



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

May 4, 2016

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 – INTEGRATED INSPECTION
REPORT 05000277/2016001 AND 05000278/2016001**

Dear Mr. Hanson:

On March 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The enclosed inspection report documents the inspection results, which were discussed on April 18, 2016, with Mr. Michael Massaro, Peach Bottom Site Vice President, and other members of your staff.

NRC Inspectors examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No NRC-identified or self-revealing findings were identified during this inspection.

In accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC's Public Document Room or from

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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 05000277/2016001
and 05000278/2016001
w/Attachment: Supplementary Information

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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. 05000277/2016001 and 05000278/2016001

Licensee: Exelon Generation Company, LLC

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

Location: Delta, Pennsylvania

Dates: January 1, 2016 through March 31, 2016

Inspectors: J. Heinly, Senior Resident Inspector
B. Smith, Resident Inspector
P. Boguszewski, Reactor Engineer
C. Graves, Health Physicist
P. Ott, Operations Engineer

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

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SUMMARY

IR 05000277/2016001, 05000278/2016001, 01/01/2016 – 03/31/2016; Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3; Integrated Inspection Report.

This report covered a three-month period of inspection by resident inspectors, and announced baseline inspections performed by regional inspectors. The Nuclear Regulatory Commission's (NRC) program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

No NRC-identified or self-revealing findings were identified during this inspection.

Other Findings

A violation of very low safety significance that was identified by Exelon was reviewed by the inspectors. Corrective actions taken or planned by Exelon have been entered into Exelon's corrective action program (CAP). This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 2 began the inspection period at 100 percent rated thermal power (RTP) and remained at 100 percent power until an emergent downpower to 80 percent RTP on March 28, 2016, for the loss of a 480V electrical bus. The bus was restored and full power was restored the same day. Unit 2 remained at full power until the end of the inspection period.

Unit 3 began the inspection period at 100 percent RTP. Unit 3 downpowered to 75 percent power on February 11, 2016, to support planned testing and control rod sequence exchange and returned to full power on February 12, 2016. Unit 3 remained at or near full power until the end of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed PBAPS' preparation and response to sheet ice on the Susquehanna River from January 20-22, 2016. The inspectors reviewed the implementation of PBAPS' adverse weather preparation procedures before the onset of the adverse weather condition. The inspectors walked down the river intake structure and verified ice removal systems and equipment were available. The inspectors verified that operator actions defined in PBAPS' adverse weather procedure maintained the readiness of essential systems. In addition, the inspectors observed the operators' manual actions in response to sheet ice build up on the trash racks. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04Q – 4 samples)

Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 2 'B' residual heat removal (RHR) following system restoration on February 3, 2016

- Unit 2 reactor core isolation cooling (RCIC) during a high-pressure coolant injection (HPCI) system outage window (SOW) on February 22, 2016
- Unit 3 'B' and 'D' core spray (CS) during an 'A' RHR SOW on February 29, 2016
- Unit 2 HPCI with the automatic depressurization system inoperable on March 24, 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 Updated Final Safety Analysis Report (UFSAR), Technical Specifications (TSs), work orders (WOs), issue reports (IRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have 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 PBAPS 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 (71111.05Q – 4 samples)

Resident Inspector Quarterly Walkdowns

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 PBAPS controlled combustible materials and ignition sources were controlled 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 out-of-service (OOS), degraded or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Unit 2/Unit 3 circulating water pump structure on February 25, 2016
- Unit 2 HPCI/RCIC sump rooms on February 26, 2016
- Unit 3 battery and switchgear rooms on February 26, 2016
- Unit 2/Unit 3 emergency diesel generator (EDG) cardox room on March 3, 2016

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)Annual Review of Cables Located in Underground Bunkers/Manholesa. Inspection Scope

During the week of March 14, 2016, the inspectors conducted an inspection of an underground manhole subject to flooding that contains cables whose failure could disable risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, including manhole 89 to verify that the cables were not submerged in water, that cables and/or splices appeared intact, and to observe the condition of cable support structures. In addition, the inspectors observed ground water intrusion mitigation work activities in manhole 89. When applicable, the inspectors verified proper sump pump operation and verified level alarm circuits were set in accordance with station procedures and calculations to ensure that the cables will not be submerged. The inspectors also ensured that drainage was provided and functioning properly in areas where dewatering devices were not installed.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 1 sample)a. Inspection Scope

The inspectors reviewed the 3 'B' RHR cleaning on February 17, 2016 and its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified PBAPS' commitments to NRC Generic Letter 89-13, "Service Water System Requirements Affecting Safety-Related Equipment." The inspectors observed actual performance tests for the heat exchangers (HXs) and/or reviewed the results of previous inspections of the Unit 3 RHR HXs. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that PBAPS initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the HX did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance
(71111.11 – 3 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training
(71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed a licensed operator simulator training on February 8, 2016, that involved a Unit 2 anticipated transient without scram complicated by a RCIC steam leak. 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 operators. 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
(71111.11Q - 1 sample)

a. Inspection Scope

The inspectors observed and reviewed the licensed operator performance from the main control room (MCR) in response to the sheet ice event on January 20, 2016, and post-modification testing on the Unit 2 '71K' safety relief valve (SRV) on March 24, 2016. 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 evolutions to verify that the crew was following procedures and plant expectations for conduct of operations.

b. Findings

No findings were identified.

.3 Licensed Operator Requalification Program (71111.11A – 1 sample)

a. Inspection Scope

On March 29, 2016, one NRC region-based inspector conducted an in-office review of results of licensee-administered annual operating tests for 2016 for PBAPS, Units 2 and 3 operators. The inspection assessed whether pass/fail rates were consistent with the

guidance of NRC Manual Chapter 0609, Appendix I, and “Operator Requalification Human Performance Significance Determination Process (SDP)”. The review verified that the failure rate (individual or crew) did not exceed 20 percent.

- None of the 68 operators failed any section of the annual exam. The overall individual failure rate was 0.0 percent.
- None of the 10 crews failed the simulator test. The crew failure rate was 0.0 percent.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 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 PBAPS 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 PBAPS 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 PBAPS staff was identifying and addressing common cause failures that occurred within and across MR system boundaries.

- Unit 2 and Unit 3 RHR and CS room cooler system review on February 18, 2016
- Unit 2 reactor protection system (RPS) review on February 22, 2016

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 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 PBAPS 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 PBAPS personnel performed risk assessments as required by 10 Code of Federal Regulations (CFR) 50.65(a)(4) and that the assessments were accurate and complete. When PBAPS 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.

- Yellow risk during a planned Unit 3 HPCI SOW on January 20, 2016
- Green risk during a planned Unit 2/Unit 3 'A' standby gas treatment system exhaust fan SOW on February 1, 2016
- Yellow risk during a planned Unit 2 'A' RHR SOW on February 8, 2016
- Yellow risk during a planned Unit 3 'B' high pressure service water (HPSW)/RHR SOW on February 16, 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 3 RCIC governor slow response time on February 2, 2016
- Unit 2 'A' RHR check valve swing arm detached on February 11, 2016
- Unit 2 'D' RHR motor operated valve over thrust condition on March 9, 2016
- Unit 2 'K' SRV intermittent ground condition on March 24, 2016
- Unit 3 HPCI hi torus level switch failure on March 31, 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 PBAPS' 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 (OWAs), the inspectors determined whether the measures in place would function as intended and were properly controlled by PBAPS. Based on the review of selected OWAs listed above, the inspectors verified that PBAPS identified OWAs at an appropriate threshold and addressed them in a manner that effectively managed OWA-related adverse effects on operators and SSCs.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)Temporary Plant Modificationa. Inspection Scope

The inspectors reviewed the temporary plant modification listed below to determine whether the modification affected the safety functions of systems that are important to safety. The inspectors also reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modification to the automatic depressurization system (ADS) logic wiring did not degrade the design bases, licensing bases, and performance capability of the affected system.

- Unit 2 'K' SRV ADS logic wiring on March 24, 2016

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 3 HPCI unplanned maintenance outage to repair the flow controller on January 1, 2016
- Unit 2 'A' RHR planned maintenance outage on February 2, 2016
- Unit 3 'B' HPSW/emergency service water (ESW) fan replacement on February 17, 2016
- Unit 2 HPCI planned maintenance outage window on February 23, 2016
- Unit 2 'K' SRV unplanned outage on March 24, 2016
- Unit 3 RCIC remote shutdown panel flow controller replacement on March 29, 2016

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 samples)a. Inspection Scope

The inspectors observed performance of surveillance tests (STs) and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied TSs, the UFSAR, and PBAPS 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/Unit 3 E-2 EDG 24-hour endurance run on January 28 – 30, 2016
- Unit 2/Unit 3 E-3 EDG fuel oil sampling surveillance on February 10, 2016
- Unit 2 HPCI logic system functional testing on March 1, 2016
- Unit 2 standby liquid control (SBLC) on March 2, 2016 (in-service test)
- Unit 3 HPCI biennial comprehensive test on March 22, 2016 (in-service test)

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness1EP6 Drill Evaluation (71114.06 – 1 sample)Emergency Preparedness Drill Observationa. Inspection Scope

The inspectors evaluated the conduct of a routine PBAPS Unit 2 emergency drill on February 8, 2016, to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The drill required the operators to declare an Alert due to an emergency blowdown. The inspectors observed emergency response operations in the simulator, technical support center, and emergency operations facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by PBAPS staff in order to evaluate PBAPS' critique and to verify whether the PBAPS staff was properly identifying weaknesses and entering them into the CAP.

b. Findings

No findings were identified.

2. **RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety (OS)

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 4 samples)

a. Inspection Scope

During March 7 - 10, 2016, the inspectors reviewed Exelon's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR 20, TSs, applicable Regulatory Guides (RGs), and the procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the performance indicators (PIs) for the occupational exposure cornerstone, radiation protection (RP) program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

Radiological Hazard Assessment (1 sample)

The inspectors conducted independent radiation measurements during walk-downs of the facility and reviewed the radiological survey program; air sampling and analysis; continuous air monitor use, recent plant radiation surveys for radiological work activities, and any changes to plant operations since the last inspection to verify survey adequacy any new radiological hazards for onsite workers or members of the public.

Contamination and Radioactive Material Control (1 sample)

The inspectors observed the monitoring of potentially contaminated material leaving the radiological controlled area and inspected the methods and radiation monitoring instrumentation used for control, survey, and release of that material. The inspectors selected several sealed sources from inventory records and assessed whether the sources were accounted for and were tested for loose surface contamination. The inspectors evaluated whether any recent transactions involving nationally tracked sources were reported in accordance with requirements.

Risk-Significant High Radiation Area (HRA) and Very High Radiation Area (VHRA) Controls (1 sample)

The inspectors reviewed the procedures and controls for HRAs, VHRAs, and radiological transient areas in the plant.

Problem Identification and Resolution (1 sample)

The inspectors evaluated whether problems associated with radiation monitoring and exposure control (including operating experience) were identified at an appropriate threshold and properly addressed in the CAP.

b. Findings

No findings were identified.

2RS2 Occupational As Low As Is Reasonably Achievable (ALARA) Planning and Controls (71124.02 – 2 samples)

a. Inspection Scope

During March 7-10, 2016, the inspectors assessed Exelon's performance with respect to maintaining occupational individual and collective radiation exposures ALARA. The inspectors used the requirements contained in 10 CFR 20, applicable RGs, TSs, and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted a review of PBAPS' collective dose history and trends; ongoing and planned radiological work activities; radiological source term history and trends; and ALARA dose estimating and tracking procedures.

Radiological Work Planning (1 sample)

The inspectors selected the following radiological work activities based on exposure significance for review:

- Radiation Work Permit (RWP) PB-C-15-00511, Drywell Valve Maintenance and Support Activities
- RWP PB-C-15-00546, Drywell & Outboard Main Steam Isolation Valve Room Small Bore Pipe and Associated Work
- RWP PB-C-15-00609, B RHR Floating Head
- RWP PB-C-1500624, Unit 3 B & D RHR Rooms-Work Associated with EPU Crosstie Mod
- RWP PB-C-1500901, P3R20 Refuel Floor Reactor Disassembly and Re-assembly

For each of these activities, the inspectors reviewed: ALARA work activity evaluations, exposure estimates, and exposure reduction requirements.

Problem Identification and Resolution (1 sample)

The inspectors evaluated whether problems associated with ALARA planning and controls were identified at an appropriate threshold and properly addressed in the CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151)

.1 Unplanned Scrams, Unplanned Power Changes, and Unplanned Scrams with Complications (6 samples)

a. Inspection Scope

The inspectors reviewed PBAPS's information submitted for the initiating events PIs listed below to assess the accuracy and completeness of the data reported to the NRC for these PIs. The PI definitions and the guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and Exelon procedure LS-AA-2001, "Collecting and Reporting of NRC PI Data," Revision 14, were used to verify that procedure and reporting requirements were met. The inspectors reviewed raw PI data collected from January 1, 2015 to December 31, 2015, and compared graphical representations from the applicable PI reports to the raw data to verify the data was included in the report. The inspectors also examined a selected sample of operations logs and plant computer thermal power data trends to verify the PI data was appropriately captured for inclusion into the PI report and that the individual PIs were correctly calculated.

- Units 2 and 3 Unplanned Scrams per 7,000 Critical Hours (IE01)
- Units 2 and 3 Unplanned Power Changes per 7,000 Critical Hours (IE03)
- Units 2 and 3 Unplanned Scrams with Complications (IE04)

b. Findings

No findings were identified.

.2 Occupational Exposure Control Effectiveness (1 sample)

a. Inspection Scope

During March 7 - 10, 2016, the inspectors sampled licensee submittals for the occupational exposure control effectiveness PI for the period from the second quarter 2015 through fourth quarter 2015. The inspectors used PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, to determine the accuracy of the PI data reported.

To assess the adequacy of Exelon's PI data collection and analyses, the inspectors discussed with radiation protection staff the results of their PI review, and independently reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period. The inspectors conducted walk-downs of numerous locked high and VHRA entrances to determine the adequacy of the controls in place for these areas.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 1 sample)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure (IP) 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that PBAPS 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, PBAPS performed an evaluation in accordance with 10 CFR Part 21.

b. Findings

No findings were identified.

.2 Annual Sample: Degraded Limitorque Model SMB-000 "Leaf-Style" Torque Switches

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's analysis and corrective actions associated with condition report IR 02555841, "MO-2-13C-4487 Did Not Stroke Full Closed from the Main Control Room (MCR)," written on September 16, 2015. Specifically, Exelon's Unit 2 RCIC Trip Throttle Valve (TTV) operator did not stroke full closed when the control switch was placed in the close direction because the operator's torque switch prematurely actuated.

The inspectors assessed Exelon's problem identification threshold, engineering change request (ECR), extent of condition reviews, 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 performed field walkdowns and interviewed engineering, operations and work management personnel to assess the effectiveness of the implemented corrective actions.

b. Findings and Observations

No findings were identified.

On November 18, 2014, the motor-operated valve (MOV) operator, MO-2-13C-4487, for the Unit 2 RCIC TTV failed to close during the performance of RCIC overspeed trip surveillance testing. The MOV operator is used to reset the RCIC TTV following a RCIC turbine overspeed event, but its inability to close does not impact the RCIC safety function. Following troubleshooting efforts, Exelon determined that the closed contacts on the MOV torque switch had unexpectedly tripped open, thus preventing the valve from closing. Exelon initiated IR 02413679 and determined debris buildup existed on the torque switch closed contacts. Exelon cleaned the contacts with denatured alcohol and the valve was returned to functional status following successful valve strokes. The MOV was stroked successfully during subsequent quarterly surveillance tests. However, on September 16, 2015, the MOV again failed to close because the MOV's torque switch closed contacts were tripped open, thus preventing valve motion. Exelon initiated IR 02555841, cleaned the open and closed contacts, and adjusted the torque switch setpoints. Exelon determined that the MO-2-13C-4487 torque switch leaf spring was found to be making inconsistent contact, resulting in a high resistance control circuit.

The MOV operator for the RCIC TTV has a Limitorque SMB-000 actuator with a "Leaf Style" torque switch. IR 02555841 specified a recommendation to replace the "leaf-style" SMB-000 torque switch with a more reliable "C" style SMB-000 torque switch. Although the failure of MO-2-13C-4487 did not impact the safety function of the RCIC system, the inspectors identified that Exelon had over twenty "leaf-style" SMB-000 torque switch subcomponents per unit used in other safety related MOVs.

The inspectors noted that eleven failures of SMB-000 "Leaf Style" torque switches had occurred since 2013, three of those failures were identified among the Exelon fleet. On August 25, 2014, Limitorque issued a technical update along with an environmental qualification report demonstrating the acceptability of a new "C Style" torque switch that is not subject to a high failure rate as are the "Leaf Style" torque switches. The "C Style" torque switch was evaluated by Limitorque to be a direct replacement for the "Leaf Style" torque switches in SMB-000 actuators and therefore the vendor discontinued obsolete "Leaf Style" torque switches. Exelon initiated IR 02556564, in which Exelon's engineering department recommended replacing the "Leaf Style" torque switch with a "C Style" torque switch in MOV operators via ECR 15-00469.

Exelon ECR 15-00469, "Replace "C Style" Torque Switch for SMB-000 Operators," was not issued, however, until February 19, 2016. The inspectors observed that Exelon's ECR to replace the torque switches was not timely in its implementation. However, the inspectors determined that Exelon's interim actions, which were to replace any degraded "leaf-style" SMB-000 torque switches in safety related applications found during periodic inspections were appropriate. Exelon utilized procedure MA-AA-723-301, "Periodic Inspection of Limitorque Model SMB/SB/SBD-000 through 5 MOVs," which directs the maintenance department to periodically inspect the SMB-000 torque switches for "pitted, burned, corroded, or oxidized contacts" among other specific criteria to determine if the "leaf-style" SMB-000 switch is degraded. Given the nature of the previous failures on the RCIC TTV operator, the inspectors determined the interim procedural requirements were appropriate to preclude any failures on safety-related MOVs. In addition, the inspectors determined the observation of the ECR timeliness to be minor since no failures on safety-related MOV torque switch subcomponents occurred before the ECR issue date.

The inspectors reviewed each individual “leaf-style” torque switch subcomponent maintenance and inspection history used in safety-related MOVs and did not identify any maintenance inspection that identified degraded contacts which necessitated an immediate replacement. Exelon documented further torque switch observations in IRs 02629710 and 02629960.

40A3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample)

(Closed) Licensee Event Report (LER) 05000278/2015-001: Loss of HPCI System Function as a Result of Failed Flow Controller Signal Converter

On December 31, 2015, a PBAPS control room operator identified that the Unit 3 HPCI flow controller demand indicated zero percent. The flow controller was in automatic with a nominal set point of 5000 gpm. However, for the HPCI flow controller to function properly to maintain HPCI available to perform its design function in the event of an accident, controller demand is required to indicate 100 percent. The HPCI system was declared inoperable and TS 3.5.1(C) was entered. This TS allows the HPCI to be inoperable for 14 days otherwise Unit 3 must be in Mode 3 within 12 hours. Subsequent troubleshooting of the HPCI flow controller found that a signal converter in the HPCI control circuitry had failed. The failure of the signal converter was determined to be a latent manufacturing issue resulting in an infant mortality of the converter. The corrective actions included replacing the signal converter and testing the HPCI system. There were no actual safety consequences associated with this event. The inspectors reviewed LER 05000278/2015-001 and its apparent cause evaluation, and determined no findings or violations of NRC requirements existed. This LER is closed.

40A6 Meetings, Including Exit

Quarterly Resident Exit Meeting Summary

On April 18, 2016, the inspectors presented the inspection results to Mr. Michael Massaro, Peach Bottom Site Vice President and other members of the PBAPS staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

40A7 Licensee-Identified Violations

The following violation of very low safety significance was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section 2.3.2 of the NRC Enforcement Policy to be dispositioned as a non-cited violation (NCV).

On September 29, 2015, Exelon identified the door to the Unit 3 condensate backwash tank room was not secure. The room is controlled as a locked HRA, and a survey of the room indicated that actual radiation levels were greater than 1.0 rem/hour. TS 5.7.2.a requires, in part, that entryways to areas exceeding 1.0 rem/hour will be locked or continuously guarded to prevent unauthorized entry. Contrary to the above, on September 29, 2015, Exelon identified an area with radiation levels greater than 1.0 rem/hour with an entryway that was not locked or continuously guarded.

Traditional enforcement applies in accordance with Inspection Manual Chapter (IMC) 0612, sections 0612-09 and 0612-13; and Enforcement Policy Section 2.2.4.d; because the inspectors did not identify an associated performance deficiency. Specifically, the inspectors determined that because Exelon had an acceptable door maintenance program, conducted weekly checks of LHRA doors, and has not had previous issues with unsecured doors, that the failure of the door lock mechanism was not apparent and, therefore, was not foreseeable and preventable.

The issue was considered to be a SL IV violation of TS 5.7.2.a in accordance with Enforcement Policy Section 6.1.d. In addition, IMC 0612, Appendix B, Figures 1 and 2, "Issue Screening," were utilized in documenting this as a SL IV licensee-identified NCV. The licensee took immediate corrective actions to ensure the door remained locked and documented the issue in condition report 2562192, and the investigation determined that no unauthorized access to the room had occurred.

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
 D. Baracco, Radiological Engineering Manager
 J. Chizever, Design Engineering Manager
 T. Dombach, Engineer
 D. Dullum, Regulatory Assurance Engineer
 B. Holmes, Radiation Protection Manager
 J. Layton, Mechanical Maintenance Manager
 J. Lucas, Business Support
 J. McClintock, LOR Training Supervisor
 H. McCroy, Radiation Protection Technical Support Manager
 B. Miller, Fire Protection Engineer
 N. Patel, Plant Engineering
 M. Retzer, Outage Manager
 C. Reynolds, MOV Engineer
 W. Reynolds, Engineering Programs Manager
 D. Wheeler, Maintenance Rule Program Engineer

NRC PERSONNEL

J. Heinly, Senior Resident Inspector
 B. Smith, Resident Inspector
 P. Boguszewski, Reactor Inspector
 C. Graves, Health Physicist
 P. Ott, Reactor Inspector

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

None

Closed

05000278/2015-001	LER	Loss of HPCI System Function as a Result of Failed Flow Controller Signal Converter (Section 4OA3)
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LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather

Procedures

AO 29.2, Discharge Canal to Intake Pond Cross-Tie Gate Operation, Frazil Ice Mitigation and Icing Condition Operations, Revision 21

OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 14

OP-PB-108-111-1001, Preparation for Severe Weather, Revision 15

IRs

2615435 2614867 293187 195915

WOs

R1280197 R1303409 R1255764

Section 1R04: Equipment Alignment

Procedures

OP-OB-112-101-1005, Feedwater Field Instrument Trouble Alarm, Revision 4

COL 13.1.A-2, RCIC System, Revision 23

COL 14.1.A-3B, CS System Loop B, Revision 11

COL 23.1.A-3, HPCI System, Revision 24

Drawings

P&I Diagram RHR System, 6280-M-361, Sheet 1, Revision 85

P&I Diagram RHR System, 6280-M-361, Sheet 2, Revision 71

Miscellaneous

Unit 3 System Health Report, dated 1/1/2016 – 3/31/2016

Unit 2 Hourly Control Room Walk-Down Sheet (Mode 1 and 2) dated February 3, 2016

PBAPS Multi-Step Clearance No. 16000038, dated 2/16/16

Section 1R05: Fire Protection

Procedures

OP-AA-201-008, Pre-Fire Plant Manual, Revision 3

OP-AA-201-009, Control of Transient Combustible Material, Revision 17

MA-AA-716-026, Station Housekeeping/Material Condition Program

ST-M-037-350-2, Safety-Related Door Inspection, Revision 6

ARs

2632434 2635162 A2035949

IRs

2635423 2634393 2634969

Miscellaneous

PF-61, Unit 2 Reactor Building, Sump Pump Room, Elevation 88'-0", Revision 3
PF-127, Unit 2 Turbine Building, Emergency Battery Switchgear Rooms, Elevation 135'-0",
Revision 10
PF-136, Emergency Cooling Tower, General Area – Elevation 123'-0"/153'-0", Revision 3
PF-144, Circulating Water Pump Structure, General Area, Revision 7

Section 1R06: Flood Protection Measures

ARs

A1391394

IRs

2631145 1039017

WOs

C0255361

Miscellaneous

ECR 10-00236, Modifications to Electrical Manholes, Revision 0
OpEval 10-002, Underground Safety Related Cables, Revision 0

Section 1R07: Heat Sink Performance

Procedures

ER-AA-340-1002, Service Water HX Inspection Guide, Revision 6
ER-TM-340-1002, Guidance for HX Inspections and Cleaning at TMI, Revision 3

WOs

R1039654

Section 1R11: Licensed Operator Requalification Program

Procedures

EP-AA-1007, Exelon Nuclear Radiological Emergency Plan Annex for PBAPS, Revision 31
ON-121 Procedure, Drifting Control Rod, Revision 13

Miscellaneous

PSEG 2020R, Out of the Box Evaluation, Revision 1

Section 1R12: Maintenance Effectiveness

ARs

A1984431

IRs

02621307 02627933

WO

R1285846

Miscellaneous

Assessment of Risk Resulting from Performance of Maintenance Activities
Calculation No.: PM-0958 Revision 3A
Final Task Report, PEAE-EPU, Evaluation of Equipment Survivability for Appendix R Event,
Revision 01
MR Monthly Monitoring Evaluation
MR System Basis Documents, Unit 2 Ventilation (HVAC) and RPS
NEI 00-02, Industry PRA Peer Review Process Guidelines, Revision 1

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

ER-AA-600-1042, On-Line Risk Management, Revision 10
ER-AA-600, Risk Management, Revision 7
OP-AA-201-012-1001, Operations On-line Fire Risk Management, Revision 1
OP-PB-108-101-1002, PBAPS Protected Equipment Tracking Sheet, Attachment A
OP-PB-108-117-1000, Peach Bottom Protected Equipment Program, Revision 0
SO 32.1.A-2, HPSW System Startup and Normal Operations, Revision 19
WC-AA-101, On-Line Work Control Process, Revision 26
WC-AA-101-1006, On-Line Risk Management and Assessment, Revision 2
WC-AA-104, Integrated Risk Management, Revision 23

IRs

02621307 02627933

Miscellaneous

Engineered Safeguards Compartment Cooling and Ventilation, B.3.11
Evaluation of the Pump Structure Ventilation System Design, PEAM-003, Revision 2
MR Basis Risk Significance

1R15: Operability Evaluations

Procedures

ER-AA-302-1006, MOV Maintenance and Testing Guidelines,
Revision 13
ER-AA-302-1007, MOV Limitorque Actuator Capability Determination Methodology, Revision 9
M-C-700-201, Meggering of Motors, Revision 7
OP-AA-108-115, ODs (CM-1), Revision 16
OT-114, Inadvertent Opening of a Relief Valve, Revision 17
RT-O-013-725-3, RCIC Response Time Test, Revision 13
SI3F-13-58-XXC2, Calibration Check of RCIC Flow Instruments, Revision 4
SI3L-23-91-XXFQ, Functional Check of HPCI Suppression Chamber Level Instruments
LS 3-23-91A and LS 3-23-91B, Revision 3
ST-O-013-301-3, RCIC Pump, Valve, Flow and Unit Cooler Functional and in-Service Test,
Revision 44
ST-I-01G-100-2, ADS Channel A Logic System Functional Test, Revision 7
ST-I-01G-105-2, ADS Channel B Logic System Functional Test, Revision 8

ARs

A2036720 A1998202

IRs

2613448	2637694	2640316	2645454	2640552	2646742
2624676	2624080				

WOs

C0256242	C0260906	R0998138	R1321847
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Miscellaneous

Bases, SR Applicability B.3.0, Revision 6

DBD No. P-S-39, Revision 16

Draft ECR 16-00117, dated March 21, 2016

PEA-2-201-0188, 2K SRV ODM, Revision 0

PBAPS UFSAR, Chapter 4, 4.7-2, RCIC, Revision 21

PBAPS UFSAR, Chapter 4, Revision 21, April 2007

PBAPS, Units 2 and 3, RCIC System, DBD No. P-S-39, Revision 16

SIL No. 336R1, Surveillance Testing Recommendations for HPCI and RCIC Systems, dated December 8, 1989

Surveillance Testing Recommendations for HPCI and RCIC Systems, dated December 8, 1989, SIL No. 336R1

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Section 1R18: Plant ModificationsDrawing

M-1-S-2, Electrical Schematic Diagram, Automatic Blowdown System, Revision 39

IR

2640316

Modifications

ECR 16-00114, 2K ADS SRV, Revision 0

ECR 16-00117, FSSD Mitigating Actions for RV-2-02-071K, Revision 0

Miscellaneous

50.59 Review, Compensatory Measures for Operability Evaluation of 2K Automatic ADS, Revision 4

Section 1R19: Post-Maintenance TestingProcedures

MA-PB-723-300, Peach Bottom Diagnostic Testing of MOVs, Revision 0

OP-AA-102-105-1001, Peach Bottom Priority Work List – Priority 3

SI3F-23-82-XXC2, Calibration Check of HPCI Flow Instruments, Revision 8

SO-32.1.A-3, HPSW System Startup and Normal Operations, Revision 18

SO-32.2.A-3, HPSW System Shutdown, Revision 9

ST-I-01G-100-2, ADS Channel A Logic System Functional Test, Revision 7

ST-I-01G-105-2, ADS Channel B Logic System Functional Test, Revision 8

ST-O-023-301-2, HPCI Pump, Valve, Flow, and Unit Cooler Functional and Inservice Test, Revision 71

ST-O-010-301-2, 'A' RHR Loop Pump, Valve, Flow, and Unit Cooler Functional and Inservice Test, Revision 41

AR

A2028522 A2019067

IRs

2574300	2585800	2606215	2610686
2610697	2610682	2622090	2631530
2623591	2624080		

WOs

C0259141	C0259408	C0259727	C0260906
R0967929	R1227408	R1234663	R1331232

Miscellaneous

Apparent Cause Investigation Report (Equipment), Failure of Unit 3 HPCI Flow Control Loop, dated January 19, 2016

Draft ECR 16-00117, dated March 21, 2016

Exelon Action Tracking Toolbox, dated February 1, 2016

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PEA MRC Agenda for Friday, February 19, 2016

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Section 1R22: Surveillance TestingProcedures

ST-C-095-883-2, Diesel Fuel Oil Storage Tank Sampling and Off-Site Analysis in Response to Unsatisfactory Receipt Analysis, Revision 3

ST-C-095-884-2, Sampling Diesel Fuel Prior to Delivery to On-site Storage Tanks, Revision 24

ST-C-095-885-2, Diesel Generator Main Fuel Tank Sampling and Analysis, Revision 14

ST-I-023-100-2, HPCI Logic System Functional Test, Revision 19

ST-O-011-301-2, SBLC Pump Functional Test for IST, Revision 25

ST-O-023-302-3, HPCI Pump, Valve, Flow and Unit Cooler Functional and In-Service Comprehensive Test, Revision 8

ST-O-052-312-2, E2 Diesel Generator Slow Start Full Load and IST Test, Revision 24

ST-O-052-702-2, E2 Diesel Generator 24 Hour Endurance Test, Revision 22

ARs

A2032054

IRs

1009644	2619326	2619192
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WOs

R1335710	R1341726
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Drawings

P&ID, SBLC System, Sheet 1 of 6280-M-358, Revision 39

Miscellaneous

ASME OM Code-2004, Code for Operation and Maintenance of Nuclear Power Plants

Section 1EP6: Drill Evaluation

Procedures

EP-AA-111, Emergency Classification and Protective Action Recommendations, Revision 19

EP-AA-1007, Exelon Nuclear Radiological Emergency Plan Annex for PBAPS, Revision 31

ON-121, Drifting Control Rod - Procedure, Revision 13

Miscellaneous

PSEG 2020R, Out of the Box Evaluation, Revision 1

Section 2RS1: Access Control to Radiologically Significant Areas

Procedures

LS-AA-2001, Collecting and Reporting of NRC PI Data, Revision 14

LS-AA-2140, Monthly Data Elements for NRC Occupational Exposure Control Effectiveness, Revision 5

RP-AA-19, HRA Program Description, Revision 2

RP-AA-100, Conduct of Radiation Protection Operations, Revision 0

RP-AA-460, Controls for High and Locked HRAs, Revision 26

RP-AA-460-002, Additional High Radiation Exposure Control, Revision 2

Surveys

15-07680 U3 09' Reactor Cavity, September 22, 2015

15-9524 Drywell Valve 28B Work Area Air Sample, October 2, 2015

15-9557 Drywell Valve 28B Breathing Zone Area Air Sample, October 2, 2015

15-10300 U3 116' Drywell 80 A & B Valve Breach, October 7, 2015

15-10417D RHR Pump Work Area Air Sample, October 8, 2015

15-10551 U3 135' Drywell System Breach, October 8, 2015

15-10890 U3 91.6' B RHR Pump Work Area Survey, October 10, 2015

15-10910 B RHR Pump Work Breathing Zone Area Air Sample, October 8, 2015

15-10911 B RHR Pump Work Breathing Zone Area Air Sample, October 8, 2015

Miscellaneous

Internal Dose Assessment from November 4, 2015

PI Modification/Review Request January 15, 2016

RT-M-045-900-2 Unit 2 and Common Door Inspection September 14, 2012

RT-M-045-900-2 Unit 2 and Common Door Inspection November 20, 2014

Unit 3 TSs

Unit 3 UFSAR

Section 2RS2: Occupational ALARA Planning and Controls

Procedures

RP-AA-401, Operational ALARA Planning and Controls, Revision 19

RP-AA-401, Operational ALARA Planning and Controls, Revision 21

RP-AA-403, Administration of the RWP Program, Revision 6

Miscellaneous

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 RWP PB-C-15-00546, Drywell & OBMSIV Room Small Bore Pipe and Associated Work
 RWP PB-C-15-00546, Drywell & OBMSIV Room Small Bore Pipe and Associated Work
 RWP PB-C-15-00609, B RHR Floating Head
 RWP PB-C-15-00624, Unit 3 B & D RHR Rooms-Work Associated with EPU Crosstie Mod
 RWP PB-C-15-00901, P3R20 Refuel Floor Reactor Disassembly and Re-assembly
 Station ALARA Committee Meeting Minutes October 2, 2015
 Station ALARA Committee Meeting Minutes October 12, 2015

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LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Revision 14
 LS-AA-2010, Monthly Data Elements for NRC WANO Unit Reactor Shutdown Occurrences,
 Revision 5
 LS-AA-2030, Monthly Data Elements for NRC Unplanned Power Changes Per 7000 Critical
 Hours, Revision 5

Miscellaneous

Data Sheets for Performance Indicator Data

Section 40A2: Problem Identification and ResolutionProcedures

MA-AA-723-301, Periodic Inspection of Limitorque Model SMB/SB/SBD/-000 through 5 Motor
 Operated Valves, Revision 11

IRs

02413679	02556564	02555841
02629710	02629960	02638682

ARs

A0045354	A0131303	A1672927	A1688003
A1692471	A1742467	A1742468	A1754249
A1754250	A1784184	A1784235	A1802144
A1826668	A1839662	A1840485	A1845295
A1859482	A1875810	A1875816	A1838115
A1839508	A1892060	A1892062	A1900105
A1907190	A1920610	A1945082	A1959342
A1956391	A1959338	A1976116	A1976538
A1977815	A1978836	A2013200	A2013203
A2013192	A2021712	A2032956	

WO

R1238875

Miscellaneous

ECR 15-00459 Replace "Leaf Style" with "C Style" Torque Switch for SMB-000 Oper.

Section 40A3: Follow-up of Events and Notices of Enforcement Discretion

IRs

02631244

02606215

Miscellaneous

LER 3-04-001, Loss of HPCI System Function as a Result of Inoperable Flow Controller

LER 3-05-001, Loss of HPCI System Function as a Result of Inoperable Flow Controller

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ADS	automatic depressurization system
ALARA	as low as is reasonably achievable
CAP	corrective action program
CFR	Code of Federal Regulations
CR	condition report
CS	core spray
ECR	engineering change request
EDG	emergency diesel generator
ESW	emergency service water
HPCI	high pressure coolant injection
HPSW	high pressure service water
HRA	high radiation area
HX	heat exchanger
IMC	inspection manual chapter
IP	inspection procedure
IR	issue report
LER	licensee event report
LHRA	locked high radiation area
MCR	main control room
MOV	motor operated valve
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
PBAPS	Peach Bottom Atomic Power Station
PI	performance indicator
PMT	post-maintenance testing
RCIC	reactor core isolation coolant
RG	regulatory guide
RHR	residual heat removal
RP	radiation protection
RPS	reactor protection system
RTP	rated thermal power
RWP	radiation work permit
SBLC	standby liquid control
SDP	significance determination process
SOW	system outage window
SRV	safety relief valve
SSCs	structures, systems, and components
ST	surveillance test
TS	technical specification
TTV	trip throttle valve
UFSAR	Updated Final Safety Analysis Report
VHRA	very high radiation area
WOs	work orders