



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION I  
2100 RENAISSANCE BLVD.  
KING OF PRUSSIA, PA 19406-2713

November 3, 2016

Mr. Bryan Hanson  
Senior Vice President, Exelon Generation, LLC  
President and Chief Nuclear Officer, Exelon Nuclear  
4300 Winfield Rd.  
Warrenville, IL 60555

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION – INTEGRATED INSPECTION  
REPORT 05000277/2016003 AND 05000278/2016003

Dear Mr. Hanson:

On September 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Peach Bottom Atomic Power Station (PB), Units 2 and 3. On October 14, 2016, the NRC inspectors discussed the results of this inspection with Mr. Michael Massaro, Peach Bottom Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. The finding did not involve a violation of NRC requirements. If you disagree with the 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 I, and the NRC Resident Inspector at Peach Bottom.

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 the NRC Public Document Room in accordance with 10 Code of Federal Regulations (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

**/RA/**

Daniel L. Schroeder, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Docket Nos. 50-277 and 50-278  
License Nos. DPR-44 and DPR-56

B. Hanson

-2-

Enclosure:

Inspection Report 05000277/2016003 and 05000278/2016003  
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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DOCUMENT NAME: G:\DRP\BRANCH4\Inspection Reports\Peach Bottom\2016\Q3\PB IR 2016-003 Final.docx  
ADAMS Accession No. ML16309A002

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION I**

Docket Nos. 50-277 and 50-278

License Nos. DPR-44 and DPR-56

Report No. 05000277/2016003 and 05000278/2016003

Licensee: Exelon Generation Company, LLC

Facility: Peach Bottom Atomic Power Station, Units 2 and 3

Location: Delta, Pennsylvania

Dates: July 1, 2016 through September 30, 2016

Inspectors: J. Heinly, Senior Resident Inspector  
B. Smith, Resident Inspector

Approved By: Daniel L. Schroeder, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Enclosure

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## SUMMARY

Inspection Report 05000277/2016003, 05000278/2016003; 07/01/2016 – 09/30/2016; Peach Bottom Atomic Power Station (PB), Units 2 and 3; Follow-Up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors. The inspectors identified one finding, which was of very low safety significance (Green). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of the Nuclear Regulatory Commission (NRC) requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated August 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

### Cornerstone: Initiating Events

- A self-revealing finding of very low safety significance (Green) was identified for Exelon's failure to maintain the Unit 2 'C' reactor feed pump (RFP) Woodward controller secondary power supply in accordance with PES-S-002, Exelon Shelf Life Program. Specifically, on May 27, 2016, the Unit 2 'C' RFP experienced speed oscillations due to an age-related failure of the Woodward controller secondary power supply, which resulted in an automatic recirculation runback to 53 percent rated thermal power (RTP). The power supply contained an electrolytic capacitor that had exceeded its shelf life per PES-S-002. This issue was entered into Exelon's corrective action program (CAP) under issue report (IR) 02691322. Exelon's corrective actions included replacement of the faulted power supply and an extent of condition (EOC) review of proper expiration date entry for shelf life program components.

The finding was more than minor because it was associated with the equipment performance attribute of the Initiating Events cornerstone and affected the cornerstone's objective of limiting the likelihood of events that upset plant stability during power operations. The inspectors evaluated the finding in accordance with Exhibit 1 of Inspection Manual Chapter (IMC) 0609, Appendix A, "SDP for Findings At-Power," and determined the finding was of very low safety significance (Green) because it did not cause 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. The inspectors determined that no cross-cutting aspect was applicable to this finding because the performance deficiency (PD) was not indicative of current performance. The PD occurred between 1997 and 1999 when the power supply expiration date was incorrectly coded in Exelon's work management process in accordance with PES-S-002. (Section 4OA3)

### Other Findings

None.

## REPORT DETAILS

### Summary of Plant Status

Unit 2 began the inspection period at 100 percent RTP. On September 2, 2016, operators reduced power to 59 percent RTP to support waterbox cleaning in order to improve degraded vacuum in the main condenser. The unit was returned to full power on September 3, 2016. The unit remained at 100 percent RTP except for brief periods to support planned testing and control rod pattern adjustments. The unit then began end-of-cycle coastdown for refueling outage (RFO) 2R21 on September 28, 2016, and ended the inspection period at 98 percent RTP.

Unit 3 began the inspection period at 100 percent RTP. On July 29, 2016, operators responded to a high differential alarm on the '3C' intake structure traveling screen by reducing power to 84 percent RTP and removing the '3C' circulating water pump from service. The unit was returned to full power that same day following the repairs. Unit 3 remained at 100 percent RTP until the end of the inspection period, except for brief periods to support planned testing and control rod pattern adjustments.

## 1 REACTOR SAFETY

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

#### 1R01 Adverse Weather Protection (71111.01 – 1 sample)

##### External Flooding

##### a. Inspection Scope

On August 29, 2016, the inspectors performed an inspection of the external flood protection measures for PB. The inspectors reviewed technical specification (TS), procedures, design documents, and Updated Final Safety Analysis Report (UFSAR) Chapter 2.3.4.5 and Appendix C.2.5.4, which depict the design flood levels and protection areas containing safety-related equipment. The inspectors conducted a walkdown of the internal and external features of the safety-related pump structure for Units 2 and 3 to ensure the station's flood protection measures were controlled in accordance with the design specifications. The inspectors also reviewed operating procedures for mitigating external flooding during severe weather to determine if Exelon planned or established adequate measures to protect against external flooding events. Documents reviewed for each section of this inspection report are listed in the Attachment.

##### b. Findings

No findings were identified.

## 1R04 Equipment Alignment

### Partial System Walkdowns (71111.04Q – 5 samples)

#### a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 2 and Unit 3 'A' standby gas treatment (SBGT) train with the 'B' SBGT train out of service (OOS) on July 7, 2016
- Unit 2 and Unit 3 'A' and 'B' emergency cooling tower cells with the 'C' cell OOS on July 25, 2016
- Unit 2 reactor core isolation cooling (RCIC) system during high-pressure coolant injection (HPCI) system testing on August 25, 2016
- Offsite power source alignment with the Unit 3 start-up source removed from service on September 13, 2016
- Unit 2 and Unit 3 'A' main control room emergency ventilation system during a planned E-4 emergency diesel generator (EDG) overhaul on September 22, 2016

The inspectors selected these systems based on their risk-significance relative to the Reactor Safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, TSS, work orders (WOs), IRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Exelon staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

#### b. Findings

No findings were identified.

## 1R05 Fire Protection

### .1 Resident Inspector Quarterly Walkdowns (71111.05Q – 6 samples)

#### a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Exelon controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for OOS, degraded or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Unit 3 hydraulic control unit area on July 25, 2016
- Unit 2 standby liquid control room on July 25, 2016
- Unit 2 and Unit 3 EDG building (E-1, E-2, E-3, and E-4 rooms) on July 26, 2016
- Unit 3 'C' residual heat removal room on July 28, 2016
- Unit 2 and Unit 3 station blackout building on August 8, 2016
- Unit 3 south isolation valve room on August 24, 2016

.2 Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed a fire brigade drill scenario conducted on September 20, 2016, that involved a breaker fire on the 135' elevation of the Unit 2 turbine building. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that PB personnel identified deficiencies, openly discussed them in a self-critical manner at the debrief, and took appropriate corrective actions as required. The inspectors evaluated the following specific attributes of the drill:

- Proper use of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate fire-fighting techniques
- Sufficient fire-fighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas
- Smoke removal operations
- Utilization of pre-planned strategies
- Adherence to the pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with Exelon's fire-fighting strategies.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to identify internal flooding susceptibilities for the site. The inspectors review focused on the Unit 3 RCIC room on August 1, 2016. The inspectors verified the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. It assessed the adequacy of operator actions that Exelon had identified as necessary to cope with flooding in this area and also reviewed the CAP to determine if Exelon was identifying and correcting problems associated with both flood mitigation features and site procedures for responding to flooding.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance  
(71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training scenarios on August 24, 2016, which included initiating events requiring primary and secondary containment control and reactor pressure vessel flooding actions. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classifications made by the shift manager and the TS action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed and reviewed the licensed operator performance from the main control room during the reactivity evolution listed below. The inspectors observed use of and compliance with procedures, crew communications, interpretation, diagnosis, and understanding of plant alarms, use of human error prevention techniques, documentation of activities, and management oversight of the evolution to verify that the crew was following procedures and plant expectations for conduct of operations.

- Unit 2 removal of the 5<sup>th</sup> stage 'A' and 'C' feedwater heaters on August 21, 2016
- Unit 2 downpowers to improve degraded main condenser vacuum on August 24-26 , 2016

The inspectors observed control room briefings and power changes. Additionally, the inspectors observed power changes to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 3 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structures, systems, and components (SSCs) performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance WOs, and maintenance rule (MR) basis documents to ensure that Exelon was identifying and properly evaluating performance problems within the scope of the MR. For each sample selected, the inspectors verified that the SSC was properly scoped into the MR in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by the Exelon staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2) status. Additionally, the inspectors ensured that Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule (MR) system boundaries.

- Unit 2 and Unit 3 'B' main stack radiation monitor failures on August 16, 2016
- Unit 2 and Unit 3 emergency service water (ESW) pump failures and quality control program on August 22-26, 2016
- Unit 2 and Unit 3 control room envelope system review on September 14-16, 2016

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Exelon performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the Reactor Safety cornerstones. As applicable for each activity, the inspectors verified that Exelon personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk.

The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 2 and Unit 3 planned extended diesel driven fire pump (DDFP) system outage window (SOW) and Unit 2 'D' high pressure service water (HPSW) pump OOS on July 6, 2016
- Elevated risk, Unit 2 during instrument nitrogen system check valve in-service test on July 20, 2016
- Unit 2 and Unit 3 planned maintenance on the E-2 EDG on August 2, 2016
- Yellow risk on Unit 2 during the 'A' HPSW / RHR emergent SOW on August 17, 2016
- Unit 3 HPCI unplanned maintenance on September 27, 2016

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 5 samples)

a. Inspection Scope

The inspectors reviewed operability determinations (ODs) for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Unit 2 and Unit 3 emergency service water micro switch failures on July 6, 2016
- Unit 3 elevated temperatures in the reactor water cleanup area and steam tunnel on July 20, 2016
- Unit 2 and Unit 3 E-2 EDG scissor lift seismic qualification on August 23, 2016
- Unit 2 and Unit 3 DDFP flame arrestor flood bypass on August 26, 2016
- Unit 2 and Unit 3 operator work arounds on September 1, 2016

The inspectors evaluated the technical adequacy of the ODs to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to Exelon's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations, including compliance with in-service testing requirements. Where compensatory measures were required to maintain operability, such as in the case of operator workarounds, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

Permanent Modifications

a. Inspection Scope

The inspectors reviewed the permanent modification of the DDFP controller, on July 7, 2016, to determine whether the modification affected the safety function of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modification to verify that the permanent modification did not degrade the design bases, licensing bases, and performance capability of the affected system.

b. Findings

No findings were identified

1R19 Post-Maintenance Testing (71111.19 – 6 samples)a. Inspection Scope

The inspectors reviewed the post-maintenance tests (PMTs) for the maintenance activities listed below to verify that procedures and test activities tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- Unit 2 RCIC following valve maintenance on July 20, 2016
- Unit 2 and Unit 3 E-2 EDG SOW on August 3, 2016
- Unit 2 and Unit 3 'B' main stack radiation monitor repairs on August 12, 2016
- Unit 2 'A' standby liquid control pump gasket replacement on September 1, 2016
- Unit 2 and Unit 3 E-4 EDG SOW on September 26, 2016
- Unit 3 HPCI pipe replacement on September 29, 2016

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)a. Inspection Scope

The inspectors observed performance of surveillance test (STs) and/or reviewed test data of selected risk-significant structures, systems, and components (SSCs) to assess whether test results satisfied TSs, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following STs:

- Unit 2 RHR 'A' loop pump, valve, and flow (PVF) test on July 8, 2016 (IST)
- Unit 2 and Unit 3 seismic monitor calibration and functional check on August 3-4, 2016 (ST)
- Unit 3 containment atmosphere control valve stroke time testing on August 12, 2016 (IST)
- Unit 3 RHR 'B' loop, PVF test on August 25, 2016 (IST)

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator Verification (71151)

##### .1 Safety System Functional Failures (2 samples)

###### a. Inspection Scope

The inspectors sampled PB's submittals for the Safety System Functional Failures performance indicator (PI) for both Unit 2 and Unit 3 for the period of July 1, 2015 through June 30, 2016. To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment PI Guideline," Revision 7, and NUREG-1022, Revision 3 "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed PBAPS's operator narrative logs, operability assessments, MR records, maintenance WOs, CRs, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

###### b. Findings

No findings were identified.

##### .2 Mitigating Systems Performance Index (10 samples)

###### a. Inspection Scope

The inspectors reviewed Exelon's submittal of the Mitigating Systems Performance Index for the following systems for the period of July 1, 2015 through June 30, 2016:

- Unit 2 and Unit 3 Emergency AC Power Systems (MS06)
- Unit 2 and Unit 3 HPCI Systems (MS07)
- Unit 2 and Unit 3 RCIC Systems (MS08)
- Unit 2 and Unit 3 RHR Systems (MS09)
- Unit 2 and Unit 3 Cooling Water Systems (MS10)

To determine the accuracy of the PI data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment PI Guideline," Revision 7. The inspectors also reviewed Exelon's operator narrative logs, condition reports, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

###### b. Findings

No findings were identified.

#### 4OA2 Problem Identification and Resolution (71152 – 2 samples)

##### .1 Routine Review of Problem Identification and Resolution Activities

###### a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Exelon entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. 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 CAP and periodically attended condition report screening meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Exelon performed an evaluation in accordance with 10 CFR Part 21.

###### b. Findings

No findings were identified.

##### .2 Annual Sample: Maintenance Department Decline in Standards

###### a. Inspection Scope

The inspectors performed an in-depth review of Exelon's analysis and corrective actions associated with condition report IR 2476355, "Maintenance Organization Subtle Decline in Standards," written on March 30, 2015. Specifically, PB maintenance department managers and supervisors were not always holding themselves and their departments accountable to high standards in the areas of IR generation and timeliness, clearance and tagging, troubleshooting, and meeting behaviors.

The inspectors assessed Exelon's problem identification threshold, apparent cause evaluation (ACE), and the prioritization and timeliness of Exelon's corrective actions to determine whether Exelon was appropriately identifying, characterizing, and correcting problems associated with this issue, and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Exelon's CAP and 10 CFR 50, Appendix B. In addition, the inspectors reviewed subsequent IRs, observed subsequent troubleshooting, clearance and tagging activities, and interviewed maintenance and work management personnel to assess the effectiveness of the implemented corrective actions.

###### b. Findings and Observations

No findings were identified.

On April 10, 2015, Exelon initiated an ACE to address a decline in standards within the maintenance department in the areas of IR generation and timeliness, clearance and tagging, troubleshooting, and meeting behaviors. The ACE concluded that gaps in performance areas were at times considered less consequential and inconsistently addressed through performance management. In addition, the ACE concluded through interviews that supervisors and managers believed performance management tools could be improved to allow more effective performance management of individuals.

Exelon implemented corrective actions, including actions such as a roll down communications from senior management reinforcing the consequence of not completing the aforementioned tasks with precision and rigor and the development of a template for department alignment plans including metrics.

The inspectors reviewed Exelon's corrective actions and have noted improvement within performance of the maintenance department. In general, IR generation and timeliness have improved, there have been a decrease in clearance and tagging issues over the past year, and troubleshooting has been more rigorous to identify causes for equipment failures. The inspectors did identify a PD for not generating IRs for defective commercial-grade micro switches used in safety-related 4kV breakers in accordance with PI-AA-120, "Corrective Action Procedure." PI-AA-120 states that IRs are required to be initiated if a "safety-related or critical component fails a bench test." Electrical maintenance technicians were appropriately discarding defective micro switches that had failed bench testing, however, were not initiating IRs so that Exelon could trend the issues in the CAP. The inspectors determined that the PD was minor because although electrical maintenance had not initiated IRs to be trended in the CAP, there was not an adverse impact to 4kV safety-related breaker performance as a specific result of the PD. Exelon generated IR 2711781 to document the inspectors' concern.

### .3 Annual Sample: Issue Report Initiation for Single Point Vulnerability Instruments

#### a. Inspection Scope

The inspectors performed an in-depth review of Exelon's analysis and corrective actions associated with condition report IR 2485800, "IR Initiation for Out-of-Calibration Instruments," written on April 15, 2015. Specifically, during an NRC Problem Identification and Resolution (PI&R) inspection, the inspectors identified that IRs were not initiated as required per Exelon procedure PI-AA-120, "CAP," for multiple out-of-calibration instruments that had been classified by Exelon as "Single Point Vulnerabilities." (See NRC Inspection Report 05000277/278/2015008, Section 4OA2.1)

The inspectors assessed Exelon's problem identification threshold, ACE, and the prioritization and timeliness of Exelon's corrective actions to determine whether Exelon was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Exelon's CAP and 10 CFR 50, Appendix B. In addition, the inspectors reviewed subsequent IRs, reviewed instrument calibration data sheets, and interviewed maintenance I&C personnel to assess the effectiveness of the implemented corrective actions.

#### b. Findings and Observations

No findings were identified.

On May 22, 2015, Exelon performed an ACE to address the PD, and as such, an EOC review was performed. As part of the EOC review, a random sampling of WOs were reviewed by the instrumentation & control (I&C) department beyond the scope of the NRC PI&R inspection. Additional out-of-calibration instruments were identified by I&C without required IRs being initiated. Exelon indicated in their ACE that a potential behavior gap existed within the I&C department for generating IRs. Exelon identified through interviews that confusion existed to what were the IR initiation requirements for an out-of-calibration instrument. A briefing sheet had been previously created by I&C

supervision to guide I&C technicians to initiate IRs for out-of-calibration instruments, however, the ACE concluded that communication within the maintenance department was less than adequate to ensure IRs were being generated. Corrective actions included supervisor stand downs with their respective I&C teams to disseminate the importance of IR initiation, including required sign-in sheets to be utilized to document attendance for all stand down meetings. A check-in assessment was also completed on August 29, 2015, which ensured all IRs were being generated for out-of-calibration instruments, and maintenance department managers and supervisors reinforced compliance with Exelon procedure ER-AA-520, "Instrument Performance Trending."

The inspectors reviewed Exelon's corrective actions and performed an additional sampling of out-of-calibration data sheets following these corrective actions, and did not identify any gaps within the past year. The inspectors determined that the I&C department was appropriately identifying and documenting deficient conditions in the CAP in accordance with PI-AA-120. However, the inspectors identified similar CAP implementation concerns in the electrical maintenance department and that opportunities for cross-disciplined learnings were missed concerning initiating IRs for conditions required by PI-AA-120. The inspectors concern was documented in the CAP as IR 2711781 and the inspectors determined that the issue was minor.

#### 4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample)

##### Plant Events

##### a. Inspection Scope

For the plant event listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR Parts 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the events to assure that Exelon implemented appropriate corrective actions commensurate with their safety significance.

- Unit 2 'C' RFP emergent trip due to erratic operation, and recirculation run back to 53 percent RTP on May 27, 2016

##### b. Findings

Introduction. A self-revealing finding (FIN) of very low safety significance (Green) was identified for Exelon's failure to maintain the Unit 2 'C' RFP Woodward controller secondary power supply in accordance with PES-S-002, Exelon's Shelf life Program. Specifically, on May 27, 2016, the Unit 2 'C' RFP experienced speed oscillations due to an age-related failure of the Woodward controller secondary power supply which resulted in an automatic recirculation runback to 53 percent RTP. The power supply contained an electrolytic capacitor that had exceeded its shelf life per PES-S-002.

Description. PB Unit 2 has three turbine-driven RFPs. The RFPs are part of the feedwater system, which purifies and preheats condensed steam from the main condenser before returning it to the reactor vessel. The RFPs are operated by a control system, consisting of two control loops: a digital feedwater control system and Woodward 501 controller. The digital feedwater control system monitors reactor water level and sends a demand signal to the Woodward 501 controller, which then operates an electro-hydraulic actuator that is mechanically linked to an operating cylinder. This operating cylinder controls steam flow to the RFP turbine, thereby, controlling the flowrate of water pumped through the RFPs.

On May 27, 2016, Unit 2 operators observed an immediate step change to zero flow from the 'C' RFP. The loss of 'C' RFP flow caused reactor water level to decrease to 17 inches, resulting in a 45 percent recirculation pump runback and power decrease to 53 percent RTP. Following the initial transient, the 'C' RFP flow rapidly increased resulting in a rise in reactor vessel level to 33 inches, 10 inches above the nominal set point. The 'C' RFP flow oscillated back to zero flow, causing reactor water level to trend downwards. Operators recognized the erratic behavior of the oscillations and emergency stopped the Unit 2 'C' RFP.

Exelon determined through troubleshooting that the 'C' RFP's Woodward controller had an overheated power supply. Further analysis of the 'C' RFP's Woodward controller power supply identified the cause to be an age-related failure of an electrolytic capacitor installed within the Woodward controller secondary power supply. The secondary power supply had been replaced in June 2015 with a power supply that been stored in the warehouse for 18 years prior to installation.

Exelon performed an ACE and determined that back in May 1997, Exelon assigned the secondary power supply a defined shelf life, but incorrectly coded the component in their work management system without specifying an expiration date. In August 1999, Exelon created their current shelf life program, PES-S-002, and performed a review of in-stock warehouse parts to validate compliance with the program requirements. However, due to the incorrect expiration date entry, the Woodward secondary power supply was never maintained in accordance with PES-S-002 and, as a result, the power supply experienced an age-related failure, causing RFP oscillations and an unplanned Unit 2 down power to 53 percent RTP.

Exelon's Shelf Life Program states that any items containing aluminum electrolytic capacitors are to have a maximum 10-year shelf life. The Unit 2 'C' RFP Woodward controller secondary power supply contains aluminum electrolytic capacitors and, therefore, should have been prescribed a maximum 10-year shelf life in compliance with PES-S-002. Because the secondary power supply was not properly tracked in Exelon's Shelf Life Program, the power supply was not sent out for refurbishment when it exceeded its 10-year shelf life. This issue was entered into Exelon's CAP under IR 02691322. Exelon's corrective actions included replacement of the faulted power supply and performed an EOC review of proper expiration date entry for shelf life program components.

Analysis. Exelon's failure to maintain the Unit 2 'C' RFP Woodward controller secondary power supply, in accordance with PES-S-002, was a PD that was within their ability to foresee and correct and should have been prevented. The finding was more than minor because it was associated with the equipment performance attribute of the initiating events cornerstone and affected the cornerstone's objective of limiting the likelihood of events that upset plant stability during power operations.

The inspectors evaluated the finding in accordance with Exhibit 1 of IMC 0609, Appendix A, "SDP for Findings At-Power," and determined the finding was of very low safety significance (Green) because it did not cause 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. The inspectors determined that no crosscutting aspect was applicable to this finding because the PD was not indicative of current performance. The PD occurred between 1997 and 1999 when the expiration date was incorrectly coded in Exelon's work management process in accordance with PES-S-002.

Enforcement. The finding does not involve enforcement action because the inspectors did not identify a violation of regulatory requirements associated with this finding. Because the finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as a Finding. (FIN 05000277/2016003-01, Reactor Feed Pump Controller Power Supply Shelf Life Not Maintained)

#### 4OA6 Meetings, Including Exit

##### Quarterly Resident Exit Meeting Summary

On October 14, 2016, the inspectors presented the inspection results to Mr. Michael Massaro, Peach Bottom, Site Vice President and other members of Exelon's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

#### **ATTACHMENT: SUPPLEMENTARY INFORMATION**

**SUPPLEMENTARY INFORMATION****KEY POINTS OF CONTACT**Exelon Generation Company Personnel

M. Massaro, Site Vice President  
 P. Navin, Plant Manager  
 J. Armstrong, Regulatory Assurance Manager  
 P. Breidenbaugh, Maintenance Director  
 D. Dullum, Regulatory Assurance Engineer  
 J. Fogarty, Nuclear Steam Supply Systems Manager  
 D. Henry, Engineering Director  
 B. Holmes, Radiation Protection Manager  
 P. Kester, Engineer  
 J. Koester, Fire Marshall  
 J. Lucas, Engineer  
 B. Miller, Engineer  
 M. Retzer, Systems Engineering Senior Manager  
 M. Rector, Engineering Response Team Manager  
 D. Turek, Operations Director  
 M. Weidman, Work Management Director  
 C. Weichler, Manager of Operations Support and Services

**LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**Opened/Closed

05000277/2016003-01	FIN	Reactor Feed Pump Controller Power Supply Shelf Life Not Maintained (Section 4OA3)
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**LIST OF DOCUMENTS REVIEWED**

\*-- Indicates NRC-identified

Section 1R01: Adverse Weather ProtectionProcedures

AO 56E.5-3, Emergency Load Centers Deenergization and Reenergization, Revision 20  
 COL 48.1.A, Emergency Cooling Water System, Revision 12  
 SE-4, Flood, Revision 39  
 SO 48.1.A, Emergency Cooling Water System Setup for Normal Standby Operation, Revision 5  
 SO 48.8.A, Emergency Cooling Water System Routine Inspection While in Standby Condition,  
 Revision 4

ARs

A1521009

A1967718

IRs

2712694

2711402

\*2708422

2711839

718722

Drawing

6280-M-330, Emergency Cooling System, Revision 37

Section 1R04: Equipment Alignment

Procedures

SO 9A.1.A COL, Standby Gas Treatment System Automatic Operation, Revision 10

SE-11, Loss of Off-site Power Bases, Revision 21

SE-11, Attachment O – Operation of RHR and HPSW Backup Power Supplies, Revision 1

SE-11, Attachment P – Generic Load Management Contingency during LOOP Events,  
Revision 11

SO 13.1.A-2 COL, RCIC System, Revision 24

SO 40D.7.B, Place Control Room Emergency Ventilation in Service from the Control Room,  
Revision 14

Drawings

SE-11, Loss of Off-site Power, Revision 0

6280-M-384, Control Room HVAC, Sheet 1, Revision 40

6280-M-384, Control Room HVAC, Sheet 2, Revision 6

6280-M-384, Control Room HVAC, Sheet 3, Revision 6

Miscellaneous

Clearance 16000897, 'B' Standby Gas Treatment SOW

Section 1R05: Fire Protection

Procedures

PF-0, PB Pre-Fire Strategy Plan, Revision 9

PF-5K, Unit 2 RB; General Area – Elevation 195', Revision 7

PF-11, Unit 3 Reactor Building (RB); 3 'C' RHR Pump and Heat Exchanger Room, Revision 4

PF-13H, Unit 3 RB; North CRD Equipment & West Corridor Elevation 135'-0", Revision 8

PF-13P, Unit 3 RB; South CRD Equipment and East Corridor Elevation 135'-0", Revision 8

PF-19, Unit 2 RB; South Isolation Valve Room – Elevation 135', Revision 5

PF-23, Unit 2 RB; North Isolation Valve Room – Elevation 135', Revision 4

PF-27, Unit 3 RB; North Isolation Valve Room – Elevation 135', Revision 6

PF-31, Unit 3 RB; South Isolation Valve Room – Elevation 135', Revision 7

PF-79A, Unit 2 & Unit 3 Turbine Building, ISO Phase Bus & Common Area – Elevation 135',  
Revision 9

PF-132, Diesel Generator Building, General Area – Elevation 127'-0", Revision 9

PF-165, SBO Building, Revision 2

RT-F-101-922-2, Fire Drill, Revision 3

IRs

2696532	2696571	*2700034	*2710113	*2712691	2717644
2717670					

WOs

R1234183

Drawings

A-486, Barrier Plans Elevation 135', Revision 10

Section 1R06: Flood Protection Measures

Drawings

Drawing A-484, Barrier Plans Elevation 91'6", Revision 8

Drawing PD-25, Sheet Number 1, Typical Penetration Seal Detail Link Seals, Revision 0

Drawing 6280-M-3010, Sheet 58, Typical 3 hour Fire Barrier Penetrations, Revision 9

Miscellaneous

DBD No. P-T-09, Internal Hazards, Revision 11

PM-1048 Design Basis for Internal Flood Protection for the HPSW/ESW Pump Structure

IN-2012-001 Seismic Considerations – Principally Issues Involving Tanks

Design Information Report, PB Units 2 and 3, dated November 1969

Section 1R11: Licensed Operator Regualification Program

Procedures

AO 1E.4-2, Planned Removal of the Fifth or Fourth Stage Feedwater Heaters from Service during End of Cycle Coastdown, Revision 21

PSEG-0314R, T-102 Primary Containment Control, Revision 40

PSEG-0315R, T-103 Secondary Containment Control, Revision 34

PSEG-0317R, T-116 RPV Flooding, Revision 22

GP-5-3 Exhibit 2, MELLLA+ Feedwater Temperature Reduction Curve, Revision 0

Miscellaneous

Work Week Schedule and Plans

ECR PB 15-00418-000, Unit 2 Circulating Screen Failed to Start on High Differential Level

GP-5-2, Power Operations, Revision 3

GP-5-3 Exhibit 2, Unit 2 MELLLA+ Feedwater Temperature Reduction Curve, Revision 0

Section 1R12: Maintenance Effectiveness

Procedures

ER-AA-310-1004, MR – Performance Monitoring, Revision 13

GP-30, Control Room Envelope Boundary Integrity, Revision 4

OP-AA-108-115, Attachment 1, Operability Evaluation, Revision 17

PI-AA-120, Attachment 4, Functional Area Threshold Guidance (CAP and Non-CAP), Revision 6

SM-AA-3019, Parts Quality Process, Revision 2

ST-O-40D-327-2, Control Room Emergency Ventilation Capability Test, Revision 3

ARs

A1632646

A2049815

IRs

1341267	2485920	2494228	2587570	2616098	2620268
2634743	2660474	2668556	2671849	2681397	2688934
2689001	2692220	2702804	*2711781	2712421	2712490
2712850					

Drawings

Electrical Drawing, E-7-83, Metal Clad Switchgear Inspection Box, Revision 0

Miscellaneous

Draft Regulatory Guide DG-1292, June 2016

ECR PB 15-00418000, Unit 2 Circ Screen Failed to Start on High Differential Level

MR Monthly Monitoring Evaluations

PB Inventory Parts Catalog, dated 8/25/16

PB Inventory Parts Catalog, dated 8/29/16

PEA MRC Agendas for Monday 8/22/16 and Tuesday 8/23/16

Section 1R13: Maintenance Risk Assessments and Emergent Work ControlProcedures

ST-M-016-400-2, Instrument Nitrogen System Check Valve In-service Test, Revision 14

CC-PB-309-2001, Heavy Loads Design Guide, Revision 0

SA-AA-115, Work at Heights, Revision 13

IRs

*2700034	2704854	*2710113	*2712691
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AR

A2056696

Miscellaneous

Protected Equipment Status Sheets

Risk Profiles for 7/6/2016; 7/20/2016; 8/2/2016; 8/17/2016; 9/27/2016

1R15: Operability Determinations and Functionality AssessmentsProcedures

OP-AA-102-103, OWA Program, Revision 4

OP-AA-102-103-1001, Operator Burden and Plant Significant Decisions Impact Assessment Program, Revision 7

CC-PB-309-2001, Heavy Loads Design Guide, Revision 0

SA-AA-115, Work at Heights, Revision 13

OP-AA-108-115, Attachment 1, Operability Evaluation, Revision 17

PI-AA-120, Attachment 4, Functional Area Threshold Guidance (CAP and Non-CAP), Revision 6

SM-AA-3019, Parts Quality Process, Revision 2

ARs

A1790319	A2052999	A2005082	A2032624	A2051826	A2052927
A2053315	A2050585				

IRs

2702895	2704228	2708422	2711402	2708624	2718722
2711839	2712051	2674524	2701766	2708895	

Section 1R18: Plant ModificationsProcedures

ARC-201, Diesel Fire Pump Trouble, Revision 8  
 ST-O-37D-372-2, DDFP Battery Check, Revision 11  
 ST-O-37D-370-2, DDFP Operability Test, Revision 34  
 RT-O-37D-39-2, DDFP Engine Controller Test, Revision 4

Drawings

6280-M-318, Fire Protection System, Revision 70

IRs

2691510	2691544	2691542	2691539	2691462	2691152
2691150	2691140	2691009	2690973	2690961	2690147

WOs

C0248705	R1355635	R1355641	R1355639	R1355637	R1260362
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Miscellaneous

ECR 13-00222, Revision 0

Section 1R19: Post-Maintenance TestingProcedures

ST-O-013-301-2, RCIC Pump Valve Flow and Unit Cooler Functional and In-service Test, Revision 48  
 ST-O-052-202-2, E2 Diesel Generator Slow Start and Full Load Test, Revision 22  
 SI2R-63F-050-B1FQ, Main Stack Rad Monitor RY-0-17-00B Functional Check, Revision 14  
 CH-925, Obtaining a Gas Sample from the Main Stack and Roof Vents Following Accident Conditions, Revision 5  
 CH-916, Obtaining the Iodine and Particulate Samples from the Main Stack and Roof Vents Following Accident Conditions, Revision 6  
 ST-O-011-611-2, Standby Liquid Control System Piping Pressure Test Inspection, Revision 3  
 SO 23.1.B-3, HPCI System Manual Operation, Revision 22

ARs

A2056096  
 A1867898

IRs

1390982	2460662	2494228	2703592	2711449	2711451
2720241					

WOs

R0993370	R1284505	R1290666	R1356857	M1990588	M1990035
M1985431	C0243968				

Miscellaneous

PBAPS Plan by System Window dated August 29, 2016

Section 1R22: Surveillance Testing

Procedures

ER-AA-321-1007, Evaluation of Preconditioning Acceptability, Revision 1  
ER-AA-425, Implementation of the TS Surveillance Frequency Control Program, Revision 1  
ER-AA-425-1001, Surveillance Test Interval (STI) Evaluation Form, Revision 1  
SI2S-7-SSA3-XXC2, Calibration Check of Triaxle Time-History Accelerograph and  
Central Recording Equipment, Revision 10  
SI2S-67-SSA3-XXMM, Channel Check of Solid State Accelerograph, Revision 6  
ST-O-010-302-2, 'A' RHR Loop Pump, Valve, Flow, and Unit Cooler Functional and Inservice  
Comprehensive Test, Revision 7  
ST-O-010-306-3, 'B' RHR Loop Pump, Valve, Flow, and Unit Cooler Functional and Inservice  
Test, Revision 44  
ST-O-010-616-3, RHR LOOP B Piping Pressure Test Inspection, Revision 4

IRs

2702529  
2703905  
2708248

WO

R1288111  
R1355319

Miscellaneous

Narrative Logs, Log Entries Search Report dated August 25, 2016

Section 4OA1: Performance Indicator Verification

Procedures

ER-AA-2008, Mitigating Systems Performance Index (MSPI), Revision 4

IRs

2673479  
2606215  
2622090

Miscellaneous

Reactor Oversight Program MSPI Basis Document PBAPS, Revision 12  
MSPI Data Sheets for Unit 2 and Unit 3, Emergency AC Power, RHR, HPCI, RCIC, HPSW,  
and ESW Systems

Section 4OA2: Problem Identification and Resolution

Procedures

PI-AA-120, Issue Identification and Screening Process, Revision 6  
PI-AA-125, Corrective Action Program CAP Procedure, Revision 4  
PI-AA-125-1006, Investigation Techniques Manual, Revision 2  
PI-AA-115, Operating Experience Program, Revision 1

IRs

2476355      2485800      2699679      2699774

Miscellaneous

ACE for IR 2476355 MCA PG 2015: Subtle Decline in Standards

ACE for IR 2485800 IR Generation for Single Point Vulnerabilities

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures

OP-AA-106-101, Significant Event Reporting, Revision 19

PES-S-002, Shelf Life, Revision 0

PES-S-002, Shelf Life, Revision 8

MA-AA-716-004, Attachment 2, Complex Troubleshooting, Revision 12

IR

2720241

**LIST OF ACRONYMS**

AC	alternating current
ACE	apparent cause evaluation
CAP	corrective action program
CFR	Code of Federal Regulations
CR	condition report
CS	core spray
DDFP	diesel driven fire pump
EDG	emergency diesel generator
EOC	extent-of-condition
ESW	emergency service water
FIN	finding
HPCI	high-pressure coolant injection
HPSW	high-pressure service water
IMC	inspection manual chapter
IR	issue report
MR	maintenance rule
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OD	operability determination
OOS	out of service
OWA	operator work around
PARS	publicly available records
PB	Peach Bottom Atomic Power Station
PD	performance deficiency
PI	performance indicator
PMTs	post-maintenance testing
PVF	pump, valve and flow
RCIC	reactor core isolation cooling
RFO	refueling outage
RFP	reactor feed pump
RG	regulatory guide
RHR	residual heat removal
RCS	reactor coolant system
RTP	rated thermal power
SBGT	standby gas treatment
SDP	significance determination process
SOW	system outage window
SSCs	structures, systems, and components
ST	surveillance test
TS	technical specification
UFSAR	Updated Final Safety Analysis Report
WOs	work orders