

July 26, 2006

Mr. Christopher M. Crane  
President and CNO  
Exelon Nuclear  
Exelon Generation Company, LLC  
200 Exelon Way  
Kennett Square, PA 19348

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION - NRC INTEGRATED  
INSPECTION REPORT 05000277/2006003 AND 05000278/2006003

Dear Mr. Crane:

On June 30, 2006, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Peach Bottom Atomic Power Station Units 2 and 3. The enclosed inspection report documents the inspection results, which were discussed on July 24, 2006, with Mr. J. Grimes and other members of your staff.

The inspection 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.

The report documents three NRC-identified findings of very low safety significance (Green). All of the findings were determined to involve violations of NRC requirements. Additionally, one licensee-identified violation which was determined to be of very low safety significance is listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program (CAP), the NRC is treating the three findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC's Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at Peach Bottom.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (The Public Electronic Reading Room).

Sincerely,

**/RA/**

James Trapp, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Docket Nos.: 50-277, 50-278  
License Nos.: DPR-44, DPR-56

Enclosures: Inspection Report 05000277/2006003 and 05000278/2006003  
w/Attachment: Supplemental Information

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION I**

Docket Nos.: 50-277, 50-278

License Nos.: DPR-44, DPR-56

Report No.: 05000277/2006003 and 05000278/2006003

Licensee: Exelon Generation Company, LLC

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

Location: Delta, Pennsylvania

Dates: April 1, 2006 through June 30, 2006

Inspectors: F. Bower, Senior Resident Inspector  
D. Schroeder, Resident Inspector  
D. Tifft, Acting Resident Inspector  
R. Bhatia, Reactor Inspector  
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Approved by: James Trapp, Chief  
Reactor Projects Branch 4  
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## SUMMARY OF FINDINGS

IR 05000277/2006-003, 05000278/2006-003; 04/01/2006 - 06/30/2006; Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3; Licensed Operator Requalification; Operability Evaluations ; Radiation Safety.

The report covered a 3-month period of inspection by resident inspectors, and announced inspections by four regional specialist inspectors. Three Green findings, which were non-cited violations (NCVs), were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### A. NRC-Identified and Self-Revealing Findings

#### **Cornerstone: Barrier Integrity**

- Green. The inspectors identified a non-cited violation (NCV) of 10 CFR 55.59(a)(2)(ii) for an inadequate annual operating test that was administered at Limerick for Peach Bottom and Limerick Senior Reactor Operators Limited to Fuel Handling (LSROs). Exelon procedures and commitments made by the licensee in 1991 require questions on job performance measures (JPMs) to explore the differences, if any, in task performance between Limerick and Peach Bottom. Three of the five JPMs had significant differences in the way the task is performed at Limerick versus the same task at Peach Bottom. These three JPMs should have had questions to explore these differences, but did not. Exelon has entered this issue into their corrective action program (CAP) for resolution.

The inspectors determined that the inadequate annual operating test administered at Limerick for Peach Bottom and Limerick LSROs was more than minor because it was associated with the human performance attribute and affected the Barrier Integrity Cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding is of very low safety significance because the inadequate annual operating test did not have an adverse impact on operator actions such that safety related equipment was made inoperable during normal operations or in response to a plant transient. (Section 1R11)

- Green. The inspectors identified a NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," when PBAPS personnel inadequately accomplished foreign material exclusion (FME) recovery procedures for the Unit 3 high pressure coolant injection (HPCI) turbine exhaust drain piping. The failure to properly implement this procedure prevented a HPCI primary containment isolation valve (PCIV) closure on April 5, 2006. PBAPS entered this procedure adherence issue into their CAP for resolution.

The finding is more than minor because the failure of a containment isolation valve to close is associated with the Barrier Integrity Cornerstone attribute of systems and component performance and affected the objective to provide reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. The finding was determined to be of very low safety significance since the finding did not represent an actual open pathway in the physical integrity of reactor containment. A contributing cause of the finding has a cross-cutting aspect in the area of problem identification and resolution because PBAPS did not thoroughly evaluate a similar October 2005 loss of FME integrity in the same piping such that the extent of debris intrusion was determined and the cause was resolved to preclude recurrence. (Section 1R15)

### **Cornerstone: Emergency Preparedness**

- Green. The inspectors identified a NCV of 10 CFR 50.47(b)(10) for failure to maintain protective measures for emergency workers. On April 20, 2006, the NRC identified a ready-for-use self-contained breathing apparatus (SCBA), in the main control room, with a partially separated regulator air diffuser. This NRC observation revealed that program procedures for inspection of SCBAs were not in accordance with the manufacture's guidance for maintenance and inspection of SCBAs. Exelon removed the SCBA from service, entered this issue into its CAP, and conducted an extent of condition review.

This finding is more than minor because if left uncorrected damaged components may be missed during other SCBAs inspections. Using the Emergency Preparedness Significance Determination Process, the inspectors determined that the finding was Green because the failure to meet a regulatory requirement and maintain onsite respiratory protective equipment, in accordance with regulations, is specifically identified in NRC Manual Chapter 0609, Appendix B, as an example of a 10 CFR 50.47(b)(10) finding of very low safety significance. The licensee's 10 CFR 20.1703 required quality assurance program for respiratory protection equipment did not require complete inspection of the SCBAs. Although the finding did involve an emergency planning standard, the standard was not degraded in that additional devices were available, and an extent of condition review did not identify any additional examples. (Section 2OS3)

### **B. Licensee-Identified Violation**

A violation of very low safety significance (Green), which was identified by the licensee, was reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's CAP. The violation and corrective actions are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 2 began the inspection period at approximately 100 percent rated thermal power (RTP) until May 19, 2006, when power was reduced to 53 percent for waterbox cleaning and other planned maintenance and testing. The unit returned to full power on May 21, 2006, where it remained except for brief periods to support planned turbine testing and rod pattern adjustments.

Unit 3 began the inspection period at approximately 100 percent RTP until May 5, 2006, when power was reduced to 55 percent for condenser tube plugging, waterbox cleaning, and other planned maintenance and testing. The unit returned to full power on May 8, 2006, where it remained except for brief periods for the conduct of planned turbine testing and rod pattern adjustments.

### 1. REACTOR SAFETY

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

1R01 Adverse Weather (71111.01 - 2 System Samples; 1 Site Sample)

#### .1 Summer Seasonal Readiness

##### a. Inspection Scope

The inspectors reviewed Peach Bottom Atomic Power Station's (PBAPS) preparation for the summer period, from May 15 through September 15, that includes high temperature adverse weather. The review included a verification of the adequacy of procedure WC-AA-107, "Seasonal Readiness," and PBAPS's implementation of this procedure and the summer readiness work items for the following two systems. The inspectors discussed these actions with PBAPS's work management, maintenance and engineering personnel. The inspectors walked down the systems and toured the associated plant spaces to ensure the systems' physical readiness in relation to existing warm weather conditions and to ensure that the systems would remain functional when challenged by expected hot weather conditions.

- Emergency Cooling Water System
- Emergency Diesel Generator (EDG) System

The inspectors also completed the following inspection activities for the ECW system: reviewed the Updated Final Safety Analysis Report (UFSAR) to determine the licensing basis and design basis of the system; reviewed system operating procedures; verified that the applicable preventive maintenance tasks were completed; and, reviewed the licensed operator training scenario for the loss of the Conowingo Pond and confirmed the completion time for the scenario was consistent with the design requirements in UFSAR, Section 2.4.3.5.5.

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b. Findings

No findings of significance were identified.

.2 Adverse Weather Event Review

a. Inspection Scope

On June 29, 2006, the inspectors reviewed PBAPS's actions taken to prepare and to respond to potential adverse environmental conditions from the ultimate heat sink (Conowingo Pond) that included increasing pond level and Susquehanna river flow due to heavy rainfall during the week. These conditions caused an abnormal amount of debris to collect on the outer screens. The review was performed to verify the adequacy of PBAPS's actions in response to the abnormal river conditions. The actions taken by PBAPS included implementation of applicable procedures and staffing of the outage control center to coordinate maintenance activities at the outer screens. The inspectors observed a portion of the maintenance activities that consisted of utilizing a crane to scrape debris away from the intake structure.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04Q - 4 Samples)

Partial Walkdown

a. Inspection Scope

The inspectors performed a partial walkdown of the following four systems to verify system and component alignment and to note any discrepancies that could impact system operability. The partial walkdowns included verification of the alignment of selected portions of redundant or backup systems and risk-significant systems that were recently realigned following an extended system outage, maintenance, modification, or testing. The inspectors reviewed selected valve positions, electrical power availability, and the general condition of major system components. The partial walkdowns included the following systems:

- Unit 3 Reactor Core Isolation Cooling with Unit 3 HPCI Out-of-Service
- 2 "A" Residual Heat Removal (RHR) with 2 "B" RHR Out-of-service
- E-2, E-3, and E-4 with E-1 Out-of-Service
- E-1, E-3, and E-4 Diesel Generators with E-2 Out-of-Service

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q - 9 Samples)Fire Protection - Toursa. Inspection Scope

The inspectors reviewed PBAPS's Fire Protection Plan, Technical Requirements Manual (TRM), and the respective pre-fire action plan procedures to determine the required fire protection design features, fire area boundaries, and combustible loading requirements for the areas examined during this inspection. The fire risk analysis was reviewed to gain risk insights regarding the areas selected for inspection. The inspectors then performed walkdowns of the following areas to assess the material condition of active and passive fire protection systems and features. The inspection was also performed to verify the adequacy of the control of transient combustible material and ignition sources, the condition of manual firefighting equipment, fire barriers, and the status of any related compensatory measures. The following nine fire areas were reviewed for impaired fire protection features:

- Reactor Building 3, Drywell Area, Elevation 135' (Fire Zone 32)
- Standby Gas Treatment, Radwaste, Elevation 91'6" (Fire Zone 70)
- Unit 3, Torus Room Reactor Building 91'6" Elevation (Fire Zone 13C)
- Unit 3, Reactor Building HPCI Room, Elevation 88' (Fire Zone 62)
- Unit 3, Torus Room, Elevation 91'6" (Fire Zone 5C)
- Unit 2, Reactor Building, 2 "A" & 2 "C" RHR Pump and Heat Exchanger Rooms, Elevations 91'6" and 116' (Fire Zone 1)
- Unit 2, Reactor Building, 2 "B" & 2 "D" RHR Pump and Heat Exchanger Rooms, Elevations 91'6" and 116' (Fire Zone 3)
- Unit 2, Reactor Building, 2 "A" & 2 "C" Core Spray Rooms, Elevation 91'6" (Fire Zones 5A & 5B)
- Unit 3, Reactor Building, Standby Liquid Control Area, Elevation 195' (Fire Zone 13K)

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 - 2 Internal Samples)Internal Floodinga. Inspection Scope

The inspectors reviewed PBAPS's internal flooding analysis contained in the Individual Plant Examination (IPE) for the EDG rooms and the Unit 3 "A" and "C" core spray rooms. The inspectors also reviewed Design Basis Document (DBD) P-T-09, Rev 8, "Internal Hazards," and noted that internal flooding of the EDG rooms was not included in the PBAPS design basis. The inspectors walked down selected areas of the EDG

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building to verify internal flooding design features were as described in the IPE. The inspectors also verified that floor plugs were installed in the 3 "A" and "C" core spray room drains to prevent multiple core spray pumps from being affected by a flood.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification Program (71111.11Q - 1 Sample; 71111.11B - 2 Samples)

.1 Limited Senior Reactor Operator Regualification Program Review

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, Rev. 9, "Operator Licensing Examination Standards for Power Reactors," Inspection Procedure Attachment 71111.11, "Licensed Operator Regualification Program," and NRC Manual Chapter 0609, Appendix I, "Operator Regualification Human Performance Significance Determination Process (SDP)," as acceptance criteria.

The inspectors reviewed documentation of operating history related to Limited Senior Reactor Operators - Limited to Fuel Handling (LSROs) since the last regualification program inspection. The inspectors also discussed facility operating events with the resident staff. Documents reviewed included NRC inspection reports and licensee condition reports (CRs) that involved human performance issues for LSROs to ensure that operational events were not indicative of possible training deficiencies.

The inspectors reviewed one set of five JPMs and the written exam administered during this current LSRO exam cycle, as well as the exams administered the previous cycle to ensure the quality of these exams. Limits on test item repetition did not exceed the criteria established in the Examination Standards and 10 CFR 55.59.

During this inspection, the inspectors observed the administration of operating examinations to all five licensed LSROs on the refueling floor as well as classroom JPMs at Limerick. The operating examinations consisted of one set of five JPMs administered to each individual. In addition, inspectors observed the administration of the written exam to the five LSROs. Inspectors reviewed the grading of the JPMs and the written exam on June 1, 2006.

The inspectors interviewed all five LSROs regarding the facility's policies and practices for administering examinations as well as the method and effectiveness of the licensee feedback system.

The inspectors reviewed the Exelon's program for maintaining active LSRO licenses and ensuring the medical fitness of its LSROs. Inspectors assessed the facility and operator licensee's compliance with the requirements for maintaining license conditions in

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accordance with 10 CFR 55.53. Inspectors reviewed medical records for three (of five) of the LSROs as part of this process. In addition, inspectors reviewed reactivation records for all five existing LSROs for conformance with Exelon procedures and 10 CFR 55 requirements.

The inspectors assessed the effectiveness of the facility licensee's process for revising and maintaining its LSRO continuing training.

The inspectors reviewed training records for the 2005 and 2006 LSRO requalification cycles to ensure conformance with licensee procedure and 10 CFR 55 requirements. Since there were no failures on the 2005 LSRO exam, there were no remediation records that needed review.

The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspector verified that:

- Individual failure rate on the walkthrough test (JPMs) was less than or equal to 20 percent. (Failure rate was 0.0 percent)
- Individual failure rate on the written exam was less than or equal to 20 percent. (Failure rate was 0.0 percent).
- More than 75 percent of the individuals passed all portions of the exam (100 percent of the individuals passed all portions of the exam).

b. Findings

Introduction: The inspectors identified a non-cited violation (NCV) of 10 CFR 55.59 (a)(2)(ii) in that Exelon did not include questions on the annual operating tests to explore the differences between JPMs performed at Limerick versus the same task at Peach Bottom.

Description: The NRC clarified the requirement to ask questions on JPMs in a letter from the NRC to Philadelphia Electric Company (PECO) dated December 10, 1991. Since the LSROs are licensed to move fuel at both Limerick and Peach Bottom stations, this letter specifies the following: "Pursuant to 10 CFR 55.59 (a)(2) and 10 CFR 55.59 (c)(4)(i) licensed operators must successfully complete a requalification program that includes an annual operating test. In 10 CFR 55.4, the definition for cases where a license is issued for operation of two or more facilities, facility means all facilities identified in the license. Therefore, an operating test, as described in 10 CFR 55.45, requires that the test be applicable to all of the units for which the LSROs are licensed. The annual operating test Philadelphia Electric Company administers to the LSROs consists of Job Performance Measures (JPMs) tailored to the knowledge, skills and abilities required to perform refueling activities. The operating tests administered to multi-site licensed LSROs will have to include questions associated with each JPM that explore the difference, if any, between the task performed at the facility where the JPM

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was administered and the same task at the other facility. This will ensure that the operating test suffices as an examination for each facility.”

Inspectors observed the 2006 annual operating examination at Limerick for Peach Bottom and Limerick LSROs. The inspectors noted that no questions were asked at the conclusion of the JPM to explore the differences between performing the task at Limerick and how that same task would have been performed at Peach Bottom. Three of the five JPMs had significant differences in the way the task was performed at Limerick versus the same task at Peach Bottom. These three JPMs should have had questions to explore these differences, but did not. The failure to ask questions has resulted in an operating test that only suffices as an adequate annual examination for Limerick.

Exelon implemented the commitment to ask followup questions in Exelon procedure TQ-AA-131, “Senior Reactor Operator - Limited Requalification Training.” Section 4.10.2 of this procedure states “The annual operating examinations administered to the LSROs will include questions associated with each JPM that explore the differences, if any, between the task performed at the facility where the JPM was administered and the same task at the other similar facilities. This shall be done to ensure that the operating test suffices as an examination for each facility for which the individual holds a license.” The 2006 LSRO exam did not satisfy the requirements of this procedure.

Analysis: The inspectors determined that the inadequate annual operating test administered at Limerick for Peach Bottom and Limerick LSROs was more than minor because it was associated the human performance attribute and affected the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radio nuclide releases caused by accidents or events. The finding was evaluated using the Operator Requalification Human Performance SDP (IMC 0609, Appendix I). The SDP, Appendix I, Block 10, requires the inspectors to determine if more than 20 percent of the individual operating test items reviewed by the inspector were unacceptable. In this case, the inspectors determined that at least 3 out of 5 (60 percent) of the JPMs administered on the examination were unacceptable because they had tasks that were performed differently at Peach Bottom and Limerick and no followup questions were asked to explore these differences. This has resulted in an annual operating examination that does not test both facilities. Therefore the answer to Block 10 was affirmative and indicates a finding of very low safety significance (Green).

Enforcement: 10 CFR 55.59 (a)(2)(ii) requires that the operating test as described in 10 CFR 55.45 be applicable to all of the units for which the LSRO's are licensed. Exelon Procedure TQ-AA-131, Section 4.10.2, states, “The annual operating examinations administered to the LSROs will include questions associated with each JPM that explore the differences, if any, between the task performed at the facility where the JPM was administered and the same task at the other similar facilities. This shall be done to ensure that the operating test suffices as an examination for each facility for which the individual holds a license.” Contrary to the above, on May 30, 2006, the inspectors identified that Exelon administered an inadequate annual operating

examination to its LSROs because no followup questions were asked to explore differences in how the task that was just performed at Limerick would have been performed differently at Peach Bottom. Because this finding was of very low safety significance and has been entered into the corrective action program under issue report 496375, this violation is being treated as an NCV, consistent with section VI.A of the NRC enforcement policy: **NCV 05000277&278/2006003-01, Inadequate Annual Operating Test Administered at Limerick.**

## .2 Resident Inspector Quarterly Review

### a. Inspection Scope

On June 6, 2006, the inspectors observed operators in the plant's simulator during licensed operator requalification training to verify that operator performance was adequate and that evaluators were identifying and documenting crew performance problems. The inspectors also verified that performance errors were discussed in the crew's post-scenario critiques. The inspectors focused on the control room supervisor's satisfactory completion of critical tasks, including proper and timely identification and classification of emergencies. The inspectors also evaluated whether the operators adhered to the emergency operating procedures. The inspectors discussed the training, simulator scenarios, and critiques with the operators, shift supervision, and the training instructors. The three scenarios observed for this one sample are listed below:

- Loss of Reactor Building Closed Cooling Water (RBCCW)
- Loss of Conowingo Pond
- Low Condenser Vacuum

### b. Findings

No findings of significance were identified.

## .3 Regional In-Office Review of Annual Requalification Exam Results

### a. Inspection Scope

A review was conducted of licensee requalification exam results for the annual operating testing cycle. The inspection assessed whether pass rates were consistent with the guidance of NUREG-1021, Revision 9, "Operator Licensing Examination Standards for Power Reactors," and IMC 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)."

The inspector verified that:

- Crew pass rate was greater than or equal to 80 percent. (Pass rate was 100 percent)
- Individual pass rate on the dynamic simulator test was greater than 80 percent. (Individual pass rate was 95.4 percent.)

- Individual pass rate on the walkthrough (JPMs) was greater than 80 percent. (Pass rate was 100 percent)
- Individual pass rate on the comprehensive written exam was greater than 80 percent (Pass rate was 98.5 percent)
- More than 80 percent of the individuals passed all portions of the exam. (93.8 percent of the individuals passed all portions of the exam)

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 2 Samples)

Routine Maintenance Effectiveness Issues

a. Inspection Scope

The inspectors reviewed the follow-up actions for issues to assess the effectiveness of PBAPS's maintenance activities. The review included items such as: (1) appropriate work practices; (2) identifying and addressing common cause failures; (3) scoping in accordance with 10 CFR 50.65(b) of the Maintenance Rule (MR); (4) characterizing reliability issues for performance; (5) trending key parameters for condition monitoring; (6) charging unavailability for performance; (7) classification and reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); and (8) appropriateness of performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified as (a)(1). In addition, the inspectors reviewed specific maintenance events. The items reviewed included the following:

- Primary Containment Isolation Valves (System 7). The following issue was identified and processed in the PBAPS's CAP when System 7 met the maintenance rule (a)1 threshold: IR 487942.
- E-2 Emergency Diesel Generator (EDG) Overhaul

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 6 Samples)

a. Inspection Scope

The inspectors reviewed PBAPS's planning and risk management actions for planned and emergent work activities to assess PBAPS's management of overall plant risk. The activities selected were based on plant maintenance schedules and systems that contributed to risk. As applicable, the inspectors reviewed PBAPS's probabilistic safety



assessment risk evaluation results forms. The inspectors compared the risk assessment results and the risk management actions against the requirements of 10 CFR 50.65(a)(4) and the information in Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," and Procedure WC-AA-101, "On-line Work Control Process." The inspectors verified that risk assessments were performed when required and appropriate risk management actions were identified. The inspectors also reviewed selected control room operating logs, walked down protected equipment and maintenance locations, and interviewed personnel. These reviews were performed to determine whether PBAPS properly assessed and managed plant risk and performed activities in accordance with applicable Technical Specifications (TS) and work control requirements. The following six planned and emergent work order (WO) activities were reviewed:

- WO R0757927, Unit 2 RHR Pump Torus Suction Valve, MO 2-10-013B, Diagnostic Testing
- WO R096753280, E-2 DG Scope Expansion
- WO R01011685, Unit 3 Service Water Bay Cleaning
- WO C0215988, Transport, Load and Store Independent Spent Fuel Storage Installation (ISFSI) Cask 32
- WO C021709713, Unit 2 HPCI, Replace Steam Trap Internal Parts
- WO C0216896, Unit 2 "C" RHR Heat Exchanger Helium Leak Testing

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 6 Samples)

j. Inspection Scope

The inspectors reviewed six issues to assess the technical adequacy of the evaluations, the use and control of compensatory measures, and compliance with the licensing and design bases. As applicable, associated adverse condition monitoring plans, engineering technical evaluations (TE) and operational and technical decision making (OTDM) documents were also reviewed. The inspectors verified these processes were performed in accordance with the applicable procedures. The inspectors used the TSs, TRM, the UFSAR, and associated Design Basis Documents as references during these reviews. The issues reviewed included:

- Local Leak Rate Test: HPCI Turbine Exhaust (Action Request (AR) A1436009), ST-30-23-4
- Unit 3 Reactor Water Chlorides and Sulfates Increase Due to Reduced Clean-up Flow (IR 480004)
- E-2 EDG Upper Vertical Drive Thrust Bearing Locknut Loose (AR A1565569)
- Diesel Driven Fire Pump Not Analyzed for 92F Normal Heat Sink Temperature (IR 453415)
- HPCI Exhaust Drain (PCIV) (IR 475597), AO-3-23C-137



- Body to Bonnet Leak on Core Spray Loop "A" Inboard Discharge Isolation Valve, MO-3-14-012A (AR A1564766\IR 486386)

b. Findings

Introduction: The inspectors identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," when PBAPS personnel inadequately accomplished FME integrity recovery procedures for the Unit 3 HPCI turbine exhaust drain piping.

Description: The high pressure coolant injection (HPCI) turbine exhaust drain line inboard isolation valve is a two inch, air-operated and normally open PCIV, AO-3-23-137. Performance of the Unit 3 HPCI logic system functional test on April 5, 2006, should have realigned AO-3-23-137 to the closed position.

During a plant tour on April 6, 2006, the inspectors observed that AO-3-23-137 appeared to be partially open by local indication. The main control room indicating lights for AO-3-23-137 incorrectly indicated that AO-3-23-137 was in the closed position. The inspectors reported this observation to control room personnel. PBAPS personnel confirmed that AO-3-23-137 was approximately 20 percent open by local observation, and declared AO-3-23-137 inoperable as a PCIV. The hand valve (HV3-23C-31158) located upstream of AO-3-23-137 was closed to ensure that primary containment isolation of the HPCI exhaust drain line was restored in accordance with TS 3.6.1.3.

On April 7, PBAPS personnel disassembled AO-3-23-137 after the valve failed a local leak rate test. PBAPS personnel found and removed foreign material from the valve body that had prevented valve closure. The recovered foreign material consisted of four pieces of metal resembling shim stock and a three inch length of eighth inch diameter weld rod. The AO-3-23-137 valve was reworked following removal of foreign material and was returned to service on April 7, 2006.

The inspectors noted a related prior instance of foreign material being found in the Unit 3 HPCI turbine exhaust drain line (IR 378515) during the 2005 refueling outage. In October 2005, a manual valve (HV-3-23C-31158) upstream of AO-3-23-137 would not fully close to support leak rate testing of AO-3-23-137. During the outage, foreign material similar to that found in April 2006 was removed from HV-3-23C-31158.

Exelon Procedures MA-AA-716-008, "Foreign Material Exclusion Program," and ER-AA-2006, "Lost Parts Evaluations," specify actions to take for a loss of integrity for the FME program. These actions include determination of the extent of debris intrusion, planning for debris removal and an assessment of existing and future equipment damage. In October 2005, PBAPS personnel performed boroscope inspections to locate and remove any additional foreign material. However, these inspections were limited by the piping configuration. No additional debris was located at that time. The inspectors noted that the piping was not cut open to inspect areas inaccessible to boroscope inspection. Conversely, in 2004, during a similar loss of FME integrity event

in the Unit 2 HPCI turbine exhaust drain line, techniques including cutting piping to inspect otherwise inaccessible areas were used.

Exelon Procedures MA-AA-716-008, and ER-AA-2006 also specify documenting the lost parts evaluation in an engineering technical evaluation or an operability determination. These evaluations were not performed to assess the impact of any remaining foreign material located in inaccessible areas of the drain piping. PBAPS's analysis, in IR 378515, concluded that the scope of the inspection and satisfactory removal of identified foreign material were adequate to ensure the continued reliable operation of the Unit 3 HPCI turbine exhaust system. However, PBAPS personnel did not consider that a PCIV was located in the HPCI turbine exhaust system. This was approximately six months prior to identification of additional FME in this piping in April 2006. Since this prior problem was not thoroughly evaluated, foreign material in the HPCI steam exhaust drain line migrated from an area not accessed during the boroscope inspection into the AO-3-23-137 valve body and prevented it from functioning as a PCIV.

Analysis: PBAPS's inadequate accomplishment of procedure actions for a loss of FME integrity in the Unit 3 HPCI turbine exhaust drain line is considered a performance deficiency since 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires that activities affecting quality shall be accomplished in accordance with documented instructions or procedures. The finding is more than minor because the failure of a containment isolation valve to close is associated with the Barrier Integrity Cornerstone attribute of systems and component performance and affected the objective to provide reasonable assurance that physical design barriers (containment) protect the public from radio nuclide releases caused by accidents or events. During the period of exposure, the redundant containment penetration barriers were operable. Therefore, the finding was determined to be of very low safety significance using Phase 1 of the SDP, since the finding does not represent an actual open pathway in the physical integrity of reactor containment.

This finding has a cross-cutting aspect in the area of problem identification and resolution because PBAPS did not thoroughly evaluate a similar October 2005 loss of FME integrity in the same piping such that the extent of debris intrusion was determined and the cause was resolved to preclude recurrence.

Enforcement: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires that activities affecting quality shall be prescribed by, and accomplished in accordance with, documented instructions or procedures, and shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Exelon Procedure MA-AA-716-008, "Foreign Material Exclusion Program," controls investigation and recovery actions when unexpected foreign material is discovered. Procedure MA-AA-716-008, Attachment 9, "Loss of Integrity Actions - Recovery from a Loss of FME Integrity," and Attachment 10, "Loss of Integrity Notification and Recovery Plan," provide detailed instructions for response to a loss of FME integrity. The attachments direct a determination of the extent of debris intrusion, planning for debris removal and an assessment of existing and future equipment damage. Contrary to the above, the loss

of integrity actions contained in Attachments 9 and 10 of Procedure MA-AA-716-008 were not adequately accomplished. Specifically, PBAPS's determination of the extent of debris intrusion, the removal of the FME and the assessment of future equipment damage were inadequately accomplished following the October 2005 loss of FME integrity in the Unit 3 HPCI drain line upstream of AO-3-23-137. These incomplete activities were evident based on the subsequent identification of debris in AO-3-23-137 in April 2006. The debris in AO-3-23-137 damaged seat tightness of the valve and resulted in an unplanned inoperability of this PCIV. Because this violation was of very low safety significance and was entered into PBAPS's corrective action program (IR 475597), it is being treated as a non-cited violation, consistent with section VI.A.1 of the NRC Enforcement Policy. Immediate corrective actions included declaring AO-3-23-137 inoperable as a PCIV and closing a manual valve to isolate the drain line. Valve AO-3-23-137 was subsequently repaired, leak rate tested and returned to service: **NCV 05000277&278/2006003-02, Inadequate Accomplishment of FME Integrity Recovery Procedures Following Identification of FME in the Unit 3 HPCI Turbine Exhaust Drain Piping.**

1R17 Permanent Plant Modifications (71111.17 - 1 Sample)

.1 Continuous Pre-Lubrication Modification for the E-2 EDG

a. Inspection Scope

The inspectors reviewed licensee procedures CC-AA-102, "Design Input and Configuration Change Impact," and CC-AA-103, "Configuration Change Control" and observed selected portion of the licensee's activities to implement a design change that affected one EDG and both units, while the units were online. The inspectors reviewed selected portions of engineering change request PB-05-00254-005, "Provide Continuous Pre-Lube for E-2 EDG." The review was conducted to verify that the design bases, licensing bases, and performance capability of this risk significant EDG had not been degraded through this modification. The inspectors also reviewed the 10 CFR 50.59 screening for the ECR to verify that the modifications had not affected the E-2 EDG operability and availability. The inspectors reviewed selected portions of the modification field implementation and compared the implementation performance to the design requirements and installation standards. The inspectors also verified that the implementation did not impair operating procedure actions, key safety functions and operator response to a loss of key safety functions. The review of selected post-modification testing results were also conducted to verify that operability was established, to verify that unintended system interactions did not occur and to verify that the test acceptance criteria were met.

b. Findings

No findings of significance were identified.

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

The inspectors observed selected portions of post-maintenance testing activities and/or reviewed completed test records. The inspectors observed whether the tests were performed in accordance with the approved procedures and assessed the adequacy of the test methodology based on the scope of maintenance work performed. In addition, the inspectors assessed the test acceptance criteria to verify whether the test demonstrated that the tested components satisfied the applicable design and licensing bases and the TS requirements. The inspectors reviewed the recorded test data to evaluate whether the acceptance criteria were satisfied. The inspectors reviewed six post-maintenance tests performed in conjunction with the following maintenance activities:

- WO R0936985-02, Unit 2 “B” RHR Pump Discharge Check Valve, CK-2-10-48B
- WO R0842698-01, Unit 2 “B” RHR Shutdown Cooling Valve, MO-2-10-15B
- WO C0217206, HPCI Exhaust Drain PCIV, A03-23C-137
- WO R0757927-03, Unit 2 “B” RHR Pump Torus Suction Valve Operator, MO-2-10-013B-OP
- R101473201, Core Spray Unit 3 Loop “B” Pump, Valve, and Flow following Lube Oil Cooler Cleaning
- C0215786, Replace E-2 EDG Speed Switch

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 7 Samples)a. Inspection Scope

The inspectors reviewed and/or observed portions of surveillance tests, and compared test data with established acceptance criteria to verify the systems demonstrated the capability of performing the intended safety functions. The inspectors also verified that the systems and components maintained operational readiness, met applicable TS requirements, and were capable of performing the design basis functions. The surveillance tests reviewed and observed included:

- ST-I-010-105-3, RHR Loop “B” Logic System Functional Test
- ST-O-052-122-2, E-2 DG RHR Pump Reject Test
- ST-O-052-412-2, E-2 DG Fast Start and Full Load Test
- SI3M-60F-RT7-B4M2, Main Steam Isolation Valve (MSIV) Scram Closure Response Time
- ST-I-03B-100-2, Alternate Rod Insertion (ARI) Recirculation Pump Trip (RPT) Channel “A” Logic System Functional Test

- ST-O-020-560-2 & 3, Reactor Coolant Leakage Test - Units 2 & 3 (reactor coolant system - sample)
- ST-O-032-301-2, HPSW Pump, Valve, and Flow (inservice testing - sample)

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 Sample)

b. Inspection Scope

The inspectors reviewed one temporary modification to verify that implementation of the modifications did not place the plant in an unsafe condition. The review was also conducted to verify that the design bases, licensing bases, and performance capability had not been degraded through these modifications. The inspectors verified the modified equipment alignment through control room instrumentation observations, UFSAR, drawings, procedures, and work order reviews, and plant walkdowns of accessible equipment. The following temporary modification was reviewed:

- TCCP 06-00214, Unit 2 Stator Cooling Water Temporary Demineralizer Skid

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

**Cornerstone: Occupational Radiation Safety**

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 2 Samples)

a. Inspection Scope

The inspector reviewed selected activities, and associated documentation, in the below listed areas. The evaluation of Exelon's performance in these areas was against criteria contained in 10 CFR 20, applicable TSs, and applicable station procedures.

### Inspection Planning

The inspector reviewed Occupational Exposure cornerstone performance indicators (PIs) for follow-up, as appropriate.

### Plant Walkdowns and Radiation Work Permit (RWP) Reviews

The inspector made tours of selected radiologically controlled areas (RCAs) at the station and made independent radiation surveys of ambient conditions to verify that radiological controls and postings were appropriate for existing conditions. The inspector also toured external portions of the station.

The inspector reviewed and discussed external and internal dose assessments to identify unplanned external and internal occupational doses or potential performance indicator occurrences.

The inspector selectively reviewed and discussed internal dose assessments for 2005 and 2006 (since the previous inspection) to identify any apparent actual occupational internal doses greater than 50 millirem committed effective dose equivalent (CEDE). The review included selected review of the program for evaluation of potential intakes associated with hard-to-detect radionuclides (e.g., airborne transuranics).

### High Risk Significant, High Dose Rate HRA and VHRA Controls

The inspector reviewed high and very high radiation area (HRA and VHRA) posting and controls, as appropriate, discussed the status of applicable procedures, and physically challenged the locked access points to three locked high radiation area access points. The inspector evaluated administrative controls for access to high radiation areas. The inspector discussed changes in the high radiation area access control program with radiation protection supervisors.

### Problem Identification and Resolution

The inspector selectively reviewed corrective action reports in the area of access controls to determine if access control issues were entered into the corrective action program for resolution. The inspector evaluated the corrective action database, since the previous inspection, to identify repetitive deficiencies or significant individual deficiencies. The review also included evaluation of data to determine if any problems involved undetected PI occurrences. (Section 4OA2.)

#### b. Findings

No findings of significance were identified.

## 2OS2 ALARA Planning and Controls (71121.02 - 2 Samples)

### a. Inspection Scope

The inspector conducted the following activities to determine if Exelon was properly implementing operational, engineering, and administrative controls to maintain personnel occupational radiation exposure as low as is reasonably achievable (ALARA). Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and applicable Exelon procedures.

#### Verification of Dose Estimates and Exposure Tracking

The inspector reviewed 2005 station aggregate dose estimates relative to applicable goals. The inspector selectively compared the results achieved (person-rem sustained) with the intended dose goals. The inspector evaluated differences between initial radiation dose estimates and actual doses sustained for the work activities to identify causes for differences in results achieved. The inspector reviewed 2006 dose goals and planned major work activities.

#### Problem Identification and Resolution

The inspector reviewed problem reports in this area since the last inspection to determine if Exelon was including ALARA deficiencies and issues in its corrective action program (Section 4OA2).

### b. Findings

No findings of significance were identified.

## 2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03 - 2 Samples)

### a. Inspection Scope

The inspector reviewed selected activities, and associated documentation, in the below listed areas. The evaluation of Exelon's performance in these areas was against criteria contained in 10 CFR 20, applicable TSs, and applicable station procedures.

#### Self-Contained Breathing Apparatus

The inspector reviewed the functional testing and inspection of self-contained breathing apparatus (SCBA) to ensure equipment was being properly maintained and inspected in accordance with the manufacturer's recommendations and applicable regulatory requirements. The functional testing of seven SCBA units, ready-for-use, were reviewed (Pack Nos. 12, 93, 303, 328, 333, 384, 451). In addition, the inspector visually inspected two of the SCBAs (Pack Nos. 328, 384). The components of the two units visually inspected were also checked against approved component lists published by the SCBA manufacturer and the National Institute for Occupational Safety and Health



(NIOSH). The inspector reviewed periodic testing of the SCBA units' components (i.e., hydro testing of tank, maintenance and testing of regulators, low pressure alarms) and reviewed conformance of the SCBAs with published certification lists. The inspector also reviewed the December 2005 audit of Exelon's SCBA maintenance vendor. The quality of breathing air provided was also reviewed.

### SCBA Training

The inspector selectively reviewed the training and qualification of personnel for use of SCBAs, including bottle change-out. The inspector reviewed qualification documentation to verify the required numbers of personnel had received training and qualifications consistent with Emergency Plan requirements. Personnel qualifications reviewed included control room personnel, chemistry personnel, radiation protection personnel, and maintenance personnel.

### Problem Identification and Resolution

The inspector reviewed Action Requests (ARs) to determine if identified problems were entered into the CAP for resolution. The inspector reviewed selected ARs to evaluate Exelon's threshold for identifying, evaluating, and resolving problems relating to occupational radiation safety. The review included a check of possible repetitive issues, such as radiation worker or radiation protection technician errors (392426, 385918, 385952, 387627, 478248). Also reviewed were various check-in audits (AR 365881, 433413, 433378), and Nuclear Oversight Report NIOSH-PEA-05-4Q, dated January 25, 2006. The inspector also selectively discussed recent industry audits.

This review was against the criteria contained in 10 CFR 20, Technical Specifications, and the station procedures.

## b. Findings

Introduction: A non-cited violation (NCV) was identified by the NRC of 10 CFR 50.47(b)(10) regarding failure to maintain protective measures for emergency workers.

Description: On April 20, 2006, the NRC inspector reviewed functional testing and visually inspected Scott Presur-Pak Self-Contained Breathing Apparatus (SCBA) Pack No. 384, located in the control room. The vendor manual for the Scott Presur-Pak 4.5 states; in Item 1 of the Regular Operation Inspection Section and the Stand-by Inspection, Cleaning and Storage Section; that the complete respirator is to be visually inspected for worn or aging rubber parts, worn or frayed harness webbing, or damaged components. The vendor manual further states that, if any damage or deterioration is noted, remove the respirator from service and tag for repair. The manual also warns that respirators with damaged or worn components shall not be used. Exelon's procedure did not include guidance to conduct a complete visual inspection of the SCBA in that the procedure for this device (RT-H-099-990-2, Rev. 8, Scott AirPak and Bottle Inspection) did not provide for visual inspection of the complete regulator. This performance deficiency was revealed when the NRC inspector identified on



April 20, 2006, that SCBA No. 384 exhibited a partially separated air diffuser on the regulator (Part No. 3830786) for this ready-for-use SCBA. This SCBA (Pack No. 384) had been signed-off as having been satisfactorily inspected on April 14, 2006. The failure to conduct an adequate quality assurance program, in accordance with the manufacturer's guidance and 10 CFR 20.1703, for emergency use respiratory protective equipment is a violation of 10 CFR 50.47(b)(10). Exelon removed this unit from service and replaced it, placed this issue into the CAP (AR 00481763), and conducted an extent of condition review.

This NRC identified performance deficiency revealed a programmatic weakness, in that, Exelon's program procedures did not provide for complete visual inspection of the regulator. In this instance, the SCBA had recently been inspected, the partially separated regulator air diffuser was not identified, the unit was not removed from service, and Exelon's program procedures did not provide for complete visual inspection of SCBAs.

Analysis: The failure to conduct a complete and adequate inspection of emergency use SCBA, in accordance with the manufacturer's guidance and regulatory requirements, is a performance deficiency because Exelon failed to meet a requirement and the cause was reasonably within Exelon's ability to foresee and correct and should have been prevented. The finding is more than minor, in that, if left uncorrected, damaged components may be missed on other SCBAs.

The inspectors evaluated this finding using NRC Manual Chapter (MC) 0609, Appendix B, and determined it was of very low safety significance (Green). NRC MC 0609, Appendix B, identifies the failure to meet a regulatory requirement, and maintain onsite respiratory protective equipment, in accordance with regulations, as an example of a 10 CFR 50.47(b)(10) finding of very low safety significance (Green). In this case, Exelon did not conduct an adequate quality assurance program for its respiratory protection equipment as required by 10 CFR 20.1703. Although the finding did involve an emergency planning standard, the standard was not degraded in that additional devices were available, an extent of condition review did not identify any additional examples, and a preliminary evaluation by the licensee's SCBA Service vendor indicated the specific regulator should still remain functional as long as the two pieces were fused together around the balance of the circumference. Exelon took this unit out-of-service.

Enforcement: 10 CFR 50.47(b)(10) requires that the licensee provide for the protection of emergency workers through a range of protective actions. As part of these measures, Exelon has provided SCBA for emergency workers. Notwithstanding, a complete and adequate quality assurance program was not accomplished for these emergency devices in accordance with the manufacturer's guidance and regulatory requirements in 10 CFR 20.1703. This is a violation of 10 CFR 50.47(b)(10). Because this finding was of very low safety significance and Exelon entered this finding into its CAP, this violation is being treated as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy: **NCV 05000277/2006003-03, Inadequate Procedure for Inspection of SCBAs.**

#### 4. OTHER ACTIVITIES

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

###### a. Inspection Scope

The inspectors sampled PBAPS's submittals for the two Barrier Integrity cornerstone Performance Indicators (PIs) listed below associated with both Units 2 and 3. Specifically, the inspectors looked at the period from the fourth quarter 2004 to the fourth quarter 2005, to assess the accuracy and completeness of the data reported to the NRC for the four PIs. To verify the accuracy of the PI data reported during that period, the information reviewed was compared against the criteria, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline," Revision 3, for each of the following IE PIs:

- Unit 2 and Unit 3 Reactor Coolant System (RCS) Specific Activity
- Unit 2 and Unit 3 RCS Leakage

The information and records reviewed included licensee event reports (LERs), NRC inspection reports and selected portions of the operations logs and the raw PI data. The inspectors discussed the methods for compiling and reporting the PIs with cognizant engineering and regulatory assurance personnel. The inspectors also compared the graphical representations from the most recent PI report to the raw data to verify that the data was correctly reflected in the report.

###### b. Findings

No findings of significance were identified.

##### 4OA2 Identification and Resolution of Problems (71152 - 1 Trend Sample; - 1 Annual Sample)

###### .1 Review of Items Entered Into the Corrective Action Program

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures, human performance issues or program issues for follow-up. The inspectors performed routine screening of issues entered into PBAPS's CAP. This review was accomplished by selectively reviewing copies of IRs, attending daily screening meetings, and accessing PBAPS's computerized database.

###### .2 Annual Sample: Review of Operator Work-Arounds

###### a. Inspection Scope

As required by Inspection Procedure (IP) 71152, "Identification and Resolution of Problems," the inspectors conducted a review of the operator workaround (OWA) program to verify that the PBAPS was identifying operator OWA problems at an

appropriate threshold, have entered them in the corrective action program and proposed or implemented appropriate corrective actions. The inspectors reviewed the list of OWAs and operator challenges (OCs) identified and managed in accordance with Exelon Procedure, OP-AA-102-103, "Operator Work-Around Program." Specifically, the review was conducted to determine if any OWAs for mitigating systems affected the mitigating system's safety functions or affected the operator's ability to implement abnormal and emergency operating procedures. The inspectors reviewed both of the following open OWAs being tracked by PBAPS:

- Unit 2 Steam Jet Air Ejector Suction Valves Fail to Open When Placing the SJAE In Service (AR A1497703)
- Unit 3 Steam Jet Air Ejector Suction Valves Fail to Open When Placing the SJAE In Service (AR A1536806)

The inspectors also reviewed the lists of open OCs (deficiencies that are obstacles to normal plant operations) and periodically walked down the panels in the main control room and reviewed control room deficiencies to identify and be cognizant of: (1) OWAs that have not been evaluated by the licensee, and (2) OWAs that increase the potential for personnel error, including OWAs that:

- Require operations contrary to past training or require more detailed knowledge of the system than routinely provided,
- Require a change from longstanding operational practices,
- Require operation of system or component in a manner dissimilar from similar systems or components,
- Create the potential for the compensatory action to be performed on equipment or under conditions for which it is not appropriate,
- Impair access to required indications, increase dependence on oral communications, or require actions under adverse environmental conditions, and
- Require the use of equipment and interfaces that had not been designed with consideration of the task being performed.

The inspectors verified that an issue (IR 493384) regarding identification of proceduralized operator workarounds was entered in the CAP.

b. Findings

No findings of significance were identified.

.3 Semi-Annual Review to Identify Trends

a. Inspection Scope

The inspectors reviewed a list of approximately 5000 issue reports (IRs) that Exelon initiated at PBAPS from December 1, 2005 through June 1, 2006, to perform the semi-annual PI&R trend review. Approximately 20 of the IRs were reviewed in detail to verify whether the issues were adequately identified, appropriately evaluated and corrected.

The inspectors evaluated the IRs against the requirements of LS-AA-125, "Corrective Action Program (CAP) Procedure," and 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." Issues numbered IR 487942, IR 384941, and IR 475597 describe PCIV leakage test failures with foreign material in the valves as a cause or contributing cause, and may indicate an adverse trend. In IR 487942, PBAPS personnel documented that PCIVs had exceeded their maintenance rule performance criteria and foreign material was a contributing cause for functional failures. There were also numerous training and qualification issues that PBAPS personnel identified and documented in IR 467506.

b. Findings

No findings of significance were identified.

4OA3 Event Followup (71153 - 2 Samples)

The inspectors reviewed the following LERs to verify the accuracy of the LERs, the appropriateness of the corrective actions, and to determine whether violations of requirements or generic issues existed.

.1 (CLOSED) LER 05000277/2005002-00, Recirculation Motor/Pump Modification Activities Unanalyzed for Postulated Seismic Conditions

On September 21, 2005, PBAPS personnel identified that there was insufficient analysis of the interim rigid configuration of piping system supports for planned work to replace the 3 "B" recirculation motor and pump during the Unit 3 15th Refueling Outage (P3R15). Corrective actions included deferral of the replacement of the 3 "B" recirculation motor and pump (IRs 376253 and 377756) and increased vibration monitoring of the pump (IR 483491). However, it was determined that similar recirculation pump maintenance work was performed in previous refueling outages at Units 2 and 3. During the previous outages, the interim piping support condition of the associated loops of recirculation and RHR piping were not analyzed for seismic conditions. This condition also affected the operability of the shutdown cooling (SDC) and low pressure coolant injection modes of RHR while in the interim configuration. The recirculation pump maintenance activities were typically performed within a three week period and the various interim configurations that were unanalyzed were a smaller subset of these periods. There were no actual safety consequences since there were no seismic events while in the interim configuration. The event was caused by less than adequate review of the interim piping support configuration of the recirculation system during certain recirculation motor and pump maintenance activities. An issue (IR 377756) was placed in the CAP that included corrective actions to: perform engineering analyses and to design an acceptable temporary piping support configuration; and revise appropriate implementation procedures in support of future recirculation motor and pump replacements. The enforcement aspects of this finding are discussed in Section 4OA7. This LER is closed.

.2 (CLOSED) LER 05000278/2006001-00, Technical Specification Non-Compliance Due to Inoperable Primary Containment Isolation Valve

On April 6, 2006, licensed operations personnel declared an air-operated PCIV associated with the HPCI turbine exhaust drain line inoperable in accordance with TS Limiting Condition for Operation 3.6.1.3. This declaration was based on questions raised by an NRC resident inspector performing an in-plant observation of the position status of the HPCI turbine exhaust line inboard isolation valve (AO-3-23-137). The cause of the failure of AO-3-23-137 to properly close was due to foreign material found in the seating areas of the valve. Similar foreign material was found in the associated drain and test connection valves associated with the AO-3-23-137 valve. PCIV AO-3-23-137 was inoperable for a minimum time period of 15 days (i.e., the time period between the last HPCI operation on March 23, 2006, and the return to operable status on April 7, 2006). The last assurance of the valve being leak-tight was on September 30, 2005, when the valve was leak tested with satisfactory results during the P3R15 Refueling Outage. The valves were repaired and appropriate leak-tightness was verified as part of an as-left local leak rate test. The redundant containment penetration barriers for the affected containment penetrations were operable throughout the period of exposure. Therefore, the primary containment isolation safety function was met during the period of non-compliance. The enforcement aspects of this finding are discussed in Section 1R15. This LER is closed.

4OA5 Other

3. Implementation of Temporary Instruction (TI) 2515/165 - Operational Readiness of Offsite Power and Impact on Plant Risk

a. Inspection Scope

The objective of TI 2515/165, "Operational Readiness of Offsite Power and Impact on Plant Risk," was to gather information to support the assessment of nuclear power plant operational readiness of offsite power systems and impact on plant risk. The inspectors evaluated Exelon's procedures against the specific offsite power, risk assessment, and system grid reliability requirements of TI 2515/165.

The information gathered while completing this TI was forwarded to the Office of Nuclear Reactor Regulation for further review and evaluation on April 3, 2006.

b. Findings

No findings of significance were identified.

#### 4OA6 Meetings, Including Exit

##### .1 Exit Meeting Summary

On July 24, 2006, the resident inspectors presented the inspection results to Mr. J. Grimes and other PBAPS staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

#### 4OA7 Licensee-Identified Violations

The following finding of very low safety significance (Green) was identified by Exelon and is a violation of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a non-cited violation.

- TS 3.9.7, Residual Heat Removal (RHR) - High Water Level, requires one RHR shutdown cooling (SDC) subsystem shall be operable and in operation. As noted in report section 4OA3, LER 05000277/2005002-00 reported instances in September 2002 and 2003, when TS 3.9.7 was not met since SDC was inoperable and the required TS actions were not taken. The SDC inoperability resulted during recirculation pump maintenance that involved placing the piping supports of the associated loops of recirculation and RHR piping in an interim rigid configuration that were not analyzed for seismic conditions. The recirculation pump maintenance activities were typically performed within a three week period and the various interim configurations that were unanalyzed were a smaller subset of these periods. There were no actual safety consequences since there were no seismic events while in the interim configuration. This finding was of very low safety significance (Green) based on a Phase 3 SDP analysis performed by a regional senior reactor analyst (SRA).

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION****KEY POINTS OF CONTACT**Exelon Generation Company personnel

R. Braun, Site Vice President  
 J. Grimes, Plant Manager  
 J. Armstrong, Regulatory Assurance Manager  
 C. Behrend, Engineering Director  
 C. Crabtree, Radiation Protection Supervisor  
 D. Foss, Senior Regulatory Engineer, Regulatory Assurance  
 C. Hardee, Radiological Engineering Manager  
 M. Hochreiter, Plant Engineering  
 J. Hunter, Operations Training Manager  
 D. Lewis, Operations Director  
 M. Lyate, Radiation Support Manager  
 R. Rhode, Instructor/Exam Development  
 G. Stathes, Maintenance Director  
 S. Taylor, Manager, Radiation Protection  
 A. Wasong, Training Director  
 W. Ward, Exam Development

NRC personnel

J. Trapp, Branch Chief, DRP, Branch 4

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened and Closed

05000277, 278/2006003-01	NCV	Inadequate Annual Operating Test Administered at Limerick (Section 1R11)
05000277, 278/2006003-02	NCV	Inadequate Accomplishment of FME Integrity Recovery Procedures Following Identification of FME in the Unit 3 HPCI Turbine Exhaust Drain Piping (Section 1R15)
05000277/2006003-03	NCV	Exelon Did Not Maintain Respiratory Protective Equipment in Accordance with Manufacturer's Guidance and Regulatory Requirements (Section 2OS3)



Closed

05000277/2005-002-00	LER	Recirculation Motor/Pump Modification Activities Unanalyzed for Postulated Seismic Conditions (Section 4OA3)
05000278/2006-001-00	LER	Technical Specification Non-Compliance Due to Inoperable Primary Containment Isolation Valve (Section 4OA3)

Discussed

None.

**LIST OF DOCUMENTS REVIEWED****Section 1R01: Adverse Weather**

WC-AA-107, Rev 1, "Seasonal Readiness"  
 UFSAR Section 10.24, "Emergency Heat Sink"  
 DWG 6280—330, Rev 35, "P&ID Emergency Cooling System"  
 UFSAR Section 2.4.3.5.5, "Emergency Shutdown due to High or Low Water Level in Conowingo Pond"  
 Procedure SO-48.1.B, Rev 11, "Emergency Cooling Water System Startup"  
 SE-3, "Loss of Conowingo Pond-Bases", Rev 13  
 Memorandum dated May 4, 2006 R.C. Braun to R.P. Lopriore, "Summer Readiness Preparation Status-Peach Bottom Atomic Power Station, Units 2 & 3"  
 Procedure SO-48.8.A, Rev 3, "Emergency Cooling Water System Routine Inspection While in Standby Condition"  
 \*IR 505115, ECT Reservoir Calculations Do Not Factor Leakage Losses  
 AO 28.2, Rev. 1, "Response to High/Low River Level"  
 SE-4, Rev. 20, "Flood Procedure"

**Section 1R05: Fire Protection**

PF-1, Rev. 2, "Prefire Strategy Plan"  
 PF-3, Rev. 3, "Prefire Strategy Plan"  
 PF-5A, Rev. 1, "Prefire Strategy Plan"  
 PF-5K, Rev. 3, "Prefire Strategy Plan"  
 PF-13K, Rev. 2, "Prefire Strategy Plan"  
 PF-32, Rev. 0, "Prefire Strategy Plan"  
 PF-70, Rev. 2, "Prefire Strategy Plan"

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\* Indicates this was generated as a result of this inspection.



PF-13C, Rev. 2, Prefire Strategy Plan”  
PF-62, Rev. 1, “Prefire Strategy Plan”

**Section 1R06: Flood Protection Measures**

Drawing 543, Rev 3, “Plumbing & Drainage Diesel Generator Building Floor Plan”  
DBD P-T-09, Rev 8, “Internal Hazards”  
IPE Section 3.3.8.2.2 “(Internal Flooding) Diesel Generator Building”  
IPE Section 3.3.8.2.3, “Reactor Building”  
\*IR 505423, Emergency Diesel Building Flooding - Check Valve and IPE Issues  
AR 362880  
AR 427691  
AR 304278  
Peach Bottom Response to IN 83-44  
RT-W-020-930-3, Rev. 2, “Survey for Flood Barriers in Reactor Building Drainage System”  
GP-2, Rev. 112, “Normal Plant Start-Up”

**Section 1R11: Licensed Operator Regualification Program**

Regualification Program Procedures

TQ-AA-131, “Senior Reactor Operator-Limited Regualification Training,” Rev. 4  
TQ-AA-131, “Senior Reactor Operator – Limited Regualification License Training,” Rev. 4  
TQ-AA-103-0121, “Lead Regulatory Examination Author Qualification Guide,” Rev. 0  
TQ-AA-105-102, “NRC Active License Maintenance,” Rev. 7

Other Procedures

—041-201, “Reactor Cavity Work Platform (RWCP) Instructions”, Rev. 0  
S97.0.M, “Refueling Platform Operation,” Rev. 18  
Off Normal (ON-112) Procedure, “Loss of Reactor Building Closed Cooling Water” (RBCCW)  
Special Event (SE-3) Procedure, “Loss of Conowingo Pond”  
Operational Transient (OT-106) Procedure, “Condenser Low Vacuum”

Other Plant Documents

UFSAR Section 15.7.4, “Fuel Handling Accident”

JPMs

JPM-2041, “Loss of Secondary Containment (Limerick),” Rev. 3  
NLSRO2036, “Response to a Dropped Irradiated Fuel Assembly,” Rev. 2  
NLSRO2023, “Dummy Bundle Movement Within the Spent Fuel Pool (LSRO performs as RPO)”  
JPM-3050, “CRB/FSP Replacement Using Combined Grapple (Alternate Path Due to Gross Undervessel Leakage)”  
NLSROJPM2051, “Manual Operation of the Refuel Platform (LGS)”

2005 Operating Exam

JPM 3005, “Refuel Platform C.O.L., Main Hoist Grapple Checks”  
JPM 3025, “Response to an Unanticipated Spent Fuel Pool Hi Radiation Alarm During Fuel Handling in the Spent Fuel Pool”

JPM 3035, "Actual Dummy Fuel Movement in the Spent Fuel Pool"  
JPM 3051, "Control Rod Removal Using Combined Grapple"  
JPM 3053, "Fuel Handling Director Shift Turnover Checklist"

Biennial Written Exams

2004 NRC Written Examination (PBAPS)  
2005 NRC Written Exam (PBAPS)  
2006 NRC Written Examination (Limerick)

Other

2006 LSRO Operating Exam Sample Plan  
LSRO Requal Cycle 0501 Schedule  
LSRO Approved Task List  
NUREG 1021, Rev. 9  
AR-00254722, LSRO Exam Practice Position Paper  
AR-00498411, LSRO 71111.11B Inspection Comment  
AR-00495748, TQ-AA-131 requires revision  
AR-00495724, Delays encountered in starting the LSRO JPMs  
AR-00496375, 2006 LSRO NRC 71111.11B Inspection Results  
LSRO CRC Meeting Minutes for LGS 1R11  
Limerick Top 30 Cut sets for Operator actions

**Section 1R12: Maintenance Effectiveness**

IR 488950, E-2 EDG Vertical Drive Assembly Does Not Match Vendor Manual  
IR 489702, E-2 EDG, Loose Generator Foundation Bolts Identified  
IR 488881, Pin Missing from the E-2 #4 Connecting Rod Bearing  
IR 488829, E-2 Upper Thrust Bearing Found With A Wipe Mark  
IR 488492, E-2 D/G #12 Cylinder Liner is Scored and Lower Piston Rings  
IR 488459, E-2 D/G Upper Vertical Drive Thrust Bearing Locknut Found Loose  
IR 488947, Keeper Ring Tab Broken Off in E-2 Vertical Drive  
IR 490769, EDG Speed Switch Factory Setting Out-of-Specification  
AR 00487942, MR Performance Criteria Exceeded

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"  
Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants"  
\*IR 493251, ECW Pump Not Protected While "B" ESW Pump Out of Service  
AR 00391237, HPCI Steam Trap Continuously Alarming  
WO C0215866, Replace LE/LS-2-23-090  
AR A1537966, HPCI Steam Trap Continuously Alarming

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Indicates this was generated as a result of this inspection.

MA-AA-716-004, Rev. 2

### **Section 1R15: Operability Evaluations**

AR 00453415, DDFP Engine not Analyzed for 92F NHS Temperature  
 CC-AA-309-101, "Engineering Technical Evaluations"  
 LS-AA-105, "Operability Determinations"  
 OP-AA-108-111, "Adverse Condition Monitoring and Contingency Planning"  
 OP-AA-106-101-1006, Rev. 2, "Operational and Technical Decision Making Process"  
 MA-AA-716-008, Rev. 2, "Foreign Material Exclusion Program"  
 AR 00475597, AO-3-23-137 Indicates Mid-position Locally  
 WO C0215262, Inspect HPCI Components for FME  
 —510-606, Rev. 6, Flowserve (ACF Industries, Anchor Darling, W-K-M and BS & B) Control Valve Maintenance

#### **Action Requests**

AR 00256390	AR A1434608	AR A1416635
AR 00251022	AR A1532919	AR A1416635
AR 00221714	AR A1396066	AR 00475597
AR 00475984	AR A1416635	AR 00475597
AR 00475597	AR A1416630	AR A1533148
AR A1436009	AR A1416631	

#### **Work Orders**

WO R0943941  
 WO R0814376  
 WO R0879524  
 WO R0815846  
 WO R0463119  
 WO R0943300

### **Section 1R17: Permanent Plant Modifications**

CC-AA-102, "Design Input and Configuration Change Impact Screening"  
 CC-AA-103, "Configuration Change Control"  
 AR A1497315, Implement E-2 EDG Prelube Modification  
 ECR PB 05-00254-005, "Modification to Provide Continuous Prelube for EDG No. E-2"  
 AR A1497315, Implement Prelube Modification  
 WO C0214742, OBG012: Prelube Keep-Warm Modification/ECR 05-00254 R4  
 IR 00446076, Concerns Regarding EDG Continuous Pre-Lube Modification  
 AR 174578, EDG Keep-Warm Modification  
 Non-Licensed Operator Continuing Training, PNLOC-04-12A, Diesel Modification  
 ECR 05-00254

**Section 1R19: Post-Maintenance Testing**

RT-0-052-252-2, "E-2 EDG Inspection Post-Maintenance Functional Test"  
ST-O-014-306-3, Rev. 29, "Core Spray Loop "B" Pump, Valve, Flow, and Cooler Functional and Inservice Test"  
ST/LLRT 30.23.06, Rev. 4, "LLRT HPCI Turbine Exhaust 2" Line"  
ST-O-023-301-3, Rev. 40, "HPCI Pump, Valve, Flow and Unit Cooler Functional and In-service Test"  
ST-O-023-301-3, Rev. 41, "HPCI Pump, Valve, Flow and Unit Cooler Functional and In-service Test"  
WO R0936985-02, Unit 2 "B" RHR Pump Discharge Check Valve, CK-2-10-48B  
WO R0842698-01, Unit 2 "B" RHR Shutdown Cooling Valve, MO-2-10-15B  
WO C0217206, HPCI Exhaust Drain PCIV, A03-23C-137  
WO R0757927-03, Unit 2 "B" RHR Pump Torus Suction Valve Operator, MO-2-10-013B-OP  
R101473201, Core Spray Unit 3 Loop "B" Pump, Valve, and Flow Following Lube Oil Cooler Cleaning  
C0215786, Replace E-2 EDG Speed Switch  
AR A1529468, E-2 EDG Speed Switch Erratic

**Section 1R22: Surveillance Testing**

ST-I-03B-100-2, Rev. 3, ARI/RPT Channel A Logic System Functional Test  
ST-I-03B-101-2, Rev. 4, ARI/RPT Channel B Logic System Functional Test  
ST-O-052-122-2, Rev. 4, E2 Diesel Generator RHR Pump Reject Test  
ST-I-010-105-3, Rev. 16, RHR Loop "B" Logic System Functional Test  
ST-O-032-301-2, Rev. 20, HPSW Pump, Valve and Flow Functional and Inservice Test

**Section 1R23: Temporary Plant Modifications**

CC-MA-112-1001, Rev. 1, TCCP Installation/Removal Instructions and Test Requirements

**Section 2OS: Occupational Radiation Safety**

NF-AA-390-1000, Rev. 1  
NF-AA-390, Rev. 1  
RT-H-099-990-2, Rev. 8  
RP-AA-441, Rev. 3  
RP-AA-300, Rev.1  
RP-AA-460-1001, Rev. 0  
RP-PB-460-1001, Rev. 5  
RP-AA-460, Rev. 10  
IR 429224 Report, Cobalt 60 Detected in Downstream Sediment  
IR 472624, RWCU Readings Out of Specification High for Daily Rounds  
AR A1556840, 2 "C" RFPT Control Valve Position Indication Varies from Other RFPTs  
IR 493384, Failure to Identify Feed Pump Control Problem as a Work Around  
IR 465785, 2 "C" Reactor Feed Pump Turbine (RFPT) Control Valve Position Indication Varies from other RFPTs

### **Section 4OA1: Performance Indicator Verification**

ST-C-095-820-3, Rev. 4, "Determination of Dose Equivalent F Ci/g I-131 in Primary Coolant"  
ST-C-095-820-2, Rev. 4, "Determination of Dose Equivalent F Ci/g I-131 in Primary Coolant"

### **Section 4OA3: Event Followup**

AR 376253  
AR 377756  
AR 438425  
AR 450788  
AR 483491  
A1492498  
SO 2A.7.A-2, Rev. 5, "Recirculation Pump Motor Vibration Instrumentation Operation"  
SO 2A.7.A-3, Rev. 8, "Recirculation Pump Motor Vibration Instrumentation Operation"  
ARC-314 30C204M G-1, Rev. 11, "B Recirc pump Motor HI Vibration"  
OP-AA-106-101-1006, Rev. 3, "P3R15 Recirc Pump & Motor Replacement OTDM"

### **Section 4OA5: Other**

SE-16, Rev. 3, "Grid Emergency"  
WC-AA-101, Rev. 11, "On-Line Work Control Procedure"  
WC-AA-107, "Seasonal Readiness"  
OP-AA-108-107-1001, Rev. 3, "Station Response to Grid Capacity Conditions"  
"OP-AA-108-107-1002, Rev. 3, "Interface Agreement between Exelon Energy Delivery and Exelon Generation for Switchyard Operations"  
WC-AA-8000, "Interface Procedure between Energy Delivery (ComED/PECO) and Exelon Generation Nuclear/Power for Construction and Maintenance Activities"

## **LIST OF ACRONYMS**

ADAMS	Agency-wide Documents Access and Management System
ALARA	as low as is reasonably achievable
AR	action request
ARI	alternate rod insertion
CAP	corrective action program
CFR	Code of Federal Regulations
DBD	Design Bases Document
EDG	emergency diesel generator
FME	foreign material exclusion
HPCI	high-pressure coolant injection
IMC	Inspection Manual Chapter
IPE	Individual Plant Examination
IR	issue report
JPM	job performance measure
LER	licensee event report

NCV	non-cited violation
NRC	Nuclear Regulatory Commission
OWA	operator workaround
OTDM	operational and technical decision making
PBAPS	Peach Bottom Atomic Power Station
PCIV	primary containment isolation valve
PI	performance indicator
RBCCW	reactor building closed-cooling water
RCIC	reactor core isolation cooling
RHR	residual heat removal
RPT	recirculation pump trip
RTP	rated thermal power
SCBA	self-contained breathing apparatus
SDC	shutdown cooling
SDP	significance determination process
SSCs	structures, systems, or components
TE	technical evaluation
TS	Technical Specification
TRM	Technical Requirements Manual
UFSAR	Updated Final Safety Analysis Report
WO	work order