4, 2017; and
- Emergency Diesel Generator (EDG) 2B with EDG 2A OOS for a planned maintenance outage during the week ending March 11, 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), Technical Specification (TS) requirements, work orders (WOs), issue reports (IRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization.

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

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Fire Protection Zone Inspections

a. Inspection Scope

During the week ending February 4, 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:

- Fire Zone 3.3D–2, Upper Cable Spreading Room, Zone 2EE4;
- Fire Zone 10.1–1, Diesel Oil Storage Tank (DOST) Room – Train 1B;
- Fire Zone 10.2–1, DOST Room – Train 1A; and
- Fire Zone 18.4–1, Control Room Heating Ventilation and Air Conditioning Room – Train A.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. 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 four quarterly fire protection zone inspection tour samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

.2 Annual Fire Protection Drill Observation

a. Inspection Scope

The inspectors observed the licensee's fire brigade respond to a simulated Class 'C' electrical fire associated with a 480 Vac motor control center in the station's turbine building on February 9, 2017. Based on their observations, the inspectors evaluated the readiness of the station's fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner during the drill debrief, and took appropriate corrective actions. Specific attributes evaluated included, but were not limited to:

- The proper wearing of turnout gear and self-contained breathing apparatus;
- The proper use and layout of fire hoses;
- The employment of appropriate firefighting techniques;
- Whether sufficient firefighting equipment was brought to the scene;
- The effectiveness of fire brigade leader communications, as well as command and control;
- The search for victims and propagation of the fire into other plant areas;
- Smoke removal operations;
- The utilization of pre-planned strategies;
- The adherence to the pre-planned drill scenario; and

- The satisfactory completion of the drill objectives.

These activities constituted a single annual fire protection drill inspection sample as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Simulator Training

a. Inspection Scope

On March 7, 2017, and March 13, 2017, the inspectors observed a crew of licensed operators in the plant’s simulator during a graded simulator scenario. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and that training was being conducted in accordance with licensee procedures. In addition, the inspectors verified that licensee personnel were observing NRC examination security protocols to ensure that the integrity of the graded scenario was being protected from being compromised. The inspectors evaluated the following areas:

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

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

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

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation of Control Room Activities

a. Inspection Scope

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

- Reactivity manipulations and overall control room crew response during a small transient on Unit 1 that occurred when a shell side normal drain valve for Moisture Separator Reheater (MSR) 1A (1HD099C) failed closed during the week ending February 25, 2017;
- Operations shift crew performance during 345 KV bus switching operations during the week ending February 25, 2017;
- Coordination of backshift testing activities for EDG 2A during the week ending March 11, 2017; and
- Entry into RFO power coast down operations on Unit 2 during the week ending April 1, 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 DOST; and
- The station off gas system.

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

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

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

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:

- Planned maintenance activities associated with the replacement of a hydraulic actuator pilot check valve (PCV-3) on the Steam Generator (SG) 2C Power Operated Relief Valve (PORV), 2MS018C, during the weeks ending January 21, 2017, and January 28, 2017;
- Preventative maintenance activities associated with the 2A SX Pump during the week ending February 18, 2017;
- Planned activities associated with a two year preventative maintenance work window for EDG 2A during the week ending March 11, 2017;
- Planned activities associated with a six year preventative maintenance work window for EDG 1A during the week ending April 1, 2017; and
- Emergent maintenance activities involving the replacement of charcoal adsorber material for the 0C Nonaccessible Area Exhaust Filter Plenum Ventilation Train during the week ending April 1, 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 slow closure time for an essential service water system air-operated valve, 1SX114B, as documented in IR 3974161;
- The evaluation of 2B SX Pump operability with severely degraded cooling water flow to the pump lube oil cooler, as documented in IR 3976217;
- The technical evaluation of pipe wall thickness measurements taken on EDG 2A exhaust stack, as documented in IR 3982772;
- The impact of degraded floor drain flows on the operability of equipment in the Unit 2 main steam isolation valve rooms, as documented in IR 3986839;

- Inspections and acceptability assessments performed for fuel assemblies following identification of tripped accelerometers on new fuel shipping containers, as documented in IRs 3987880, 3988624, 3988628, and 3988780; and
- Operability of EDG 2B following issues identified with its No. 2 125 Vdc Control Power Circuit, as documented in IRs 3988400 and 3988450.

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

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modification

a. Inspection Scope

The inspectors reviewed the following temporary change to the facility:

- Engineering Change (EC) No. 617642: Temporarily Defeat Feedwater Water Hammer Prevention System (WHPS) Feedwater Isolation Signals During Normal Power Operation for Steam Generators (SGs) 2A/2B/2C/2D.

The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 safety evaluation documents with the design basis, the UFSAR, and the TSs to verify that the temporary change 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 modification was installed as directed and consistent with the design control documents; that the modification operated as expected; and that operation of the modification did not impact the operability of any interfacing systems. The inspectors verified that relevant procedure, design, and licensing documents were properly updated. For this temporary facility change, the inspectors also reviewed the licensee's plans for removal and the long-term resolution to the issue. Finally, the inspectors discussed the plant modification with operations, engineering, and training department personnel to ensure that the

individuals were aware of how the operation with the modification in place could impact overall plant performance.

The inspectors' review of this temporary plant modification constituted a single inspection sample 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:

- Stroke time testing of SG PORV 2C (2MS018C) following planned maintenance on a hydraulic actuator pilot check valve (PCV-3) during the week ending January 28, 2017;
- Operational and functional testing of the 2B SX Pump following planned maintenance during the week ending February 25, 2017; and
- Fast start and engine interlock testing of EDG 2A following planned preventative maintenance during the week ending March 11, 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 three PMT inspection samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

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

- The changes to the station's surveillance frequency program for gas voiding during the week ending January 14, 2017 (Routine);
- EDG 1B semiannual performance testing during the week ending January 21, 2017 (Routine); and
- Inservice testing (IST) of CC Pump 2B required by Section XI of the American Society of Mechanical Engineers (ASME) Code during the week ending February 18, 2017 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 two routine surveillance inspection samples and a single IST inspection sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of the following planned licensee emergency drill:

- A full scale integrated emergency preparedness (EP) drill conducted on February 7, 2017.

The inspectors observed emergency response operations in the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures, and to identify any weaknesses or deficiencies in classification, notification, or protective action recommendation development activities. The inspectors also attended the licensee drill critique to compare any inspector-observed weaknesses with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP. As part of their inspection activities, the inspectors reviewed the drill package for the scenario and other EP documents.

The inspectors' review of this EP drill scenario and other related activities 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

2RS5 Radiation Monitoring Instrumentation (71124.05)

.1 Walkdowns and Observations (02.02)

a. Inspection Scope

The inspectors assessed select portable survey instruments that were available for use for current calibration and source check stickers, and instrument material condition and operability.

The inspectors observed licensee staff demonstrate performance checks of various types of portable survey instruments. The inspectors assessed whether high-range instruments responded to radiation on all appropriate scales.

The inspectors walked down area radiation monitors and continuous air monitors to determine whether they were appropriately positioned relative to the radiation sources or areas they were intended to monitor. The inspectors compared monitor response with actual area conditions for selected monitors.

The inspectors assessed the functional checks for select personnel contamination monitors, portal monitors, and small article monitors to verify they were performed in accordance with the manufacturer's recommendations and licensee procedures.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.05-05.

b. Findings

No findings were identified.

.2 Calibration and Testing Program (02.03)

a. Inspection Scope

The inspectors assessed laboratory analytical instruments used for radiological analyses to determine whether daily performance checks and calibration data indicated that the frequency of the calibrations was adequate and there were no indications of degraded instrument performance. The inspectors assessed whether appropriate corrective actions were implemented in response to indications of degraded instrument performance.

The inspectors reviewed the methods and sources used to perform whole body count functional checks before daily use and assessed whether check sources were appropriate and aligned with the plant's isotopic mix. The inspectors reviewed whole body count calibration records since the last inspection and evaluated whether calibration sources were representative of the plant source term and that appropriate calibration phantoms were used. The inspectors looked for anomalous results or other indications of instrument performance problems.

Inspectors reviewed select containment high-range monitor calibration and assessed whether an electronic calibration was completed for all range decades, with at least one decade at or below 10 rem/hour calibrated using an appropriate radiation source, and calibration acceptance criteria was reasonable.

The inspectors reviewed select monitors used to survey personnel and equipment for unrestricted release to assess whether the alarm setpoints were reasonable under the circumstances to ensure that licensed material was not released from the site. The inspectors reviewed the calibration documentation for each instrument selected and discussed the calibration methods with the licensee to determine consistency with the manufacturer's recommendations.

The inspectors reviewed calibration documentation for select portable survey instruments, area radiation monitors, and air samplers. The inspectors reviewed detector measurement geometry and calibration methods for portable survey instruments and area radiation monitors calibrated onsite and observed the licensee demonstrate use of the instrument calibrator. The inspectors assessed whether appropriate corrective actions were taken for instruments that failed performance checks or were found significantly out of calibration, and that the licensee had evaluated the possible consequences of instrument use since the last successful calibration or performance check.

The inspectors reviewed the current output values for instrument calibrators. The inspectors assessed whether the licensee periodically measured calibrator output over the range of the instruments used with measuring devices that have been calibrated by a facility using National Institute of Standards and Technology traceable sources and corrective factors for these measuring devices were properly applied in its output verification.

The inspectors reviewed the licensee's Title 10 of the *Code of Federal Regulations*, (10 CFR) Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," source term to assess whether calibration sources used were representative of the types and energies of radiation encountered in the plant.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.05-05.

b. Findings

No findings were identified.

.3 Problem Identification and Resolution (02.04)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring instrumentation were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radiation monitoring instrumentation.

The inspectors' reviews constituted a single inspection sample as defined in IP 71124.05-05.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

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

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams per 7000 Critical Hours Performance Indicator (PI) for the period from January 2016 to December 2016 for Units 1 and 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operations narrative logs, IRs, event reports and NRC integrated inspection reports for the period to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

These reviews by the inspectors constituted two unplanned scrams per 7000 critical hours inspection samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications PI for the period from January 2016 to December 2016 for Units 1 and 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, event reports and NRC integrated inspection reports for the period to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

These reviews by the inspectors constituted two unplanned scrams with complications inspection samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients per 7000 Critical Hours PI for the period from January 2016 through December 2016 for Units 1 and 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, maintenance rule records, event reports and NRC integrated inspection reports for the period to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

These reviews by the inspectors constituted two unplanned transients per 7000 critical hours inspection samples as defined in IP 71151-05.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors sampled licensee submittals for the Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences PI for the period from January 2016 through December 2016 for Units 1 and 2. The inspectors used PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's CAP database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary data and the results of associated offsite dose calculations for selected dates to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose.

These reviews by the inspectors constituted a single Radiological Effluent Technical Specification/Offsite Dose Calculation Manual radiological effluent occurrences 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: (Closed) Unresolved Item 05000456/2016007-01 – 05000457/2016007-01; Identification of Significant Conditions Adverse to Quality in Accordance with the Quality Assurance Topical Report

a. Inspection Scope

During the 2016 Problem Identification & Resolution (PI&R) inspection at Braidwood Station (NRC IR 05000456/2016007 – 05000457/2016007; ADAMS Accession No. ML16267A152), the inspectors identified an unresolved item (URI) regarding the identification of significant conditions adverse to quality (SCAQs). This URI involved two distinct issues. The inspectors questioned whether the licensee's CAP, as implemented through procedures PI-AA-125, "Corrective Action Program," and PI-AA-120, "Issue Identification and Resolution," adequately identified SCAQs as delineated in the licensee's Quality Assurance Topical Report (QATR), NO-AA-10. In addition, the inspectors questioned whether an oil leak identified in the 1B SX pump seal on December 30, 2013, and which recurred on November 18, 2014, met the definition of an SCAQ as defined in the licensee's QATR.

This in-depth review inspection sample continued and completed the inspectors' review of the licensee's processes and procedures to determine if the licensee had been consistent with the provisions of their QATR related to the identification of SCAQs, and as required by 10 CFR 50, Appendix B, Criterion II, "Quality Assurance Program."

b. Background

The licensee's CAP is described in procedures PI-AA-125 and PI-AA-120. In the CAP issue screening and classification process a significance level (SL) is determined for a documented issue that was based on the consequences of the event. An investigation class is also established, utilizing a matrix involving both SL and the likelihood of the event/issue. In total, the licensee's CAP delineates five different SLs, with SLs 1 and 2 being the most significant events/issues. Likelihood was defined by the licensee as pertaining to both the uncertainty regarding the event/issue cause and the uncertainty regarding the corrective actions. Uncertainty was directly related to the complexity of the event/issue. The more complex an event/issue was, then the greater the uncertainty and the need to utilize formal analysis tools. A corrective action to prevent recurrence (CAPR) by the licensee's process was assigned to prevent recurrence/repetition of the root cause(s) of an event/issue and stemmed only from a formal root cause evaluation (RCE). During their review of this process in the 2016 PI&R inspection, the inspectors noted that the QATR SCAQ definition was not being used to determine whether a RCE was needed. As a result, the licensee's procedures and CAP processes appeared to allow for items meeting the definition of an SCAQ to be addressed by simple corrective actions (CAs), which might not necessarily prevent issue/event recurrence as was the case for a CAPR.

Prior to September 4, 2002, the licensee implemented a process that linked certain plant events to SCAQs based on the QATR SCAQ definition. Appendix D of the licensee's QATR defined an SCAQ as a condition "which, if left uncorrected, could have a serious effect on safety or operability." Prior to 2002, examples of SCAQs provided in the licensee's CAP procedures and controlling documents included:

- Safety system functional failures;
- Common mode failures;

- Unanalyzed conditions; and
- Widespread program or organization breakdown in an area such as design, analysis, operation, maintenance, tests, procedures, or training that were likely to cause a significant event.

Additionally, licensee CAP procedures directly linked certain event/issue SLs or conditions to both SCAQs and conditions adverse to quality (CAQs). Versions of licensee CAP implementing procedures directly linked SL 1, or both SL 1 and SL 2, events/issues to SCAQs. Following September 4, 2002, the licensee revised their CAP process to utilize the graded approach of SL and likelihood as previously described.

c. Observations

During the inspectors' in-depth review and follow up of this issue, a prominent example of the vulnerability in the licensee's CAP explicitly related to the inspectors' questions from the 2016 PI&R inspection was identified. An October 2005 event/issue involving a bryozoa (a species of aquatic invertebrate biologic) infestation was not identified as an SCAQ by the licensee and, as a result, no corresponding CAPRs were established. Consequently, in September 2008 the accumulation of bryozoan colonies in the essential service water (SX) and main circulating water system pump intake bays resulted in SX system strainers being fouled resulting in a challenge to the reliability and operability of the SX system. A finding and associated NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action Program," were identified by inspectors for this issue (NRC IR 05000456/2009003 – 05000457/2009003; ADAMS Accession No. ML092260344).

In reviewing the circumstances surrounding this finding and the associated NCV, the inspectors determined that the performance deficiency was not related to licensee's implementation of their CAP. The process within the licensee's CAP had been dutifully followed in this case. Rather, the inspectors concluded that the performance deficiency was related to a vulnerability in the licensee's CAP itself, which ultimately resulted in the event/issue recurring in 2008 after it had been first identified and corrective actions taken in 2005.

d. Findings

- (1) (Closed) Unresolved Item 05000456/2016007–01; 05000457/2016007: Identification of Significant Condition Adverse to Quality in Accordance with the Quality Assurance Topical Report

Criterion II, "Quality Assurance Program," of 10 CFR 50, Appendix B, specifies that a quality assurance program be established, and that this program be documented by written policies, procedures, or instructions. Criterion XVI, "Corrective Action," of 10 CFR 50, Appendix B, requires that measures be established to assure that CAQs are promptly identified and corrected. For SCAQs, Criterion XVI also requires that the measures assure that the cause of the condition is determined; that corrective actions are taken to preclude repetition; and that the identification of the SCAQ, the cause of the condition, and the corrective actions taken are documented and reported to appropriate levels of licensee management.

To establish and implement a CAP that met these requirements the license developed several written documents, most notably their QATR. Chapter 16 of the QATR

described how the licensee identified and corrected SCAQs and CAQs. Provisions in this chapter of the QATR included:

- In the “General Requirements” of Section 2.1: Measures are required to assure that the cause of any significant condition adverse to quality is determined and takes corrective actions to prevent recurrence;
- In Section 2.2.1 regarding “Significant Conditions Adverse to Quality”: In cases of significant conditions adverse to quality the cause of the condition is determined and documented, resolution determined and documented, and the corrective actions taken and documented to prevent recurrence; and
- From the “Glossary of Terms” contained in Appendix D of the QATR: A significant condition adverse to quality is one which, if left uncorrected, could have a serious effect on safety or operability.

The requirements specified in the QATR are implemented by licensee procedures PI-AA-125 and PI-AA-120. During the 2016 PI&R inspection, the inspectors reviewed these procedures to further understand how the licensee identified SCAQs and established CAPRs to address them. During their review of the licensee’s CAP process, the inspectors noted that the definition of a SCAQ was not necessarily being used to trigger a formal RCE. The inspectors further noted that the licensee’s CAP process allowed an event/issue that met their definition of a SCAQ to be addressed by CAs, rather than CAPRs. This distinction within the licensee’s process was significant because the licensee’s procedures stated that a CAPR was assigned to prevent the recurrence of the root cause(s) of an event/issue stemming from a formal RCE. While a CA could be used to prevent recurrence of an issue, typically the CAPR was used to prevent recurrence. As a result, the inspectors questioned whether the CAP implementing procedures, PI-AA-125 and PI-AA-120, prescribed an adequate process that allowed for identification of all events/issues that met the SCAQ definition, and whether CAPRs would actually be established and implemented for all such events/issues to prevent their recurrence.

Discussions with licensee staff and management personnel confirmed that they do not currently use their definition for SCAQs to implement their CAP process. In discussions with the inspectors, the licensee offered the following:

- The licensee implemented a graded approach using SL and likelihood (which included risk and uncertainty) which assured that the level of licensee resources and rigor applied appropriately followed their CAP procedural requirements;
- The licensee’s graded approach, along with a well-trained management team that has nuclear safety and conservative decision-making as a primary focus, provided for an effective CAP; and
- Even if a CAPR was not issued to address an event/issue, CAs would prevent recurrence of these events/issues.

In response to the inspector’s questions, the licensee revised procedures PI-AA-125 and PI-AA-120 to formally delineate that for a cause determined through a RCE or a Corrective Action Program Evaluation (CAPE) of a SL 1–3 issue, a CA would be clearly identified that would preclude repetition of the identified cause. This was done in order to demonstrate compliance with 10 CFR 50, Appendix B, Criterion XVI requirements. The inspectors reviewed the change and determined that although the action would not be labeled as a CAPR, it would accomplish the same function since it would be intended

to preclude repetition, and it would be documented and evaluated by management. Additionally, during the review the inspectors identified a gap in the CAP procedures. Specifically, the licensee's procedures did not explicitly require licensee management to approve of CA due date extensions or changes of intent when those CAs were being credited to preclude repetition. The licensee entered this identified issue into their CAP as IR 3991681.

The inspectors discussed this issue with the appropriate NRC staff and managers in both NRC Region III and headquarters. From these discussions it was concluded that 10 CFR 50, Appendix B, Criterion XVI, "Corrective Actions," required different levels of licensee review and action for SCAQs and CAQs. For SCAQs, the issue must be documented in writing, evaluated by an appropriate level of licensee management, and the cause had to be determined and precluded from repetition. In contrast, at the time of the PI&R inspection, the licensee's CAP process did not specify that any type of CA was required to preclude repetition, only CAPRs had the requirement to preclude repetition.

As a result of their review, the inspectors determined that at the time of the PI&R, licensee procedures PI-AA-125 and PI-AA-120 did not specifically ensure that measures were taken to assure that the cause(s) of any SCAQ, as defined in the licensee's QATR, were determined and that corrective actions were being taken to prevent recurrence. This was contrary to the requirements of Criterion II, "Quality Assurance Program," of 10 CFR 50, Appendix B, which specifies that a quality assurance program be established, and that this program be documented by written policies, procedures, or instructions. If left uncorrected, this issue could have constituted a violation of more than minor safety significance. However, because the licensee took actions during the inspectors' reviews to clarify the intent of their CAP procedures and addressed the inspectors' concerns, the issue was determined to be of only minor safety significance, and not subject to formal enforcement action in accordance with Section 2.3.1 of the NRC Enforcement Policy.

Finally, as part of their review the inspectors also examined whether an oil leak identified in the 1B SX pump seal on December 30, 2013, and which recurred on November 18, 2014, met the definition of an SCAQ as defined in the licensee's QATR. During their examination of this issue the inspectors concluded that the 1B SX Pump's ability to perform its specified safety function had been maintained. As a result, the issue did not constitute a SCAQ and no additional follow-up was warranted. This URI is closed.

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

.1 (Closed) Licensee Event Report 05000456/2015-003-00; 05000457/2015-003-00: Unanalyzed Condition Due to a Design Deficiency with Pressurizer Power Operated Relief Valve Circuitry that Could Prevent Valve Manual Closure to Mitigate Spurious Operation

a. Inspection Scope

On August 20, 2015, during an NRC Triennial Fire Protection inspection, the inspectors identified a design deficiency associated with the pressurizer PORV block valve control circuitry. A circuit deficiency for certain fires in the main control room or cable spreading rooms was identified as having the potential to prevent the pressurizer PORV block valves from being locally closed at their local control switch. This condition was reported

by the licensee to the NRC in accordance with 10 CFR 50.73(a)(2)(ii)(B) as an event or condition that resulted in the plant being in an unanalyzed condition that significantly degraded plant safety.

The licensee had entered this event into their CAP as IR 2544447, and the inspectors had previously dispositioned the event as a finding of very low safety significance with an associated NCV of the Braidwood Station Operating License, Condition 2E, regarding fire protection program requirements (NRC IR 05000456/2015007 – 05000457/2015007; ADAMS Accession No. ML15279A618).

In addition to those actions previously performed, in response to receipt of this licensee event report (LER) the inspectors completed additional reviews that included, but were not limited to:

- The potential for any generic issues, including those potentially requiring reporting under 10 CFR Part 21;
- The licensee's completed cause evaluation reports and additional corrective actions associated with the issues; and
- The accuracy of the information provided by the licensee in the LER.

This LER is closed.

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

b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report 05000456/2016–002–00; 05000457/2016–002–00: Inadequate Protection from Tornado Missiles Identified Due to Non-Conforming Design Conditions

a. Inspection Scope

On May 25, 2016, the licensee identified non-conforming conditions in the plant as-built configuration and condition such that specific TS equipment on both units was considered to not be adequately protected from tornado missiles as required by the current design and licensing basis. Specific vulnerabilities included:

- Ventilation openings in the wall that separated the nonsafety-related turbine building from the safety-related auxiliary building;
- Exhaust vents for the diesel-driven auxiliary feedwater (AF) pump engines not having adequate protection; and
- The roof access hatches fabricated of sheet metal on top of the units' refueling water storage tanks (RWSTs) not providing adequate protection.

The licensee entered various TS action statements for the SSCs. Operability was restored promptly using the guidance in Interim DSS–ISG–2016–01, "Clarification of Licensee Actions in Receipt of Enforcement Discretion," per NRC Enforcement Guidance Memorandum 15–002, "Enforcement Discretion for Tornado-Generated Missile Protection Non-Compliance," dated February 2016.

A list of specific SSCs adversely effected and discussed in the LER included:

- Both trains of control room ventilation for a shared Unit 1 and Unit 2 control room;
- Unit 1 Division 11 and Unit 2 Division 21 battery chargers and associated DC buses;
- Unit 1 112/114 and Unit 2 212/214 engineered safeguard feature inverters;
- Main control room radiation monitors 0PR31J, 0PR32J, 0PR33J, and 0PR34J;
- Unit 1 and Unit 2 containment spray systems;
- Unit 1 and Unit 2 diesel-driven AF trains; and
- The Unit 1 and Unit 2 RWSTs.

The inspectors reviewed the LER to ensure it was reported accurately in accordance with Title 10 of the *Code of Federal Regulations*, (10 CFR) Part 50.73 reporting requirements. This LER is closed.

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

b. Findings

A finding and an associated violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” was identified based upon the lack of adequate tornado missile protection for the safety-related equipment listed above. The finding was determined to be less than red (i.e., high safety significance) based on a generic and bounding risk evaluation performed by the NRC in support of the resolution of tornado-generated missile non-compliances. The bounding risk evaluation is discussed in NRC Enforcement Guidance Memorandum 15–002, Revision 1, *Enforcement Discretion for Tornado-Generated Missile Protection Non-Compliance* (ADAMS Accession No. ML14114A556).

Because the finding and violation were identified during the discretion period covered by Enforcement Guidance Memorandum 15–002, Revision 0 and Revision 1 and because the licensee has implemented interim corrective actions and has final corrective actions planned, the NRC is exercising enforcement discretion by not issuing an enforcement action. The NRC has previously exercised enforcement discretion for continued operation for an interim period as discussed in NRC IR 05000456/2016002; 05000457/2016002 (ADAMS Accession No. ML16209A139).

.3 (Closed) Licensee Event Report 05000456/2016–003–00: Indication in Control Rod Drive Mechanism Nozzle Weld Due to Embedded Flaws Opening Up from Thermal and Pressure Stresses During Operation

a. Inspection Scope

On October 2, 2016, while performing a liquid penetrant examination on the weld build up for Control Rod Drive Mechanism (CRDM) Penetration No. 69 during the licensee’s Unit 1 refueling outage, two rejectable rounded indications were documented. Because the indications did not meet the acceptance criteria of the ASME Code to remain in-service without repair, the condition was reported by the licensee to the NRC in accordance with 10 CFR 50.73(a)(2)(ii)(A) as an event or condition that results in the condition of the plant, including its principal safety barriers, being seriously degraded.

The examination of the embedded flaw repair in CRDM Penetration No. 69 was performed in accordance with the licensee's established inservice inspection (ISI) program, which requires liquid penetrant examination of embedded flaw weld repairs every refueling outage. There was no indication of through wall leakage observed during the licensee's examinations. Actions to repair both indications in accordance with applicable ASME Code requirements were completed on October 9, 2016. Based on industry experience, the licensee attributed the cause of the indications to existing mechanical discontinuities/minor subsurface voids opening up the weld surface due to thermal and/or pressure stresses experienced in the normal course of plant operation.

The licensee had entered this event into their CAP as IR 2723199, and the licensee's activities regarding this event had been monitored by the inspectors as part of their RFO ISI reviews documented in NRC IR 05000456/2016004;05000457/2016004 (ADAMS Accession No. ML17030A092).

In addition to those actions previously performed, in response to receipt of this LER the inspectors completed additional reviews that included, but were not limited to:

- The potential for any generic issues, including those potentially requiring reporting under 10 CFR Part 21;
- The licensee's completed cause evaluation reports and additional corrective actions associated with the issues; and
- The accuracy of the information provided by the licensee in the LER.

This LER is closed.

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

b. Findings

No findings were identified.

4OA5 Other Activities

.1 (Closed) NRC Temporary Instruction 2515/192: Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems

The objective of this performance-based Temporary Instruction (TI) was to verify implementation of interim compensatory measures associated with an open phase condition design vulnerability in electric power systems for operating reactors.

The inspectors determined that the licensee had implemented a permanent modification to address the technical issue. As a result, no further inspection under the requirements of this TI was performed or required. This TI is closed.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 28, 2017, the inspectors presented the inspection results to the Site Vice President, Ms. M. Marchionda, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- The results of inspections in the area of radiation protection and radiation safety with the Plant Manager, Ms. A. Ferko, and other members of the licensee staff on January 27, 2017; and
- The results of LER closure reviews with the Regulatory Assurance Manager, Mr. S. Reynolds, via telephone on March 6, 2017.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received by the inspectors and reviewed in the course of these inspections was returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Marchionda, Site Vice President
A. Ferko, Plant Manager
J. Cady, Radiation Protection Manager
B. Currier, Engineering Director
K. Dovas, Operations Training Director
B. Finlay, Security Manager
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

None.

Closed

05000456/2016007-01; URI Identification of Significant Conditions Adverse to Quality
05000457/2016007-01 in Accordance with the Quality Assurance Topical Report
(Section 4OA2.3)

05000456/2015-003-00; LER Unanalyzed Condition Due to a Design Deficiency with
05000457/2015-003-00 Pressurizer Power Operated Relief Valve Circuitry that
Could Prevent Valve Manual Closure to Mitigate Spurious
Operation (Section 4OA3.1)

05000456/2016-002-00; LER Inadequate Protection from Tornado Missiles Identified
05000457/2016-002-00 Due to Non-Conforming Design Conditions
(Section 4OA3.2)

05000456/2016-003-00 LER Indication in Control Rod Drive Mechanism Nozzle Weld
Due to Embedded Flaws Opening Up from Thermal and
Pressure Stresses During Operation (Section 4OA3.3)

2515/192 TI Inspection of the Licensee's Interim Compensatory
Measures Associated with the Open Phase Condition
Design Vulnerabilities in Electric Power Systems
(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:

- 3955147; Trend in Winter Readiness Issues; December 20, 2016
- 3982409; 0BwOA ENV-1 Entered Due to Adverse Weather; March 7, 2017
- 3983095; 0/1/2BwOA ENV-1 Entered Due to Sustained High Winds; March 8, 2017

Procedures:

- 0BwOA ENV-1; Adverse Weather Conditions – Unit 0; Revision 121
- 1BwOA ENV-1; Adverse Weather Conditions – Unit 1; Revision 5
- 2BwOA ENV-1; Adverse Weather Conditions – Unit 2; Revision 5

1R04 Equipment Alignment

Action Requests/Issue Reports:

- 3983388; 2DG5215B Leaks By Equalizing Starting Air Receiver Pressures; March 9, 2017
- 3983484; 2PSH-DG104A Air Leaking from Diaphragm; March 9, 2017

Procedures:

- BwOP RH-E2; Electrical Lineup – Unit 2 Operating; Revision 8
- BwOP RH-M4; Operating Mechanical Lineup Unit 2 2B Train; Revision 8
- BwOP SX-E2; Electrical Lineup – Unit 2 Essential Service Water System; Revision 13
- BwOP SX-M2; Operating Mechanical Lineup Unit 2; Revision 36
- BwOP DG-M4; Operating Mechanical Lineup Unit 2; Revision 16
- BwOP CC-M2; Operating Mechanical Lineup Unit 2; Revision 16
- BwOP CC-12; Alignment of the “0” Heat Exchanger to a Unit; Revision 15

1R05 Fire Protection

Action Requests/Issue Reports:

- 3966003; Announced Fire Drill Observations; January 24, 2017
- 3966406; 1FP02T Foam Sample Failed Testing; January 25, 2017
- 3966407; 2FP02T U-2 DOST Foam Failed Testing; January 25, 2017
- 3968216; Degraded Fire Seal on Door D-419; January 30, 2017
- 3968763; SD-104 Door Seal Degraded by Door Latching Mechanism; January 31, 2017
- 3968771; 1FS-DO001 Housing Cover/Circuitry Dangling From Flow Switch; January 31, 2017
- 3972068; Poor Radio Reception During an Announced Fire Drill; February 9, 2017
- 3972296; RP Department Not Notified or Included in Fire Drill; February 9, 2017
- 3972327; Fire Brigade Equipment Cart Wheels Degraded; February 9, 2017
- 3983086; 0A Fire Protection Jockey Pump Running Continuously; March 8, 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 7
- BwAR 0-37-A4; Unit One Area Fire; Revision 15
- BwOP FP-100; Fire Response Guidelines; Revision 22
- OP-AA-201-003; Fire Drill Performance; Revision 16
- OP-AA-201-008; Pre-Fire Plan Manual; Revision 3
- OP-AA-201-009; Control of Transient Combustible Material; Revision 18

Fire Drill Scenarios:

- 20.17.01.23; MCC 133V4 B3 Fire; January 23, 2017

Pre-Fire Plans:

- No. 36; FZ 3.3D-2 – CSR 463, Upper Cable Spreading Room, Zone D-2; Revision 1
- No. 71; FZ 8.5-1 – TB 426 Unit 1, Turbine Building Mezzanine Area (SE); Revision 1
- No. 92; FZ 10.1-1 – DOST 383, Diesel Fuel Oil Storage Room 1B; Revision 0
- No. 94; FZ 10.2-1 – DOST 383, Diesel Fuel Oil Storage Room 1A; Revision 0
- No. 205; FZ 18.4-1 – AB 451, Control Room HVAC Equipment Room Train A; Revision 1

1R11 Licensed Operator Regualification Program

Action Requests/Issue Reports:

- 3973920; Braidwood Cross Site Observation Roll Up; February 14, 2017
- 3977520; 1HD099C Failed Closed; February 23, 2017
- 3982970; Training: LORT Exam Question Challenged; March 8, 2017
- 3983414; Adverse Trend in Operations Communications; March 9, 2017

Procedures:

- BwOP HD-17; Heater Drain Level Controller Operation; Revision 38
- BwOP SY-11; Removing a 345 KV Bus From Service; Revision 23
- BwOP SY-27; Local Breaker Backup (LBB) Removal and Return to Service; Revision 8
- BwOP CD/CB-1; Condensate/Condensate Booster System Startup; Revision 29
- 2BwOS DG-2A; 2A Diesel Generator Overspeed Trip Test; Revision 3
- 2BwOS DG-4A; 2A Diesel Generator Isolate Switch Functional Test; Revision 1
- 2BwOSR 3.8.1.2-1; Unit 2 – 2A Diesel Generator Operability Surveillance; Revision 42
- 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 0
- 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 11
- OP-AA-300; Reactivity Management; Revision 11
- TQ-AA-10; Systematic Approach to Training Process Description; Revision 4
- 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

1R12 Maintenance Effectiveness

Action Requests/Issue Reports:

- 1616526; 2FIC DO002 1/A Regulator Cracked Where Gauge Mounts to Regulator; February 3, 2014
- 1627132; 2B DG DO ST TK Level Transmitter May be Sticking; February 27, 2014
- 1629112; 1L-DO021 Regulators are Leaking Air Around Body; March 4, 2014
- 1629135; 1FIC-DO021 Regulators Are Leaking Air Around Body; March 4, 2014
- 1659850; 2014 NRC PI&R FASA – 2010 CDBI – DOST Vent Lines; April 14, 2014
- 1668442; IST Coordinator Review Required by Procedure; June 5, 2014
- 1673337; 1B EDG Exhaust Rupture Disk – Additional Leakage Location; June 19, 2014
- 1677413; June Diesel Oil Consumption vs Inventory Change Discrepancy; July 1, 2014
- 1680201; 1A EDG Turbo Charger Spin Down Time – Trend IR; July 9, 2014
- 1688766; 0DO054 is Leaking DO; August 3, 2014
- 1691431; Need Contingencies for DOST Water Tight Door Surveillance; August 11, 2014
- 1694620; 1A DOST Level Higher Than Indicated on 1LI-DO001A; August 20, 2014
- 1694622; 1B DOST Level Higher Than Indicated on 1LI-DO002A; August 20, 2014
- 2415302; DO Flex Mod Test Results Don't Meet Max Press Criteria; November 20, 2014
- 2440808; NRC Question on Unit 1 DOST Anchor Bolts Thread Engagement; January 22, 2015
- 2519208; 2A DOST Tank Valve 2DO001A Leakage Impacts 2B EDG; June 24, 2015
- 2704409; Diesel Oil Storage Tank Cleaning Per TRM Appendix M; August 15, 2016
- 881765; 0OG01S Abandonment: Procedures/ Database Changes Needed; February 17, 2009
- 880513; Hydrogen Recombiners Interim Abandonment Prioritization; February 13, 2009

Procedures:

- ER-AA-380; Primary Containment Leakrate Testing Program; Revision 11

Work Orders:

- 01696788; As Found LLRT 2OG079/082; April 26, 2016
- 01696789; As Found LLRT 2OG057A/083; May 1, 2014
- 01156443; OP IST LLRT OG080/084; April 27, 2013
- 01537106; As Found LLRT 2OG081/085; October 23, 2014

Other:

- MR Function Evaluation; Braidwood Unit 1, DO-02; January 31, 2017
- M-150; Diagram of Off Gas System for Hydrogen Recombiners, Sheet 2; Revision AB
- M-47; Diagram of Off Gas System for Hydrogen Recombiners, Sheet 2; Revision Ab

1R13 Maintenance Risk Assessments and Emergent Work Control

Action Requests/Issue Reports:

- 3965966; 2MS018C Failed to Fast Stroke Close After Maintenance; January 24, 2017
- 3965968; PCV-3 Valve Installed Incorrectly – 2MS018C; January 24, 2017
- 3981892; 2A DG Pedestal Bearing Still Has Continuity to Pedestal Base; March 6, 2017
- 3982611; Insufficient Work Instructions in Work Package; March 6, 2017
- 3982645; 2DG01KB Lube Oil Leak/Weep Access Plate Below 1L Access Cover; March 7, 2017
- 3982772; Documentation of 2A EDG Exhaust Stack UT; March 7, 2017

- 3982870; Clearance Order Not Tied to Critical Path Task for 2A DG Work Window; March 8, 2017
- 3983175; New Jacket Water Circulating Pump Motor Does Not Physically Fit on Skid; March 8, 2017
- 3983200; Unable to Complete Work Order at this Time Due to a Lack of Parts; March 8, 2017
- 3983281; Piping Insulation Not Re-Installed After Work Window; March 9, 2017
- 3983710; EO Found 2A DG at 94 Percent Level with No Alarm In; March 10, 2017
- 3990273; 1DG5048A 1A DG Jacket Water Drain is Stuck Closed; March 28, 2017
- 3990078; WO 4616262-01, OVA05FI Failed Test; March 27, 2017

Procedures:

- BwMP 3100-022; Diesel Generator 2 Year Inspection; Revision 36
- 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

Work Orders:

- 01607956; 2DG01KA-C-M Replace Jacket Water Circulating Pump Motor; March 6, 2017
- 01607957; 2DG01KA-A-M Replace Prelube Oil Pump Motor; March 6, 2017
- 01743277; 4 KV Breaker Swap; February 16, 2016
- 01853870; SX1AX At Panel 2AP05EW Time Delay Relay Calibration; February 16, 2016
- 01859407; Perform 2 Year Inspection of 2DG01KA Diesel Generator; March 5, 2017
- 01926260; 2SX01AA Cooler Inspection and Cleaning; February 16, 2016
- 01965067; 2MS018C Actuator Pilot Check Valve (PCV3) Replacement; January 18, 2017
- 04616262; Replace Charcoal Sample Canisters OVA05FI; March 27, 2017
- 97103328; Replace Charcoal, Potential Penetration Test Failure; March 27, 2017

1R15 Operability Evaluations

Action Requests/Issue Reports:

- 3974161; 1SX114B Exceeds Alert Stroke Limit; February 14, 2017
- 3976217; Unable to Flush 2B SX Oil Cooler Inlet Piping; February 20, 2017
- 3982772; Documentation of 2A EDG Exhaust Stack UT; March 7, 2017
- 3986839; Unit 2 Main Steam Isolation Valve Room Floor Drains Degraded – Potential A2R19 Impact; March 19, 2017
- 3974161; 1SX114B Valve Stroke Exceeds Alert Limit; February 14, 2017
- 3987880; New Fuel Shipping Container with Tripped Accelerometer; March 21, 2017
- 3988360; 2B DG Automatic Voltage Regulator Oscillations; March 22, 2017
- 3988400; 2B DG “Unit available for Emergency” Not Lit – Bulb Stuck; March 22, 2017
- 3988450; 2PL08J DC Bus No. 2 Power Light Not Lit; March 23, 2017
- 3988624; New Fuel Shipping Container with Tripped Accelerometer – T79Z; March 23, 2017
- 3988628; New Fuel Shipping Container with Tripped Accelerometer – T80Z; March 23, 2017
- 3988780; New Fuel Shipping Container with Tripped Accelerometer – T60M; March 23, 2017
- 3990031; Trend – Bulbs Broken/Stuck in Sockets; March 27, 2017
- 3990893; 1a EDG – Craze Cracking Discovered on 5R Cylinder Liner; March 27, 2017

Procedures:

- BwFP FH-1A7; New Fuel Assembly Inspection Abnormality Reporting; Revision 2

- BwFP FH-1A7.2; Guideline for Fuel Assembly and Container Inspection Following a Tripped Accelerometer; Revision 0
- BwMS 3350-007; Flow Verification and Hydrolazing of Auxiliary Building Floor Drains; Revision 11
- OU-AP-201; New Fuel Receipt and Inspection for Byron and Braidwood; Revision 13

Engineering Changes/Technical Evaluations:

- 618283; Evaluation of SX Pump Operation Without Oil Cooler Cooling Flow; Revision 0

Drawings/Prints:

- 20E-2-4030DG52; Diesel Generator 2B Starting Sequence Control 2DG01KB Part 2; Revision AH

Engineering Design Analyses/Calculations:

- BRW-95-218; Evaluation of Essential Service Water Pump Operation With Degraded Lube Oil Coolers; December 12, 2007

Work Orders:

- 04602011; Rebuild 1SX114B Actuator; February 17, 2017
- 04602011; 1SX114B Remove/Install Equipment to Support MMD; February 17, 2017
- 04409001; Rebuild 1SX114B Actuator, Reg/Replace Elastomers; March 30, 2013

1R18 Plant Modifications

Engineering Changes/Technical Evaluations:

- 617642; Temporarily Defeat Feedwater Water Hammer Prevention System (WHPS) Feedwater Isolation Signals During Normal Power Operation for Steam Generators 2A/2B/2C/2D; Revision 0

Procedures:

- CC-AA-102; Design Input and Configuration Change Impact Screening; Revision 29
- CC-AA-112; Temporary Configuration Changes; Revision 25

Work Orders:

- 04585571; Temporarily Defeat Feedwater Hammer Prevention System (WHPS); January 13, 2017

1R19 Post Maintenance Testing

Action Requests/Issue Reports:

- 3965966; 2MS018C Failed to Fast Stroke Close After Maintenance; January 24, 2017
- 3965968; PCV-3 Value Installed Incorrectly – 2MS018C; January 24, 2017
- 3976217; Unable to Flush 2B SX Oil Cooler Inlet Piping; February 20, 2017

Procedures:

- 2BwOS DG-2A; 2A Diesel Generator Overspeed Trip Test; Revision 3
- 2BwOS DG-4A; 2A Diesel Generator Isolate Switch Functional Test; Revision 1
- 2BwOSR 3.6.3.5.MS-1; Main Steam System Containment Isolation Valve Stroke Surveillance; Revision 15
- 2BwOSR 3.8.1.2-1; Unit 2 – 2A Diesel Generator Operability Surveillance; Revision 42
- 2BwOSR 5.5.8.SX-3B; Group A IST Requirements for 2B Essential Service Water Pump (2SX01PB); Revision 12

Work Orders:

- 01859407; Perform 2 Year Inspection of 2DG01KA Diesel Generator; March 5, 2017
- 01965067; 2MS018C Actuator Pilot Check Valve (PCV3) Replacement; January 18, 2017
- 04582510; ASME Surveillance Requirements for 2B SX Water Pump; February 21, 2017

1R22 Surveillance Testing

Procedures:

- ER-AA-425-1001; Surveillance Test Interval (STI) Evaluation Form; Revision 1
- 1BwOSR 3.8.1.2-2; 1B Diesel Generator Operability Surveillance; Revision 40

Work Orders:

- 01932934 01; 1B Diesel Generator Operability Semi-Annual Surveillance; January 18, 2017
- 04586962 01; LR-IST-1B DG Operability Monthly; January 18, 2017
- 04574901 01; IST ASME Surveillance Requirements for 2CC01PB Pump; February 16, 2017

1EP6 Drill Evaluation

Action Requests/Issue Reports:

- 3970916; EP – Near Miss on Off Year Evaluation Drill Scenario Confidentiality; February 6, 2017
- 3971147; Non Drill Personnel Questioned About Plant Conditions; February 7, 2017
- 3971787; BWD EP 2017 – Off Year Evaluation Failed Demonstration Criteria TSC; February 8, 2017
- 3971792; BWD EP 2017 – Off Year Evaluation Failed Demonstration Criteria OSC; February 8, 2017
- 3981196; EP BWD 2017 Off Year Evaluation Simulator ERO Performance Issues; March 3, 2017
- 3981200; EP BWD 2017 Off Year Evaluation Exercise and Scenario Issue; March 3, 2017
- 3981198; EP BWD 2017 Off Year Evaluation TSC OSC Performance Issues; March 3, 2017
- 3981204; EP BWD 2017 Off Year Evaluation Facility Issues; March 3, 2017

Procedures:

- EP-AA-110; Assessment of Emergencies; Revision 10
- EP-AA-111; Emergency Classification and Protective Action Recommendations; Revision 19
- EP-AA-112-200; TSC Actuation and Operation; Revision 10
- EP-AA-113; Personnel Protective Actions; Revision 13
- EP-AA-114; Notifications; Revision 13
- EP-AA-122; Drills and Exercise Program; Revision 18
- EP-AA-125-1002; ERO Performance – Performance Indicator Guidance; Revision 12
- 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-MW-114-100; Midwest Region Off Site Notifications; Revision 16

Other:

- Braidwood Station 2017 Off-Year Exercise Manual; February 7, 2017
- Braidwood Station 2017 Off-Year Exercise Evaluation Report; March 6, 2017

2RS5 Radiation Monitoring Instrumentation

Action Requests/Issue Reports:

- 2442519; AMS-4 Procedure Does Not Work; January 26, 2015
- 2480806; QC Checks on the Inside Whole Body Counter Needed Fine Gain Adjustment; April 6, 2015
- 2516423; Slight Variation in the Size of Hi-Q Iodine Cartridges; June 18, 2015
- 2525388; Inspection of SAM Needed; July 08, 2015
- 2568397; Whole Body Counter Q&A Form Was Not Completed Due to Worker Exit; October 9, 2015
- 2701248; Roll Out of New RO Monitor Checks Lacking Guidance; August 5, 2016
- 2733071; 1AR11J Containment ARM Monitor Setpoint Change Methodology Needs Revision; October 27, 2016
- 3967365; NRC ID – Neutron Survey Meter Calibration Enhancement; January 27, 2017

Procedures:

- RP-AA-700-1241; Operation and Source Check of Far West REM 500B Neutron Survey Meter; Revision 0
- RP-AA-226; Calibration of Canberra Accuscan Whole Body Counter Calibration; Revision 1
- RP-AA-229; Fastscan Abacos Plus Whole Body Counter Calibration; Revision 3
- RP-AA-700-1216; Calibration of Hi-Vol Air Sampler; Revision 3
- RP-AA-700-1101; Calibration of the RO-2, RO-2A, RO-20 and RSO-50E Ion Chamber; Revision 1
- RP-AA-700-1209; Calibration of Shepherd Box Irradiators; Revision 0
- RP-AA-700-1208; Operation of Shepherd Model 89 Calibrator; Revision 3
- RP-BR-730; As Found Pre-calibration Source Check Sheet; Revision 10

Calibration Certifications:

- Exelon PowerLabs; Certificate of Calibration Eberline ASP-2E W/hp-270
- Exelon PowerLabs; Certificate of Calibration Ludlum-3
- Exelon PowerLabs; Certificate of Calibration Far West Technologies REM-500
- Exelon PowerLabs; Certificate of Calibration Rem Ball Ludlum 12-4/42-3, H

Miscellaneous Calibration Documentation:

- Apex-InVivo; Accuscan Wholebody Monitor Analysis Report for Background Check QA Count; January 26, 2017
- Apex-InVivo; Accuscan Wholebody Monitor Analysis Report Calibration Count; January 26, 2017
- BwVP RM80-3-0AR56; Fuel Building Fuel Handling Incident Area Monitor Calibration Data; July 28, 2015
- BwVP RM80-3-0AR55; Fuel Building Fuel Handling Incident Area Monitor Calibration Data; April 5, 2016

4OA1 Performance Indicator Verification

Procedures:

- LS-AA-215; Monthly Data Elements for NRC RETS/ODCM Radiological Effluent Occurrences; Revision 5
- 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 December 2016

4OA2 Problem Identification and Resolution

Action Requests/Issue Reports:

- 0385139; Multiple Issues/Systems Affected – Forebay Silt/Material; October 12, 2015
- 0813142; Bryzoa Deposition and Growth in the CW Forebays Resulted in Rapid Fouling of SX Strainers; September 2, 2008
- 2701067; PI&R – QATR Implementing Procedures; August 4, 2016
- 3972312; Adverse Trend in Retention of Failed Components; February 9, 2017

Procedures:

- PI-AA-125; Corrective Action Program (CAP) Procedure; Revision 4
- PI-AA-125; Corrective Action Program (CAP) Procedure; Revision 5
- PI-AA-120; Issue Identification and Screening Process; Revision 6
- PI-AA-120; Issue Identification and Screening Process; Revision 7
- NO-AA-10; Quality Assurance Topical Report; Revision 90
- NO-AA-10; Quality Assurance Topical Report; Revision 91
- PI-AA-125-1001; Root Cause Analysis Manual; Revision 3
- AD-AA-106; Corrective Action Program (CAP) Procedure; Revision 1
- LS-AA-125; Corrective Action Program (CAP) Procedure; Revision 0
- LS-AA-125; Corrective Action Program (CAP) Procedure; Revision 4
- LS-AA-125; Corrective Action Program (CAP) Procedure; Revision 5
- LS-AA-120; Issue Identification and Screening Process; Revision 1
- AD-AA-3000; Nuclear Risk Management Process; Revision 1
- NSP-AP-4004; Corrective Action Program Procedure; Revision 0
- NSP-AP-4004; Corrective Action Program Procedure; Revision 4
- NSWP-A-15; ComEd Nuclear Division Integrated Reporting Program; Revision 0

4OA3 Event Followup

Action Requests/Issue Reports:

- 2479588; OSP-A Rejectable Indication on CRDM Penetration 69 Weld Buildup; April 3, 2015
- 2544447; NRC Identified Potential Inadequate Safe Shutdown Strategy; August 20, 2015
- 2550306; Extent of Condition Review of IR 2544447 PORV Fire Safe Shutdown Strategy; September 2, 2015
- 2667599; 2016 CDBI – NRC NCV For Failure to Trip Test Circuit Breakers; May 10, 2016
- 2723199; OSP-A Rejectable Indications on CRDM Penetration 69 Weld Buildups; October 2, 2016

Engineering Changes/Technical Evaluations:

- 403164; Unit 1 – Install New Fuse Blocks for Pressurizer PORVs; Revision 0
- 403165; Unit 2 – Install New Fuse Blocks for Pressurizer PORVs; Revision 0

Work Orders:

- 01851555; Unit 1 Reactor Vessel Head NDE Examination; October 20, 2016
- 01864199; Install New Fuse Blocks per EC 403164; October 20, 2015
- 01864202; Install New Fuse Blocks per EC 403164; October 23, 2015
- 01864203; Install New Fuse Blocks per EC 403165; October 20, 2015
- 01864204; Install New Fuse Blocks per EC 403165; October 23, 2015

4OA5 Other

Engineering Changes/Technical Evaluations:

- 390213; Unit 1 – SAT Loss of Phase Detection Scheme Phase Unbalance Relay Installation (Microprocessor); Revision 2
- 390214; Unit 2 – SAT Loss of Phase Detection Scheme Phase Unbalance Relay Installation (Microprocessor); Revision 2

Work Orders:

- 01570215; SAT Loss of Phase Installation – 1AP02E; December 19, 2015
- 01570216; SAT Loss of Phase Installation – 2AP02E; December 19, 2015

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AF	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
CA	Corrective Action
CAP	Corrective Action Program
CAPR	Corrective Action to Prevent Recurrence
CAQ	Condition Adverse to Quality
CC	Component Cooling
CFR	<i>Code of Federal Regulations</i>
CRDM	Control Rod Drive Mechanism
DC	Direct Current
DOST	Diesel Oil Storage Tank
EC	Engineering Change
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
ISI	Inservice Inspection
IST	Inservice Testing
kV	Kilovolt
LER	Licensee Event Report
LLRT	Local Leak Rate Testing
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OOS	Out-of-Service
PCV	Pilot Check Valve
PI	Performance Indicator
PI&R	Problem Identification and Resolution
PMT	Post-Maintenance Testing
PORV	Power Operated Relief Valve
QATR	Quality Assurance Topical Report
RCE	Root Cause Evaluation
RFO	Refueling Outage
RWST	Refueling Water Storage Tank
SCAQ	Significant Condition Adverse to Quality
SG	Steam Generator
SL	Significance Level
SRO	Senior Reactor Operator
SSC	System, Structure, and Component
SX	Essential Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
Vac	Volts Alternating Current
Vdc	Volts Direct Current
WHPS	Water Hammer Prevention System
WO	Work Order