



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

May 11, 2017

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

**SUBJECT: PEACH BOTTOM ATOMIC POWER STATION - PROBLEM IDENTIFICATION  
AND RESOLUTION INSPECTION REPORT 05000277/2017008 AND  
05000278/2017008**

Dear Mr. Hanson:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution inspection at the Peach Bottom Atomic Power Station (PB), Units 2 and 3. The NRC inspection team discussed the results of this inspection with Mr. Matt Herr, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspection team reviewed the station's corrective action program and the station's implementation of the program to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC's regulations and licensee standards for corrective action programs. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

The team also evaluated the station's processes for use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

Finally, the team reviewed the station's programs to establish and maintain a safety-conscious work environment, and interviewed station personnel to evaluate the effectiveness of these programs. Based on the team's observations and the results of these interviews, the team found no evidence of challenges to your organization's safety-conscious work environment. Your employees appeared willing to raise nuclear safety concerns through at least one of the several means available.

NRC inspectors documented two findings of very low safety significance (Green) in this report. Each of these findings involved a violation of NRC's requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

B. Hanson

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If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC's Resident Inspector at Peach Bottom. In addition, if you disagree with a cross-cutting aspect assignment, 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's 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's Public Document Room in accordance with 10 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

Enclosure:  
Inspection Report 05000277/2017008  
and 05000278/2017008 w/Attachment:  
Supplementary Information

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SUBJECT: PEACH BOTTOM ATOMIC POWER STATION - PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000277/2017008 AND 05000278/2017008 DATED MAY 11, 2017

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket Nos. 50-277 and 50-278

License Nos. DPR-44 and DPR-5656

Report Nos. 05000277/2017008 and 05000278/2017008

Licensee: Exelon Generation Company, LLC

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

Location: Delta, Pennsylvania

Dates: March 13-17, 2017  
March 27-31, 2017

Team Leader: David Kern, Senior Reactor Inspector

Inspectors: Justin Heinly, Senior Resident Inspector  
Ross Telson, Reactor Operations Engineer  
Sarah Elkhiamy, Project Engineer

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

Enclosure

## SUMMARY

IR 05000277/2017008 and 05000278/2017008; 3/13 – 3/31/2017; Peach Bottom Atomic Power Station Units 2 and 3; Biennial Baseline Inspection of Problem Identification and Resolution. The inspectors identified two findings in the area of effectiveness of corrective actions.

This NRC team inspection was performed by one NRC headquarters inspector, two regional inspectors, and one resident inspector. The inspectors identified two findings of very low safety significance (Green) during this inspection and classified these findings as non-cited violations. 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, dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, Components Within Cross-Cutting Areas, dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated July 7, 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.

### Problem Identification and Resolution

The inspectors concluded that Exelon was generally effective in identifying, evaluating, and resolving problems. Exelon personnel identified problems, entered them into the corrective action program at a low threshold, and prioritized issues commensurate with their safety significance. Exelon appropriately screened issues for operability and reportability, and performed causal analyses that appropriately considered extent-of-condition, generic issues, and previous occurrences. The inspectors also determined that Exelon usually implemented corrective actions to address the problems identified in the corrective action program in a timely manner. However, the inspectors identified two violations of NRC requirements, both in the area of effectiveness of corrective actions.

The inspectors concluded that Exelon adequately identified, reviewed, and applied relevant industry operating experience to Peach Bottom operations. In addition, based on those items selected for review, the inspectors determined that Exelon's self-assessments and audits were thorough.

Based on the interviews the inspectors conducted over the course of the inspection, observations of plant activities, and reviews of individual corrective action program and employee concerns program issues, the inspectors did not identify any indications that site personnel were unwilling to raise safety issues.

### **Cornerstone: Mitigating Systems**

- Green. The inspectors identified a non-cited violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, because Exelon did not implement corrective actions in a timely manner to correct a condition adverse to quality on the '2C' core spray motor. Specifically, Exelon did not perform appropriate corrective actions to evaluate and address an increasing motor bearing vibration trend that had existed for over ten years. Consequently, motor vibration reached the fault level established in Exelon's vibration analysis procedure.

The finding was more than minor, because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely impacted the cornerstone objective to ensure the reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

In accordance with IMC 0609.04, Initial Characterization of Findings, dated October 7, 2016, and Exhibit 1 of IMC 0609, Appendix A, The SDP for Findings At-Power, dated June 19, 2012, the inspectors determined this finding was of very low safety significance because the performance deficiency did not impact the design or qualification of the component, did not result in a loss of system function, did not result in the loss of function of a train greater than its Tech Spec allowed outage time, and did not represent an actual loss of function for a high safety significant component in accordance with Exelon's maintenance rule program. The inspectors determined the finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Exelon did not take effective corrective actions in a timely manner commensurate with the safety significance of the issue. Specifically, corrective actions to address the elevated vibrations on the '2C' core spray motor were not implemented before motor vibration reached the fault level and adversely impacted the long-term reliability of the motor. [P.3] [Section 4OA2.1.c (1)]

### **Cornerstone: Barrier Integrity**

- Green. The inspectors identified a self-revealing non-cited violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, because Exelon did not promptly implement corrective actions to address a condition adverse to quality on two containment isolation valves. Specifically, drywell air sampling valves SV-3-7D-3671A and SV-3-7D-3671D failed to perform their primary containment isolation function on March 15 and September 26, 2016, respectively, as a result of untimely corrective actions to address elevated leakage. The valve internals were repaired, declared operable, and the issue was entered into the corrective action program (IR 3990490).

The finding was more than minor, because it was associated with the barrier performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone's objective to provide reasonable assurance that the containment design barrier protect the public from radionuclide releases caused by accidents or events. In accordance with IMC 0609.04, Initial Characterization of Findings, dated October 7, 2016, and Exhibit 1 of IMC 0609, Appendix A, The SDP for Findings At-Power, dated June 19, 2012, the inspectors determined this finding was of very low safety significance, because the finding did not result in an actual open pathway in the physical integrity of the reactor containment or involve an actual reduction in the function of hydrogen igniters in the reactor containment. The inspectors determined this finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Exelon did not perform effective corrective actions in a timely manner commensurate with the safety significance of the issue. Specifically, corrective actions to address a CAQ on SV-3-7D-3671A and SV-3-7D-3671D were delayed which resulted in the valves failing their LLRT and being declared inoperable. [P.3] [Section 4OA2.1.c (2)]

## REPORT DETAILS

### 4. OTHER ACTIVITIES (OA)

#### 4OA2 Problem Identification and Resolution (71152B)

This inspection constitutes one biennial sample of problem identification and resolution as defined by Inspection Procedure 71152. All documents reviewed during this inspection are listed in the Attachment to this report.

#### .1 Assessment of Corrective Action Program Effectiveness

##### a. Inspection Scope

The inspectors reviewed the procedures that described Exelon's corrective action program at Peach Bottom. To assess the effectiveness of the corrective action program, the inspectors reviewed performance in three primary areas: problem identification, prioritization and evaluation of issues, and corrective action implementation. The inspectors compared performance in these areas to the requirements and standards contained in 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, and Exelon procedure PI-AA-125, Corrective Action Program (CAP) Procedure. For each of these areas, the inspectors considered risk insights from the station's risk analysis and reviewed CAP issue reports selected across the seven cornerstones of safety in the NRCs Reactor Oversight Process. Additionally, the inspectors attended multiple Station Ownership Committee and Management Review Committee meetings. The inspectors selected items from the following functional areas for review: engineering, operations, maintenance, emergency preparedness, radiation protection, physical security, Maintenance Rule, and oversight programs.

##### (1) Effectiveness of Problem Identification

In addition to the items described above, the inspectors reviewed system health reports, a sample of completed corrective and preventative maintenance work orders, completed surveillance test procedures, operator logs, and periodic trend reports. The inspectors also performed field walkdowns of various systems in both Units 2 and 3 and common areas, which included the high pressure coolant injection, core spray, residual heat removal, control rod drive, emergency service water, and high pressure service water systems, vital 4 kV and 480 volt electrical buses, remote shutdown control panels, and the central alarm station. Additionally, the inspectors reviewed a sample of issue reports written to document issues identified through internal self-assessments, audits, emergency preparedness drills, and the operating experience program. The inspectors completed this review to verify that Exelon entered conditions adverse to quality into their CAP, as appropriate.

##### (2) Effectiveness of Prioritization and Evaluation of Issues

The inspectors reviewed the evaluation and prioritization of a sample of issue reports issued since the last NRC biennial problem identification and resolution inspection completed in June 2015. The inspectors also reviewed issue reports that were assigned lower levels of significance that did not include formal cause evaluations to ensure that they were properly classified. The inspectors' review included the appropriateness of the assigned significance, the scope and depth of causal analysis, and resolution timeliness. The inspectors assessed whether the evaluations identified likely causes for the issues and developed appropriate corrective actions to address the identified causes.

Further, the inspectors reviewed equipment operability determinations, reportability assessments, and extent-of-condition reviews for selected problems to verify these processes adequately addressed equipment operability, reporting of issues to the NRC, and the extent of the issues.

### (3) Effectiveness of Corrective Actions

The inspectors reviewed Exelon's completed corrective actions through documentation review and, in some cases, field walkdowns to determine whether the actions addressed the identified causes of the problems. The inspectors also reviewed issue reports for adverse trends and repetitive problems to determine whether corrective actions were effective in addressing the broader issues. The inspectors reviewed Exelon's timeliness in implementing corrective actions and effectiveness in precluding recurrence for significant conditions adverse to quality. The inspectors also reviewed a sample of CAP issue reports associated with selected non-cited violations and findings to verify that Exelon personnel properly evaluated and resolved these issues. In addition, the inspectors expanded the corrective action review to five years to evaluate Exelon's actions related to the Unit 2 high pressure coolant injection system and the containment isolation valve local leak rate test program.

#### b. Assessment

##### (1) Effectiveness of Problem Identification

Based on the selected samples, plant walkdowns, and interviews of site personnel in multiple functional areas, the inspectors determined that Exelon identified problems and entered them into the CAP at a low threshold. Exelon's staff at Peach Bottom initiated approximately 24,000 issue reports between January 2015 and January 2017. The inspectors observed supervisors at the Station Ownership Committee meetings appropriately questioning and challenging issue reports to ensure clarification of the issues. Based on the samples reviewed, the inspectors determined that overall Exelon trended equipment and programmatic issues, and appropriately identified problems in issue reports. The inspectors verified that conditions adverse to quality identified through this review were entered into the CAP as appropriate. The inspectors also concluded that personnel were identifying trends at low levels.

Additionally, the inspectors identified two minor observations regarding effectiveness of problem identification, which had not been entered into the CAP.

- Informal Markings Used for Equipment Configuration Control

Informal ink markings were added to the '2B' core spray pump room cooler controller and the reactor water cleanup demineralizer temperature gage as operator aides to help maintain equipment configuration. Station procedures for use of operator aides and equipment labeling did not permit use of informal markings to control equipment position.

- Service Water Expansion Joints Inspection Interval Deviation

The inspectors identified that service water rubber expansion joints were inspected at a 6 year interval instead of a 2 year interval as specified by Rubber Expansion Joint and Rubber Hose Preventative Maintenance Template, Revision 0. No technical justification had been developed to support inspecting the expansion joints less often than specified. The inspectors walked down the expansion joints and no significant signs of degradation were evident.



The inspectors determined both issues were performance deficiencies, because Exelon did not identify the conditions adverse to quality and enter them into the CAP. Following discussion with the inspectors Exelon promptly entered the issues into the CAP (issue reports 3990400 and 3992060), determined neither issue adversely effected availability, reliability, or operability of the core spray or service water systems, and initiated action to correct the deficiencies. The inspectors independently screened both performance deficiencies in accordance with IMC 0612, Appendix B, Issue Screening, and determined that the issues were of minor significance and, therefore, were not subject to enforcement action in accordance with the NRC's Enforcement Policy.

## (2) Effectiveness of Prioritization and Evaluation of Issues

The inspectors determined that, in general, Exelon appropriately prioritized and evaluated issues commensurate with the safety significance of the identified problem. Exelon screened issue reports (IRs) for operability and reportability, categorized issue reports by significance, and assigned actions to the appropriate department for evaluation and resolution. The issue report screening process considered human performance issues, radiological safety concerns, repetitiveness, adverse trends, and potential impact on the safety conscious work environment.

Based on the sample of issue reports reviewed, the inspectors determined the guidance provided by Exelon CAP implementing procedures was sufficient to support consistent categorization of issues. Operability and reportability determinations were generally performed when conditions warranted and in most cases, the evaluations supported the conclusion. Causal analyses appropriately considered the extent-of-condition or problem, generic issues, and previous occurrences of the issue.

However, the inspectors identified several recent issues associated with misclassification of CAP assignments as enhancement assignments (ACITs) instead of corrective action assignments (CAs) for conditions adverse to quality as specified by Exelon procedures. The CAP process permits an ACIT assignment to be closed without management review. A corrective action assignment type would require further management review prior to closure. As a result resolution of issues have not been timely in some instances. The inspectors discussed this observation with the Peach Bottom CAP coordinator and other plant staff. Exelon acknowledged the concern and initiated action to evaluate and address the issue through the CAP (IR 3992162). Examples include the two findings documented in section 4OA2.1 of this report and two findings documented in recent NRC inspection reports (NCV 05000277(278) /2016002-02 and NCV 05000277/2016004-01). The inspectors also identified several additional examples of untimely resolution of conditions adverse to quality as described below:

- Unverified Design Basis Assumptions for Internal Flood Mitigation

Safety-related high pressure service water (HPSW) and emergency service water (ESW) pumps are located in two rooms that share a common drain system within the pump structure. PM-1048, Internal Flood Protection Design Basis for HPSW/ESW Structure, Revision 1, design input 3.4 states, HPSW/ESW pump room level alarm instruments LS-4155 and LS-5155 have a setpoint 6 inches above floor elevation. In 2014, NRC inspectors questioned the adequacy of pump structure level instrument and alarm testing to validate design calculation assumptions for operator response time to mitigate internal pump room flooding. Issue report 1636300 was initiated to address this concern.

During this inspection, the inspectors noted station personnel had assigned an ACIT (enhancement) assignment type and closed IR 1636300 with no action taken. No maintenance or suitable testing was performed to verify the level alarm setpoint design bases assumption. The inspectors determined the failure to promptly correct this condition adverse to quality was a performance deficiency. The inspectors independently screened the performance deficiency in accordance with IMC 0612, Appendix B, Issue Screening, and determined the issue was of minor significance and, therefore, was not subject to enforcement action in accordance with the NRC's Enforcement Policy. Specifically, station personnel tested the level instrument alarms and determined there was sufficient margin in the design calculation to ensure adequate operator response time to mitigate pump structure internal flooding. Exelon documented this issue in the CAP (IRs 3990496; 3990632; 3990633; 3990929; 3991479 and 3991882).

- Untimely Corrective Action to Address Degraded Feedwater Check Valve Performance

On October 24, 2014, IR 2402909 documented a failure of two containment isolation check valves (CHK-2-06-28A and CHK-2-06-96A) in a single penetration which resulted in the loss of the containment safety function. The condition was documented in the Peach Bottom Unit 2 Licensee Event Report 2014-003 which was reviewed and closed in NRC Inspection Report No. 05000277(278)/2015002. Exelon determined the cause of the check valve failures was internal wear due to being in service beyond their preventive maintenance (PM) periodicity of 16 years. Exelon implemented a corrective action to reinstitute the 16 year PM frequency to ensure valve wear was identified and corrected prior to valve failure. The extent-of-condition population consisted of six other feedwater check valves. Corrective actions included scheduling the oldest of the valves first for the overhaul PM.

The inspectors reviewed the prioritization and implementation of the corrective actions associated with IR 2402909 corrective actions. The inspectors determined station personnel subsequently deferred the scheduled PM on Unit 3 feedwater check valve CHK-3-06-28B beyond its originally scheduled corrective action due date, which resulted in the valve being in service beyond its 16 year PM frequency. The inspectors determined the untimely implementation of the corrective actions to perform the PM was a performance deficiency. The inspectors independently screened the performance deficiency in accordance with IMC 0612, Appendix B, "Issue Screening," and determined the issue was of minor significance and, therefore, were not subject to enforcement action in accordance with the NRC's Enforcement Policy. Specifically, CHK-3-06-28B passed its latest LLRT surveillance test and had been in service for less time than the valves that failed in 2014. Exelon documented the issue in the CAP (IR 3991450).

- Inconsistent Assignment of Corrective Action to address Severity Level 3 Issue Reports

Exelon performed a CAP program self-assessment in early 2017. The self-assessment identified that station personnel did not consistently assign CA assignment types or develop causal statements for significance level 3 IRs as required by CAP program procedures. The inspectors independently screened the performance deficiency in accordance with IMC 0612, Appendix B, "Issue Screening," and determined the issue was of minor significance and, therefore, were not subject to enforcement action in accordance with the NRC's Enforcement Policy.

Specifically, the self-assessment did not identify any specific safety issues that resulted from this deficient implementation of the CAP procedure. Exelon entered this self-identified concern into the CAP (IR 3974366).

(3) Effectiveness of Corrective Actions

The inspectors concluded that corrective actions for identified deficiencies were typically timely, focused, and adequately implemented. For significant conditions adverse to quality, Exelon identified actions to prevent recurrence. Corrective actions to address a trend of human performance errors were effective and primarily consisted of revising their Management Review Meeting (MRM) crew performance assessment model and extending the model for use by the Maintenance, Chemistry, and Radiation Protection Departments. The inspectors concluded that corrective actions to address the sample of NRC non-cited violations and findings since the last problem identification and resolution inspection were usually timely and effective. Additionally, the inspectors identified two examples of more than minor significance where Exelon was not effective in implementing timely corrective actions. These findings are documented in Section 4OA2.1.c.

b. Findings

(1) Untimely Corrective Actions to Address '2C' Core Spray Motor Elevated Vibrations

Introduction. The inspectors identified a Green non-cited violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, because Exelon did not implement corrective actions in a timely manner to correct a condition adverse to quality on the '2C' core spray motor. Specifically, Exelon did not perform appropriate corrective actions to evaluate and address an increasing motor bearing vibration trend that had existed for over ten years. Consequently, '2C' core spray motor vibration reached the fault level established in Exelon's vibration analysis procedure.

Description. The core spray system is a safety-related low pressure injection system that maintains the reactor core covered and cool during a loss of coolant accident (LOCA). Furthermore, the system provides a means for long term core cooling after a LOCA for up to 100 days. The system maintains two independent subsystems and each subsystem contains two pumps. Core spray pumps are operated and pump vibration measured periodically as required by Technical Specifications. Motor bearing vibration readings are measured less frequently (based on technician availability) as a good practice to maintain equipment reliability. The Component Maintenance Optimization department evaluates motor vibration as required by station procedures. Exelon procedure, MA-AA-716-230-1002, Vibration Analysis/Acceptance Guideline, Revision 4, establishes alert and fault vibration criteria to ensure action is taken prior to damage to the equipment.

The inspectors reviewed previous IRs associated with the core spray system and identified that the '2C' core spray motor exhibited a long-term degrading vibration trend in its upper motor bearings and that the long-standing issue had not been properly resolved. On July 2, 2009, IR 938338 was written to document and evaluate a rising '2C' core spray motor vibration trend. The issue report directed that corrective action be implemented within one year, based upon the trend results exceeding the alert limit. The IR created an action to develop a troubleshooting plan and opened a tracking AR assignment used to track the issue. The troubleshooting plan was developed. However, the assignment was classified as an enhancement (ACIT) in lieu of a corrective action assignment.

The ACIT assignment was then closed without implementing the troubleshooting plan and no actions were tied to the open AR. On July 30, 2015, IR 2534870 was written to document the continued degrading trend and that the vibration level was about to exceed the fault limit. Engineers closed this IR to the open AR from 2009, and no further actions were performed.

The inspectors reviewed vibration data for the '2C' core spray motor and identified that the vibration in the upper motor bearing had not been recorded since 2015. Procedure MA-AA-716-230-1002 defines the fault limit as "...a vibratory state where corrective actions should be taken immediately or the machine should be shut down. Operation of equipment at or above this level of vibration is likely to result in severe degradation and damage to the equipment." The inspectors expressed concern that given the current adverse trend and the absence of data for the past two years, it was likely that the motor upper bearing vibration had exceeded the fault limit and corrective actions should have been performed.

Engineers initiated IR 3990487 to evaluate whether the motor would meet its 100 day mission time. Motor oil analysis, thermography, and motor operating characteristics were trended and evaluated and no significant degraded condition was identified. Station personnel concluded the elevated vibration readings were caused by resonance, the vibrations did not indicate a degraded motor bearing condition, and the '2C' core spray motor remained operable. The inspectors reviewed the proposed actions and determined that the degradation was a long term concern and the near term planned actions were commensurate with the safety significance of the issue. An extent-of-condition review did not identify any additional safety related components above the fault limit. Additionally, Exelon expedited implementation of the troubleshooting plan and repairs or modifications to the motor to reduce the vibration issue.

Analysis. The inspectors identified that failure to perform timely corrective actions to address a degrading vibration trend on the '2C' core spray motor which resulted in the vibration reaching the fault limit was a performance deficiency that was within Exelon's ability to foresee and correct. The finding was more than minor, because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely impacted the cornerstone objective to ensure the reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the reliability of the '2C' core spray motor was adversely impacted due to the untimely corrective actions to address the elevated vibrations. The inspectors evaluated the significance of this finding using IMC 0609, Appendix A, The Significance Determination Process for Findings at Power, Exhibit 2 – Mitigating Systems Screening Questions. The inspectors determined this finding was of very low safety significance (Green) because the finding did not impact the design or qualification of the component, did not result in a loss of system function, did not result in the loss of function of a train greater than its Technical Specification allowed outage time, and did not represent an actual loss of function for a high safety significant component in accordance with Exelon's maintenance rule program. The inspectors determined the finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Exelon did not take effective corrective actions in a timely manner commensurate with the safety significance of the issue. Specifically, corrective actions to address the elevated vibrations on the '2C' core spray motor were not implemented before motor vibration reached the fault level. [P.3]

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires that measure shall be established to assure conditions adverse to quality are promptly identified and corrected. Contrary to the above, since July 2, 2009, Exelon did not assure that a condition adverse to quality associated with the '2C' core spray motor was corrected commensurate with the safety significance. Specifically, Exelon did not take timely corrective actions to address the long term degrading trend in '2C' core spray upper motor vibrations, which resulted in the motor reaching its fault value. Because this violation was of very low safety significance (Green), Exelon performed a prompt determination of operability, and the issue was entered into the corrective action program for resolution (IR 3990487), this violation is being treated as an NCV, consistent with section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000277/2017008-01, Untimely Corrective Actions to Address '2C' Core Spray Motor Elevated Vibrations)**

(2) Untimely Corrective Actions to Address Elevated Primary Containment Isolation Valve Leakage

Introduction. The inspectors identified a Green self-revealing non-cited violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, because Exelon did not promptly implement corrective actions to address a condition adverse to quality on two containment isolation valves. Specifically, drywell air sampling valves SV-3-7D-3671A and SV-3-7D-3671D failed to perform their primary containment isolation function on March 15 and September 26, 2016, respectively, as a result of untimely corrective actions to address elevated leakage. The valve internals were repaired, declared operable, and the issue was entered into the corrective action program (IR 3990490).

Description. A primary function of the containment atmosphere control/dilution (CAC/CAD) system is to sample the containment atmosphere to determine combustible gas concentrations and to monitor radiation levels during normal power operations. SV-3-7D-3671A and SV-3-7D-3671D are solenoid operated valves located in the sample line from the drywell to the CAC/CAD analyzer. The valves normally remain open to support the sampling function. However, they have a safety function to close to maintain primary containment isolation. These valves are local leak rate tested (LLRT) to ensure they maintain their leak tightness requirements for containment operability.

On February 10, 2015, the internal valve components for SV-3-7D-3671A were replaced in accordance with its preventive maintenance schedule. The post-maintenance testing LLRT identified that the valve exhibited elevated leakage and IR 2447885 was written to expedite valve repair. The valve leak rate during the LLRT met operability requirements. However, the elevated leakage indicated that a CAQ existed and the valve internals needed to be repaired prior to the next surveillance test. The CAP directed a corrective maintenance work order be performed. However; it did not clearly identify the issue was a CAQ that required timely corrective action prior to the next periodic LLRT. As a result work management bundled the corrective maintenance with planned valve replacement in April 2016. No assessment of the valve's capability to perform its isolation safety function until that date was performed. Subsequently, on March 15, 2016, the valve failed an LLRT test and was declared inoperable (IR 2640532).

Station personnel determined the corrective actions to address the SV-3-7D-3671A CAQ were inappropriately delayed, which resulted in the valve failure. The station's extent-of-condition review identified three additional degraded valves whose corrective maintenance work orders had not been scheduled commensurate with the safety significance. The three valves were promptly tested and an additional LLRT failure was identified on SV-3-7D-3671D (IR 2720237), which had an open work order to address elevated leakage documented in the CAP since June 13, 2014. The cause of the LLRT failures was determined to be looseness of the valve internals as well as the presence of debris in the CAC/CAD piping system.

Technicians performed corrective maintenance on SV-3-7D-3671A and SV-3-7D-3671D valve internals and the valves were declared operable following a successful LLRT. The impact of the debris in the CAC/CAD system created a long term system and valve health concern. Additional evaluation and long term corrective actions to address the source of debris in the lines were documented in IRs 3987716 and 3990490. The inspectors determined the associated troubleshooting and corrective actions were scheduled commensurate with the safety significance.

Analysis. The inspectors determined that failure to promptly correct a CAQ associated with degraded primary containment isolation valves SV-3-7D-3671A and SV-3-7D-3671D, was a performance deficiency that was within Exelon's ability to foresee and correct. The finding was more than minor, because it was associated with the barrier performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone's objective to provide reasonable assurance that the containment design barrier protect the public from radionuclide releases caused by accidents or events. Specifically, SV-3-7D-3671A and SV-3-7D-3671D failed to perform their primary containment isolation function as a result of untimely corrective actions. The inspectors evaluated the significance of this finding using IMC 0609, Appendix A, The Significance Determination Process for Findings at Power, Exhibit 3-Barrier Integrity Screening Questions. The inspectors determined this finding was of very low safety significance (Green) because the finding did not result in an actual open pathway in the physical integrity of the reactor containment or involve an actual reduction in the function of hydrogen igniters in the reactor containment.

The inspectors determined this finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Exelon did not take effective corrective actions in a timely manner commensurate with the safety significance of the issue. Specifically, corrective actions to address a CAQ on SV-3-7D-3671A and SV-3-7D-3671D were incorrectly delayed, which resulted in the valves failing their LLRT and being declared inoperable. [P.3]

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires that measures shall be established to assure conditions adverse to quality are promptly identified and corrected. Contrary to this requirement, from June 13, 2014 until March 15, 2016, Exelon did not assure CAQs associated with primary containment isolation valves were promptly corrected commensurate with their safety significance. Specifically, Exelon did not perform timely repair of SV-3-7D-3671A and SV-3-7D-3671D valve internals, which resulted in LLRT failure and declaring the valves inoperable. Corrective action included repair of the two inoperable valves, extent-of-condition evaluation, and review of the issues via the CAP.

Because this violation was of very low safety significance and was entered into the corrective action program for resolution (IR 3990490), this violation is being treated as an NCV, consistent with section 2.3.2.a of the NRC Enforcement Policy.

**(NCV 05000278/2017008-02, Untimely Corrective Actions to Address Elevated Primary Containment Isolation Valve Leakage)**

.2 Assessment of the Use of Operating Experience

a. Inspection Scope

The inspectors reviewed a sample of CAP issue reports associated with review of industry operating experience to determine whether Exelon appropriately evaluated the operating experience information for applicability to Peach Bottom and had taken appropriate actions, when warranted. The inspectors also reviewed evaluations of operating experience documents associated with a sample of NRC generic communications to ensure that Exelon adequately considered the underlying problems associated with the issues for resolution via their corrective action program. In addition, the inspectors observed various plant activities to determine if the station considered industry operating experience during the performance of routine and infrequently performed activities.

Assessment

The inspectors determined that Exelon appropriately considered industry operating experience information for applicability, and used the information for corrective and preventive actions to identify and prevent similar issues when appropriate. The inspectors determined that operating experience was appropriately applied and lessons learned were communicated and incorporated into plant operations and procedures when applicable. The inspectors also observed that industry operating experience was routinely discussed and considered during the conduct of Plan-of-the-Day meetings and pre-job briefs.

b. Findings

No findings were identified.

.3 Assessment of Self-Assessments and Audits

a. Inspection Scope

The inspectors reviewed a sample of audits, including the most recent audit of the CAP, departmental self-assessments, and assessments performed by independent organizations. Inspectors performed these reviews to determine if Exelon entered problems identified through these assessments into the CAP, when appropriate, and whether Exelon initiated corrective actions to address identified deficiencies. The inspectors evaluated the effectiveness of the audits and assessments by comparing audit and assessment results against self-revealing and NRC-identified observations made during the inspection.

### Assessment

The inspectors concluded that self-assessments, audits, and other internal Exelon assessments were generally critical, thorough, and effective in identifying performance issues. The inspectors observed that Exelon personnel knowledgeable in the subject completed these audits and self-assessments in a methodical manner. Exelon completed these audits and self-assessments to a sufficient depth to identify issues which were then entered into the CAP for evaluation. In general, the station implemented corrective actions associated with the identified issues commensurate with their safety significance.

#### b. Findings

No findings were identified.

### .4 Assessment of Safety Conscious Work Environment

#### a. Inspection Scope

During interviews with station personnel, the inspectors assessed the safety conscious work environment at Peach Bottom. Specifically, the inspectors interviewed personnel to determine whether they were hesitant to raise safety concerns to their management and/or the NRC. The inspectors also interviewed the station Employee Concern Program (ECP) coordinator to determine what actions are implemented to ensure employees were aware of the program and its availability with regards to raising safety concerns. The inspectors reviewed the ECP files to evaluate depth of issue investigation, and to ensure that Exelon entered issues into the corrective action program when appropriate.

### Assessment

During interviews, Peach Bottom staff expressed a willingness to use the corrective action program to identify plant issues and deficiencies and stated that they were willing to raise safety issues. The inspectors noted that no one interviewed stated that they personally experienced or were aware of a situation in which an individual had been retaliated against for raising a safety issue. All persons interviewed demonstrated an adequate knowledge of the corrective action program and the ECP. Based on these limited interviews and review of selected ECP files, the inspectors concluded that there was no evidence of an unacceptable safety conscious work environment and no significant challenges to the free flow of information.

#### b. Findings

No findings were identified.

### 40A6 Meetings, Including Exit

On March 31, 2017, the inspectors presented the inspection results to Matt Herr, Plant Manager, and other members of the Peach Bottom staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.



**SUPPLEMENTARY INFORMATION  
KEY POINTS OF CONTACT**

Licensee Personnel

M. Herr, Plant Manager  
 J. Armstrong, Regulatory Assurance Manager  
 P. Breidenbaugh, Maintenance Director  
 D. Dullum, Regulatory Assurance Engineer  
 M. Flynn, Corrective Action Program Manager  
 J. Fogarty, Nuclear Steam Supply Systems Manager  
 J. Glunt, Organizational Effectiveness Manager  
 S. Griffith, Security Supervisor  
 T. Haehle, Senior Design Engineer  
 D. Henry, Engineering Director  
 D. Hilt, Shift Operations Superintendent  
 R. Holmes, Radiation Protection Manager  
 P. Kester, Mechanical Design Engineer  
 M. Lefever, System Manager  
 P. Pasqual, Environmental Qualification Program Manager  
 D. Turek, Operations Director  
 M. Weidman, Work Management Director

NRC Personnel:

D. Aird, (Acting) Resident Inspector  
 D. Schroeder, Chief, Reactor Projects Branch 4

**LIST OF ITEMS OPENED, CLOSED, DISCUSSED AND UPDATED**

**Opened and Closed**

05000277/2017008-01	NCV	Untimely Corrective Actions to Address '2C' Core Spray Motor Elevated Vibrations (Section 4OA2.1.c (1))
05000278/2017008-02	NCV	Untimely Corrective Actions to Address Elevated Primary Containment Isolation Valve Leakage (Section 4OA2.1.c (2))

## LIST OF DOCUMENTS REVIEWED

### Section 40A2: Problem Identification and Resolution

#### Audits and Self-Assessments

2017 Problem Identification and Resolution Focused Self-Assessment dated 1/31/17  
NOSA-COMP-15-04, 2015 Corrective Action Program Comparative Audit Report (AR 2413504)  
NOSA-COMP-16-03, 2016 Emergency Preparedness Comparative Audit Report (AR 2591983)  
NOSA-COMP-17-02, 2017 Security Programs Comparative Audit Report (AR 3950755)  
NOSA-PEA-15-04, Corrective Action Program Audit Report (AR 2461610) dated 5/13/15  
NOSA-PEA-15-08 (AR 2544656) Operations Functional Area Audit dated 11/25/15  
NOSA-PEA-16-03, Emergency Preparedness Audit Report Peach Bottom Atomic Power Station  
(AR 2635212) dated April 20, 2016  
NOSA-PEA-17-02, Security Programs Audit Report (AR 3958635) dated 2/1/17  
NOSCPA-PB-15-10, Peach Bottom Maintenance Performance Report dated 10/26/15  
NOSCPA-PB-15-02, Peach Bottom Maintenance Performance Report, 4/15/15  
NOSMDA-PB-15-06, Peach Bottom NOS Winter Readiness Assessment dated 11/12/15  
ER AA 300-1001, Program Health Report, Peach Bottom Atomic Power Station:  
Motor Operated Valve Program, Revision 13, 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> Periods, 2015

CAP Issue Reports (\* indicates that issue report was generated as a result of this inspection)

0798807	1882990	2540483	2651026	3964160
1119848	2395345	2540910	2654293	3967664
1120123	2402909	2550767	2654299	3969952
1120156	2428863	2550923	2654301	3971392
1120916	2437502	2556042	2654308	3972307
1120923	2437502	2556743	2654309	3973845
1187639	2438018	2556989	2669323	3974376
1319753	2450488	2559006	2673479	3975072
1322834	2452477	2560763	2673814	3984750
1351949	2459304	2562192	2674999	3985185
1373999	2463849	2563163	2675896	3986449
1381435	2470584	2569944	2680490	3990487
1437529	2476474	2574110	2681397	9380338
1452860	2477945	2574588	2687146	3988152*
1511027	2480628	2575318	2688624	3989236*
1522981	2480663	2581778	2688934	3990400*
1523212	2483745	2590294	2691322	3990487*
1525932	2486887	2591443	2692913	3990490*
1541823	2486920	2597205	2702529	3990496*
1544229	2486940	2599672	2702911	3990632*
1548397	2492131	2600694	2702936	3990633*
1562039	2497152	2600713	2705374	3990844*
1572040	2498172	2606215	2705377	3990916*
1578649	2498930	2609140	2720237	3990929*
1618302	2500697	2613243	2720241	3991450*
1629839	2502202	2619983	2733915	3992060*
1631250	2508984	2624592	2880144	3991479*
1642586	2508992	2626634	3803180	3991982*
1656255	2510270	2631547	3813477	3991450*
1662108	2510983	2634231	3890901	3988152*
1662555	2526507	2637694	3943069	3992060*
1662767	2529947	2637858	3944357	3989236*
1665636	2530466	2640514	3944358	3990490*
1665921	2530672	2640532	3946751	3990916*
1673878	2534870	2640552	3950246	3990844*
1690631	2535340	2646772	3951006	3992162*
1692457	2538737	2648763	3963696	

Drawings

6280-M124-1-5, Rubber Expansion Joint Specification Sheet, Revision 0

6280-M-314, P&I Diagram U2 Service Water System, Sheet 1, Revision 75

6280-M-315, P&I Diagram U2 Emergency Service Water and High Pressure Service Water,  
Sheet 1, Revision 86

6280-M-3801, High Pressure Service Water Floor Penetration Details, Revision 0

Operating Experience

CR1484815 - Flowserve 10CFR21 Valve Wedge Pin Failure – Anchor Darling

Electric Power Research Institute (EPRI) Cat 2 3002008021, Very Low Frequency Testing for  
Motors and Cables dated 12/15/16

NRC Information Notice (IN) 2015-01, Degraded Ability to Mitigate Flooding Events

NRC IN 2015-09, Mechanical Dynamic Restraint Lubricant Degradation not Identified

NRC IN 2015-13, Main Steam Isolation Valve Failure Events

NRC RIS 2014-09 – Effectiveness of License Renewal Aging Management Programs  
Nuclear Service Advisory Letter (NSAL) -17-1, Guide Tube Guide Card Wear Attributed to  
Ion Nitride Rod Cluster Control Assembly  
LR-ISG-2015-01, Changes to Buried and Underground Piping and Tanks

Non-Cited Violations and Findings

05000277/2013004-02 TS 5.7.2 Failure to Control Access Point to LHRA  
05000277/2016001 Inspection Report Section 4OA7 – Locked High Radiation Area (LHRA)  
Door Not Secured  
05000277/2016003-01, 2C RFP Power Supply Not in Shelf Life Program  
05000277, 278/2014004-01, Untimely Corrective Action for Appendix R breaker switches  
05000277, 278/2014004-03 Inadequate Evacuation Time Estimate Submittals  
05000277, 278/2015003-01, Failure to Test Switches at Remote Shutdown Panel  
05000277, 278/2016002-02, Untimely Corrective Action for Alternate Shutdown Panel Testing  
05000277, 278/2016002-03, Human Performance Error Results in Emergent Downpower  
05000277, 278/2016404-01 Security-Related

Procedures

CC-AA-112, Temporary Configuration Changes, Revision 16  
CC-AA-309-101, Engineering Technical Evaluations, Revision 11  
EI-AA-101, Employee Concerns Program, Revision 11  
EI-AA-101-1001, Employee Concerns Program Process, Revision 14  
ER-AA-110, Implementing and Managing Engineering Programs, Revision 17  
ER-AA-200, Preventative Maintenance Program, Revision 2  
ER-AA-200-1001, Equipment Classification, Revision 2  
ER-AA-200-1002, Preventive Maintenance Oversight Committee, Revision 0  
ER-AA-310, Implementation of the Maintenance Rule, Revision 10  
ER-AA-700 Aging Management Implementation, Revision 5  
ER-AA-700-1001 Aging Management Program Site Implementation Guideline, Revision 4  
ER-AA-700-1003 Screening and Evaluation of Potential Aging Issues, Revision 3  
GP-3-2, Shutdown Sequence, Revision 8  
HU-AA-1081, Fundamentals Tool Kit, Revision 4  
MA-AA-716-010, Maintenance Planning, Revision 24  
MA-AA-716-230, Predictive Maintenance Program, Revision 11  
MA-AA-716-230-1002, Vibration Analysis/Acceptance Guideline, Revision 4  
M-065-003, Mechanical Snubber Removal and Installation, Revision 17  
M-506-005, Valve Packing, Revision 12  
M-506-005, Valve Packing, Revision 11  
M-506-005, Valve Packing, Revision 10  
M-506-005, Valve Packing, Revision 9  
M-511-701, Atkomatic Solenoid Valve Maintenance, Revision 12  
OP-AA-101-113, Operator Fundamentals, Revision 10  
OP-AA-108-115, Operability Determinations, Revision 19  
OP-PB-102-106, Peach Bottom Master List of Time Critical and Sensitive Actions, Revision 7  
PI-AA-115, Operating Experience Program, Revision 1  
PI-AA-120, Issue Identification and Screening Process, Revisions 6 and 7  
PI-AA-125, Corrective Action Program (CAP) Procedure, Revisions 4 and 5  
PI-AA-125-1003, Corrective Action Program Evaluation Manual, Revision 4  
PI-AA-126, Self-Assessment and benchmarking Program, Revision 1  
PI-AA-126-1001, Check-In Self Assessments, Revision 1

SM-AA-102, Warehouse Operations, Revision 22  
 SM-AA-104, In Storage Maintenance, Revision 10  
 ST-J-065-920-2, Snubber Service Life Monitoring, Revision 13  
 T-103, Secondary Containment Control, Revision 21  
 WC-AA-106, Work Screening and Processing, Revision 16

Work Orders

01272711	A1652006	R0705194
04178007	A1793038	R0814622
04239102	A1793412	R0846808
A0145598	A1805573	R0846809
A1167100	A1987820	R0879880
A1249047	A2015961	R0944949
A1327334	A2019067	R0984443
A1327334	C0206982	R1009112
A1329457	C0258852	R1036835
A1329461	C0259141	R1046312
A1329461	C0259727	R1046338
A1329928	C0259727	R1056916
A1518805	R0596003	R3407887
A1544818	R0644630	R4254242
A1622572	R0645177	

Miscellaneous

Licensee Event Report (LER) 2-16-001, Leak in High Pressure Service Water Pipe Results in Condition Prohibited by Technical Specifications  
 LER 2-14-003, Containment Leakage Limit Exceeded due to Through-Seat Leakage of Feed Water Check Valves, Revision 0  
 LER 2-15-001, Condition Prohibited by Technical Specifications due to Insufficient Remote Shutdown System Surveillance Testing  
 LER 3-15-001, Loss of HPCI System Function as a Result of Failed Flow Controller Signal Converter  
 LER 3-16-001, Leak in High Pressure Coolant Injection Drain Pipe Results in Loss of Safety Function  
 Management Review Committee (MRC) Agenda dated 2/22/17  
 MRC Agenda dated 3/29/17  
 MRC Report dated 3/29/17  
 NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 4  
 Operability Evaluation 16-002 - 4 KV Breaker Micro-switches, Revision 1  
 Operability Evaluation 15-001 – ESW, Revision 1  
 PB MSPI Basis Document, Revision 12  
 PB Fire Protection Plan, Revision 21  
 PB U2 Technical Specification Bases  
 PB U3 Technical Specification Bases  
 PB Updated Final Safety Analysis Report  
 PB Unit 2 Reactor Building Operator Rounds and Data Sheets (ST-0-02F-560-2) dated 3/15/17  
 PB Units 2 & 3 Shift Manager Shift Turnover Checklists dated 7/18/16 and 1/7/17  
 PEA Station Ownership Committee (SOC) Agenda dated 3/17/17

Reactivity Maneuver Plan PB2c21-SSD1.0  
Planning Desktop Guide Insert – Putting Motor Operated Valves in Mid-Position Prior to  
Stroking dated 6/28/16  
RT-M-045-900-2, Unit 2 and common Door Inspection performed 9/14/12 and 11/26/14  
Rubber Expansion Joint and Rubber Hose Preventative Maintenance Template  
Service Life Monitoring Report dated 9/24/15  
Valve Packing Data Sheet: AO-2-01A-080C, Revisions 1, 2, and 3

### LIST OF ACRONYMS

ACIT	Enhancement Assignment
ADAMS	Agency-wide Documents Access and Management System
CA	Corrective Action Assignment
CAC	Containment Atmosphere Control
CAD	Containment Atmosphere Dilution
CAP	Corrective Action Program
CAQ	Condition Adverse to Quality
CAPCO	Corrective Action Program Coordinator
CFR	Code of Federal Regulations
CS	Core Spray
ESW	Emergency Service Water
ECP	Employee Concerns Program
HPSW	High Pressure Service Water
IMC	Inspection Manual Chapter
IR	Issue Report
LLRT	Local Leak Rate Test
LOCA	Loss of Coolant Accident
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PB	Peach Bottom Atomic Power Station
PCIV	Primary Containment Isolation Valve