

February 5, 2007

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 05000277/2006005 AND 05000278/2006005

Dear Mr. Crane:

On December 31, 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 January 19, 2007, 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 one NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it is entered into your corrective action program (CAP), the NRC is treating the finding as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC's Enforcement Policy. If you contest the NCV 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/**

Mel Gray, Chief  
Projects Branch 4  
Division of Reactor Projects

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

Enclosures: Inspection Report 05000277/2006005 and 05000278/2006005  
w/Attachment: Supplemental Information

cc w/encl:

Site Vice President, Peach Bottom Atomic Power Station  
Plant Manager, Peach Bottom Atomic Power Station  
Regulatory Assurance Manager - Peach Bottom  
Associate General Counsel, Exelon Generation Company  
Manager, Financial Control & Co-Owner Affairs  
Manager Licensing, PBAPS  
Director, Training  
Correspondence Control Desk  
Director, Bureau of Radiation Protection (PA)  
R. McLean, Power Plant and Environmental Review Division (MD)  
G. Aburn, Maryland Department of Environment  
T. Snyder, Director, Air and Radiation Management Administration,  
Maryland Department of the Environment (SLO, MD)  
Public Service Commission of Maryland, Engineering Division  
Board of Supervisors, Peach Bottom Township  
B. Ruth, Council Administrator of Harford County Council  
Mr. & Mrs. Dennis Hiebert, Peach Bottom Alliance  
TMI - Alert (TMIA)  
J. Johnsrud, National Energy Committee, Sierra Club  
Mr. & Mrs. Kip Adams  
Vice President, Licensing and Regulatory Affairs  
Vice President, Operations Mid-Atlantic  
Senior Vice President, Nuclear Services  
Director, Licensing and Regulatory Affairs  
J. Fewell, Assistant General Counsel  
E. Epstein, TMI Alert

Distribution w/encl: (via E-mail)

- S. Collins, RA
- M. Dapas, DRA
- M. Gray, DRP
- C. Khan, DRP
- F. Bower, DRP - NRC Senior Resident Inspector
- M. Brown - NRC Resident Inspector
- S. Schmitt, DRP - NRC Resident OA
- J. Lamb, RI OEDO
- J. Shea, PM, NRR
- J. Kim, PM, NRR (Back up)
- H. Chernoff, NRR
- Region I Docket Room
- [ROPreports@nrc.gov](mailto:ROPreports@nrc.gov)

**SUNSI Review Complete: \_\_\_MXG3\_\_\_\_\_ (Reviewer's Initials)**

DOCUMENT NAME: C:\FileNet\ML070360580.wpd

After declaring this document "An Official Agency Record" it will be released to the Public.

**To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy**

OFFICE	RI/DRP	RI/DRP	R1/DRP
NAME	FBower	R.Fuhrmeister	MGray
DATE	02/01/07	02/01/07	02/05/07

OFFICIAL RECORD COPY

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.: 50-277, 50-278

License Nos.: DPR-44, DPR-56

Report No.: 05000277/2006005 and 05000278/2006005

Licensee: Exelon Generation Company, LLC

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

Location: Delta, Pennsylvania

Dates: October 1, 2006 through December 31, 2006

Inspectors: F. Bower, Senior Resident Inspector  
M. Brown, Resident Inspector  
F. Arner, Reactor Inspector  
J. Mitman, Senior Risk & Reliability Analyst  
R. Nimitz, Senior Health Physicist  
T. Setzer, Project Engineer  
W. Schmidt, Senior Reactor Analyst

Approved by: Mel Gray, Chief  
Projects Branch 4  
Division of Reactor Projects

## TABLE OF CONTENTS

SUMMARY OF FINDINGS .....	iii
REPORT DETAILS .....	1
REACTOR SAFETY .....	1
1R01 Adverse Weather Protection .....	1
1R04 Equipment Alignment .....	2
1R05 Fire Protection .....	2
1R11 Licensed Operator Requalification Program .....	4
1R12 Maintenance Effectiveness .....	4
1R13 Maintenance Risk Assessments and Emergent Work Control .....	5
1R15 Operability Evaluations .....	5
1R17 Permanent Plant Modifications .....	9
1R19 Post-Maintenance Testing .....	9
1R20 Refueling and Other Outage Activities .....	10
1R22 Surveillance Testing .....	11
1R23 Temporary Plant Modifications .....	11
RADIATION SAFETY .....	12
2OS1 Access Controls to Radiologically Significant Areas .....	12
2OS2 ALARA Planning and Controls .....	14
2OS3 Radiation Monitoring Instrumentation and Protective Equipment .....	15
OTHER ACTIVITIES .....	15
4OA1 Performance Indicator (PI) Verification .....	15
4OA2 Identification and Resolution of Problems .....	16
4OA3 Event Followup .....	19
4OA5 Other Activities .....	21
4OA6 Meetings, Including Exit .....	24
ATTACHMENT: SUPPLEMENTAL INFORMATION .....	24
KEY POINTS OF CONTACT .....	A-1
LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED .....	A-1
LIST OF DOCUMENTS REVIEWED .....	A-2
LIST OF ACRONYMS .....	A-10

## SUMMARY OF FINDINGS

IR 05000277/2006-005, 05000278/2006-005; 10/01/2006 - 12/31/2006; Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3; Operability Evaluations.

The report covered a 3-month period of inspection by resident inspectors, and announced inspections by three regional specialist inspectors and risk analysts from Region 1 and the Office of Nuclear Reactor Regulation (NRR). One Green finding, which was a non-cited violation (NCV), was 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: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," for a failure to follow administrative procedures for conducting operability evaluations of nonconforming equipment which resulted in an operability determination (OD) that did not demonstrate a reasonable expectation of standby liquid control (SLC) system operability and reliability. Specifically, PBAPS personnel did not address issues regarding pressure pulsations to SLC systems with degraded relief valves.

This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affects the cornerstone objective of ensuring the reliability of systems that respond to initiating events. The finding is related to an OD for a qualification deficiency and the OD did not confirm a reasonable expectation of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." However, the finding was determined to be of very low safety significance (Green), based on a Phase 1 screening in Appendix A of IMC 0609, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," because it did not: (1) represent a loss of system safety function; (2) did not represent an actual loss of safety function of a single train; (3) the finding did not result in a loss of safety function for risk significant non-Technical Specification trains of equipment; and, (4) did not screen as potentially risk significant due to external events. This finding has a cross-cutting aspect in the area of human performance because PBAPS personnel did not use conservative assumptions in the operability determination process decision making. This finding was entered into the PBAPS's CAP. (Section 1R15)

### B. Licensee-Identified Violations

None.

## REPORT DETAILS

### Summary of Plant Status

Unit 2 began the inspection period shutdown in a refueling outage. On October 6, the reactor was restarted. However, with reactor power at 22 percent, a leak was observed in a flush line to the torus during testing of the reactor core isolation cooling (RCIC) system. The plant was shut down as required by Technical Specifications (TS) and the line was repaired. On October 9, 2006, the plant restarted. The unit reached 70 percent of rated power on October 11. An unplanned downpower of greater than 20 percent was required to investigate a generator hydrogen seal oil pressure issue. The unit was brought to full power on October 12, 2006, where it remained except for brief periods to support testing and rod pattern adjustments.

Unit 3 began the inspection period at 100 percent full rated power and operated at full power for the entire period, except for brief periods to support testing and rod pattern adjustments.

### **1. REACTOR SAFETY**

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

1R01 Adverse Weather Protection (71111.01 - 2 System Samples)

.1 Evaluate Readiness for Winter Seasonal Susceptibilities

a. Inspection Scope

The inspectors performed a detailed review of PBAPS's written procedures for winter readiness and low temperatures to evaluate PBAPS's implementation of the adverse weather preparation procedures and compensatory measures for the affected conditions before the onset of adverse weather conditions. The inspectors selected for inspection the intake structure and traveling screens supporting both Units 2 and 3, which constituted two samples. The inspection samples included selected portions of the following three systems on both units:

- Circulating Water
- Emergency Service Water
- High Pressure Service Water

The documents reviewed to verify that the selected systems would remain functional when challenged by adverse weather included the Updated Final Safety Analysis Report (UFSAR), TSs, and selected plant documents. The review also verified plant features and procedures for operation and continued availability of the ultimate heat sink, the Conowingo Pond. The inspectors walked down the plant systems listed above to verify the physical condition of the cold weather protection features and to verify that features, such as, space heaters and weatherized enclosures were monitored sufficiently to ensure they support operability of the system, structure, or component (SSC) they protect. The inspectors also verified that operator actions described in the PBAPS adverse weather procedures were adequate to maintain readiness of essential systems.

Enclosure

Documents, procedures and drawings reviewed during the inspection are listed in the attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04Q - 3 Samples)

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed a partial walkdown of the following three systems to verify the operability of redundant or diverse trains and components when safety related equipment was inoperable. The inspectors performed the walkdowns to identify any discrepancies that could impact the function of the system or increase risk. The inspectors reviewed applicable operating procedures, walked down system components, and verified that selected breakers, valves, and support equipment were in the correct position to support system operation. The inspectors also verified that PBAPS had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP.

- Unit 3 'B' SLC System with Unit 3 'A' SLC System Out-of-Service
- E-1, E-2 and E-3 Emergency Diesel Generators (EDGs) with the E-4 EDG Out-of-Service
- 3 'A' Core Spray Pump with the 3 'B' Core Spray Pump Out-of-Service

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q - 9 Samples)

.1 Fire Protection - Tours

a. 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:

- Cable Spreading Room, (Fire Zone 78H)
- Diesel Generator Building, (Fire Zone 132)
- 3 'A' Core Spray Room, Elevation 91'6" (Fire Zone 13E)
- 2 Startup Switchgear Building (Fire Zone 164)
- Unit 3 Lube Oil Tank Room, (Fire Zone 89)
- Recombiner Building, (Fire Zone 158)
- Unit 2, High Pressure Coolant Injection (HPCI) Room, (Fire Zone 59)
- Unit 3 Emergency Battery Room/ Switchgear Rooms (Fire Zone 117)
- Unit 3 Reactor Recirculation Pump Motor Generator (MG) Set Room, (Fire Zone 12C)

b. Findings

No findings of significance were identified.

.2 Fire Protection - Drill Observation (71111.05A - 1 Sample)

a. Inspection Scope

The inspectors observed an unannounced fire drill on October 18, 2006. The inspectors evaluated the fire brigade performance during the drill. Specifically, the inspectors observed:

- The fire brigade (FB) leader responded to the fire area within eight minutes to begin assessing the simulated fire and establishing a command post;
- Security, radiation protection personnel and a licensed senior reactor operator (floor supervisor) responded within seven minutes and were available to support the FB leader;
- The four FB members donned the applicable turnout gear and responded to the fire area within 13 minutes;
- Self-contained breathing apparatus were available and properly worn by the four FB members;
- FB leader maintained command and control of the fire brigade and had a copy of the pre-fire plan;
- The fire hoses were capable of reaching the fire hazard and were laid appropriately;
- The FB used the "two person rule" for personnel safety;
- FB brought sufficient fire fighting equipment to the scene;
- Drill personnel followed the scenario and all drill objectives were met; and
- The FB and the evaluators performed a post-drill critique and validated that the drill objectives were met.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11Q - 1 Sample)

.1 Resident Inspector Quarterly Review

a. Inspection Scope

On November 13, 2006, the inspectors observed operators in the PBAPS's simulator during licensed operator requalification training to verify that operator performance was adequate and that evaluators were identifying and documenting crew performance issues. The inspectors verified that performance issues were discussed in the crew's post-scenario critiques. The inspectors also observed the operators' implementation of operating procedures. The inspectors discussed the training, simulator scenarios, and critiques with the operators, shift supervision, and the training instructors. The evaluated scenario observed for this one sample is listed below:

- Anticipated Transient Without Scram

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 3 Samples)

.1 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; (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 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:

- 2 'B' High Pressure Service Water (HPSW) Motor Oil Cooler Supply Line Leak (Issue Report (IR) 00543926)
- Repetitive Maintenance Preventable Functional Failure (RMPFF) Due to Moore 352 Controller Failure (IR 00522379)

- Disassemble 2 'D' Residual Heat Removal (RHR) Pump Suction Hand Valve for Lost Foreign Material (IR 535329)

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 4 Samples)

a. Inspection Scope

The inspectors reviewed PBAPS's planning and risk management actions for planned and emergent work activities to assess their 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 to 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's properly assessed and managed plant risk and performed activities in accordance with applicable TS and work control requirements. The following four planned and emergent work order (WO) activities were reviewed:

- WO R0971251, E-4 EDG Mechanical Inspection
- IR 00542343, Main Generator Hydrogen Consumption Excessive
- IR 00568035, SLC Relief Valve RV-2-11-39B Lifting During RT-O-011-301-2
- WO C0219241, Investigate/Repair Average Power Range Monitor (APRM) 1-PB2

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 6 Samples)

a. 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 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:

- AO-2-10-046A, Indicating Tube Bent (IR 534466 & OTDM)
- Multiple Main Steam Isolation Valve (MSIV) Local Leak Rate Test (LLRT) Failures - P2R16 (IR 5534622-02 & OTDM)
- Considerable Lube Oil Leaks During E-1 Diesel Generator Run (AR A1564759)
- Standby liquid control (SLC) Relief Valves Setpoint Lower than Required (IR 560911)
- Residual heat removal (RHR) Relief Valve Lifted During Shutdown Cooling Run (IR 00532876)
- Foreign Material Exclusion (FME) - Ultrasonic Transducer Disconnected from Actuating Arm (IR 535605)

b. Findings

Introduction: The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for a failure to follow administrative procedures for conducting operability evaluations of nonconforming equipment which resulted in an operability determination that did not demonstrate a reasonable expectation of SLC system operability and reliability.

Description: On November 21, 2006, engineering personnel initiated IR 560911, which documented the incorrect setting of SLC pump relief valves. This IR indicated that during its rebuild at PBAPS on November 01, 2004, the Unit 3 'A' SLC pump discharge relief valve (RV), RV-3-11-39A, was incorrectly adjusted from its design setpoint of 1,443 psig to a set pressure of 1,341 psig. The operability determination (OD) for IR 560911 noted that the relief valve setpoints for the Unit 2 'B' SLC pump relief valve and the Unit 3 'B' SLC pump relief valve (RV-2-11-39B and RV-3-11-39B) were also set low at 1405 psig and 1,392 psig, respectively. Accounting for the setpoint drift of  $\pm 3$  percent allowed by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, PBAPS personnel concluded that RV-3-11-39A could have had an opening setpoint as low as 1,301 psig. The OD used the worst-case relief valve setpoint of 1,301 psig and assumed the worst-case post-accident SLC system pressure of 1,280 psig.

Based on these assumptions, the OD concluded that with the 21 psig of margin between these two points, the Unit 2 and Unit 3 SLC systems were degraded but operable with two compensatory actions. The two compensatory actions were to maintain the discharge accumulator (pulsation dampener) pressure greater than 325 psig and to revise system surveillance tests to document the as-found accumulator pressure. The OD indicated that this accumulator charge was necessary to minimize SLC system pressure pulsations. The relief valves were planned to be replaced during each units' next refueling outages.

The inspectors reviewed the operability determination and historical IRs for the SLC system. In particular, a technical evaluation in IR 331542 from 2005, regarding the SLC system accumulators was reviewed. From this technical evaluation, the inspectors noted that an SLC pump discharge accumulator pressure below the engineering recommended charge pressure of 377 psig would reduce the effectiveness of the accumulator to dampen system pressure pulsations. This evaluation also stated that PBAPS's SLC pumps are positive displacement pumps with a theoretical variation in pump discharge pressure of 68-116 percent of the average pump discharge pressure. The inspectors applied these theoretical pressure pulsations to the SLC system pressure (1,229 psig) during anticipated transient without scram (ATWS) conditions and noted that it could result in system pressure variations from 836-1,426 psig if the SLC accumulators are not assumed to dampen system pulsations when the accumulators are below their recommended pre-charge pressure of 377 psig. Under these theoretical conditions, the inspectors noted that the 1,426 psig system pressure would exceed the assumed worst case setting of the RV-3-11-39A (1,301 psig) by 125 psig.

On December 4 and 5, 2006, the inspectors provided these observations, to PBAPS personnel, that conservative assumptions were not being used in the operability determination for these relief valves. Specifically, the potential for the SLC pumps' discharge pressure pulsations to exceed the minimum relief valve setpoint of 1,301 psig was discussed. The minimum accumulator pressure charge of 377 psig previously recommended by site engineering versus the 325 psig charge required by their OD in effect was also discussed. Engineering personnel stated that a test (TRT 05-023) was performed in 2005 to determine the actual pressure fluctuations in the Unit 3 SLC discharge piping with the accumulator charged to various pressures. A similar test was not performed for Unit 2.

The inspectors subsequently reviewed TRT 05-023 and noted that recorded pressure pulsations went as high as 1,350 psig for the Unit 3 pump with the lowest relief valve setting (RV-3-11-39A) and an accumulator charge pressure of 300 psig. The inspectors observed that the 1,350 psig pressure pulses for Unit 3 were higher than the current relief valve (RV-3-11-39A) setpoint of 1,341 psig and the allowable drift point of 1301 psig. The inspectors noted that the information regarding the actual recorded system pressure pulsation peaks and the potential importance of the accumulator pressure charge were not included in the OD.

The OD also did not address the theoretical system pressure variations from 836-1,426 psig. This overlap in pressures could lead to the unintended opening of the SLC pump discharge relief valve and the subsequent diversion of SLC flow that could prevent the SLC system from performing its specified safety function. Therefore, the OD did not confirm a reasonable expectation of operability or reliability.

On December 11, 2006, operators observed that the 2 'B' SLC pump relief valve (RV-2-11-39B) lifted during post-maintenance testing, while throttling the system using a local manual valve. In response to this occurrence, PBAPS personnel replaced each of the four relief valves for both SLC pumps on Unit 2 and Unit 3. The inspectors determined that replacing these valves was appropriate, because the lifting of the 2 'B'

SLC pump relief valve cast additional doubt on the reliability of the SLC systems, given the incorrect settings of the relief valves.

Analysis: The failure to follow procedures that resulted in an operability determination that did not demonstrate a reasonable expectation of operability is a performance deficiency. This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affects the cornerstone objective of ensuring the reliability of a system that respond to initiating events. Specifically, the operability determination resulted in a condition that called into question the reliability of the SLC system due to improper relief valve settings. The inspectors determined the finding is of very low safety significance (Green), based on a Phase 1 screening in Appendix A of IMC 0609, "Determining the Significance of Reactor Inspection Findings for At-Power Situations." The finding is related to an OD for a qualification deficiency and the OD did not confirm a reasonable expectation of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." However, the finding screened as Green because it did not: (1) represent a loss of system safety function; (2) not represent an actual loss of safety function of a single train; (3) the finding did not result in a loss of safety function for risk significant non-TS trains of equipment; and, (4) did not screen as potentially risk significant due to external events.

This finding has a cross-cutting aspect in the area of human performance, in that PBAPS personnel did not use conservative assumptions in the operability determination process decision making. Specifically, the operability evaluation did not consider known and documented historical pressure pulsations of up to 1,350 psig in the Unit 3 SLC while the 3 'A' SLC pump discharge relief valve was set at 1,341 psig and could reasonably have been expected to drift as low as 1,301 psig.

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states, that activities affecting quality shall be prescribed by documented procedures and shall be accomplished in accordance with these procedures. Administrative Procedure OP-AA-108-115, "Operability Determinations," Rev. 0, Section 4.4.1 states that the OD should determine the circumstances of the potential nonconformance, including the possible failure mechanism and when system capability is degraded to a point where it cannot perform with reasonable expectation or reliability, the system should be declared inoperable, even if at this instantaneous point in time the system could provide the specified safety function. Contrary to the above, the operability evaluation in IR 560911 did not sufficiently address all the circumstances of the SLC relief valves' nonconformance and their potential to be unable to perform their specified safety function. Specifically, the OD did not address documented historical pressure pulsations of up to 1,350 psig in the Unit 3 SLC system while the 3 'A' SLC pump discharge relief valve was set at 1,341 psig. The potential for an unintended opening of RV-3-11-39A with this pressure overlap was not addressed in the OD therefore, the OD did not provide a reasonable expectation of operability. Because this finding is of very low safety significance and has been entered into the licensee's CAP (IR 5584677), this violation is being treated as a non-cited violation consistent with

Section VI.A of the NRC Enforcement Policy: **NCV 05000277/2006005-01, Failure to Follow Operability Determination Procedure.**

1R17 Permanent Plant Modifications (71111.17 - 1 Sample)

a. Inspection Scope

The inspectors reviewed the PBAPS's activities to implement a design change that installed yard drain sump pumps and oil filtration skids for Unit 2 and Unit 3 to address ground water intrusion issues. The inspectors reviewed selected portions of engineering change request (ECR) 06-00277. The review was conducted to verify that the design bases, licensing bases, and accident analyses had not been degraded through this modification. The inspectors observed selected portions of the modification field implementation activities and compared the implementation performance to the design requirements and installation standards. The inspectors reviewed field changes that were made during the installation to confirm that the problems associated with the installation were adequately resolved. The inspectors also verified that the implementation did not impair operating procedure actions, key safety functions and operator response to loss of key safety functions.

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 R0984379, Unit 2 Drywell & Outboard MSIV Room: Retorque Valve Packing (Valve MO-2-02-077, Main Steam Drains Outboard)
- WO R0971251-41-46, E-4 EDG Engine Inspection (Loaded to 3100 kW)
- WO R0801709-2, E-134-W-A (3694), Perform Motor Control Unit Inspection
- WO C0219205, HV-2-32-22224B, Replace Downstream Pipe/Fittings
- WO R0977202, Reactor Core Isolation Cooling (RCIC) Minor Inspection
- WO C0219414, APRM LM-1-PB2, Rework/Replace APRM Logic Module Voter Components

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (2 Samples)

.1 Unit 2 Refueling Outage 16

a. Inspection Scope

The Unit 2 Refueling Outage (P2R16) was conducted from September 15, 2006 through October 7, 2006. The inspectors performed the activities below to verify PBAPS controls over the outage activities.

- Refueling Activities - verified that PBAPS was using controls to ensure the location of the fuel assemblies were properly tracked and verified that procedures for foreign material control and retrieval were implemented on the refueling floor.
- Decay Heat Removal - verified the foreign material retrieval procedures were implemented for the 'D' RHR subsystem system pump, piping, valves and heat exchanger.
- Drywell Closure - conducted a thorough inspection and walkdown of containment prior to reactor startup and ensured that all remaining debris, tools, and equipment were removed.
- Torus Closure - conducted a thorough walkdown of accessible torus areas above the suppression pool prior to reactor startup to verify that all debris, tools, and diving gear were removed.
- Safety Relief Valves (SRVs) - reviewed the results of the post-removal lift test results to verify that there was no loss of system operability or safety function.
- Startup Requirements - observed selected portions of the start-up review meetings conducted by the plant operations review committee (PORC). The inspectors also verified that the proper post-maintenance testing had been completed on the RCIC pump and selected valves.
- Licensee Identification and Resolution of Problems - reviewed corrective action reports related to refueling outage activities to verify that PBAPS was identifying issues at the appropriate level and taking adequate corrective action.

b. Findings

No findings of significance were identified.

.2 Unit 2 Forced Outage

a. Inspection Scope

On October 7, 2006, Unit 2 was shutdown from 22 percent in response to a TS action for loss of primary containment. Details of this event are documented in report section

4OA3.1 and a Preliminary Notification of Event or Unusual Occurrence (PNO-I-06-011) dated October 10, 2006. The inspectors reviewed selected activities to investigate and repair through-wall cracks in the common HPCI\RCIC flush line to the torus between October 7 and 10, 2006. On October 10, the inspectors observed selected portions of the Unit 2 startup from the forced outage.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 2 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-O-054-752-2, E-22 4Kv Bus Undervoltage Relays and Loss-of-Coolant Accident Loop Functional Test and E-22 and E-224 Alternative Shutdown Control Functional Test
- ST-O-013-301-2, RCIC Pump, Valve, Flow and Unit Cooler Functional and In-Service Test (IST)

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 Sample)

a. Inspection Scope

The inspectors reviewed one temporary modification to verify that implementation of the modification 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 of risk significant SSCs had not been degraded through the modification. 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:

- ECR PB 06-00409-000, AO-2-10-046A, Removal of Valve Disc Position Indication

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational Radiation Safety**

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

a. Inspection Scope

The inspectors reviewed selected activities and associated documentation in the areas listed below. The evaluation of PBAPS's performance in these areas was compared to criteria contained in 10 CFR 20, TSs, and Exelon procedures.

Inspection Planning - Performance Indicators

The inspectors selectively reviewed performance indicators (PIs) for the Occupational Exposure Cornerstone. The inspectors also discussed and reviewed current performance with cognizant PBAPS personnel. (Section 4OA1)

Plant Walkdowns and Radiation Work Permit Reviews

The inspectors walked down selected radiological controlled areas and reviewed housekeeping, material conditions, posting, barricading, and access controls to radiological areas, including high radiation areas. The inspectors reviewed exposure significant work areas to determine if radiological controls were acceptable and conducted selective radiation surveys. The inspectors reviewed on-going radiological work activities to characterize irradiated control rod blades for disposal. The review included evaluation of the adequacy of applied radiological controls including radiation work permits, procedure adherence, radiological surveys, job coverage, air sampling, airborne radioactivity controls, and contamination controls. The inspectors reviewed and discussed TS controlled high radiation areas. The inspectors also reviewed applicable radiation work permits and electronic personnel dosimetry alarm set-points to verify the setpoints were commensurate with ambient/expected conditions and radiation work permits. The inspectors reviewed and discussed inter-comparison of electronic dosimeter and thermoluminescent dosimeter results to identify anomalies and licensee actions, as applicable.

The inspectors reviewed and discussed internal dose assessments for 2006, including the Unit 2 outage to identify any apparent actual occupational internal doses greater than 50 millirem committed effective dose equivalent (CEDE). The review also included the adequacy of evaluation of selected dose assessments, as appropriate, and included selected review of the program for evaluation of potential intakes associated with hard-to-detect radionuclides (e.g., airborne transuranics).

The inspectors reviewed and discussed physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within the spent fuel pool, or other storage pools, as applicable.

#### Problem Identification and Resolution

The inspectors selectively reviewed self-assessments and audits since the previous inspection to determine if identified problems were entered into the CAP for resolution. The inspectors evaluated the database for repetitive deficiencies or significant individual deficiencies to determine if self-assessment activities were identifying and addressing the deficiencies. The review also included evaluation of data to determine if any problems involved PI events with dose rates greater than 25 R/hr at 30 centimeters, greater than 500 R/hr at 1 meter or unintended exposures greater than 100 millirem total effective dose equivalent (TEDE), 5 rem shallow dose equivalent (SDE), or 1.5 rem lens dose equivalent (LDE).

The inspectors reviewed problem reports since the last inspection which involved potential radiation worker or radiation protection personnel errors to determine if there was an observable pattern traceable to a similar cause. The review included an evaluation of corrective actions, as appropriate. (Section 4OA2)

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

The inspectors discussed procedure changes for high radiation area access controls since the last inspection with the radiation protection manager and selected supervisors to determine if the changes resulted in a reduction in the effectiveness and level of worker protection. The inspectors conducted a selective review of high radiation area controls (e.g., adequate posting and locking of entrances).

#### Radiation Worker/Radiation Protection Technician Performance and Radiation Protection Technician Proficiency

The inspectors observed radiation worker performance during spent fuel pool work activities. The inspectors evaluated radiation protection technician performance and proficiency relative to control of hazards and work activities, as applicable. In addition, the inspectors reviewed problem reports to identify problems with worker or radiation protection technician performance.

b. Findings

No findings of significance were identified.

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

### a. Inspection Scope

The inspectors reviewed PBAPS's implementation of 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, industry standards and Exelon procedures.

#### Verification of Dose Estimates and Exposure Tracking

The inspectors reviewed dose results for completed Unit 2 outage work activities. The inspectors compared the results achieved (person-rem sustained) with the intended collective occupational dose established in the ALARA plans for these activities. Work-in-progress reviews as well as post-job ALARA evaluations were reviewed, as appropriate. Tasks reviewed included balance of plant work activities, refueling floor work activities, drywell work activities, undervessel work activities (control rod drive removal and replacement activities), valve work (MSIV, main steam relief valve) activities, reactor disassembly/reassembly, tank cleaning, re-circulation pump work, and reactor cavity decontamination activities.

#### Source-Term Reduction and Control

The inspectors reviewed source-term reduction and control efforts. The inspectors reviewed and discussed: fluid clean-up methods, the effectiveness of flushing strategies and work control strategies to minimize the impacts on person-rem. The inspectors reviewed the site ALARA procedures, including job exposure estimates and tracking. The inspectors reviewed and discussed system dose rate levels.

#### Problem Identification and Resolution

The inspectors reviewed problem reports in this area since the last inspection to determine if PBAPS was including ALARA deficiencies and issues in its CAP. The inspectors reviewed IRs to determine if identified problems were entered into the CAP for resolution. The inspectors reviewed selected IRs 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. (IR Nos. 527532, 542978, 557378, 534341, 538669, 481826, 313484, 529694, 532005, 532822, 535027, 543073, 556258, 532061, 532173, 5275532, 536621, 232938).

### b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03 - 1 Sample)

a. Inspection Scope

The inspectors selectively reviewed radiation monitoring/measurement instrumentation in the below listed areas. The review was performed to criteria contained in applicable TSs and station procedures.

Instrument Calibration, Operability, and Alarm Setpoint Verification

The inspectors selectively reviewed calibration data for personnel contamination monitors (PM-7: 224, 296, 332684; PMW: 9712002). The inspectors also reviewed calibration of area radiation monitors (Unit 3 refueling floor area radiation monitors Channels 29, 30 and 31; and fuel pool radiation monitor RIS 3-17-465).

Radiation Protection Technician Instrument Use

The inspectors selectively verified the calibration expiration and source check response on radiation detection instruments staged for use. The inspectors observed radiation protection technicians for appropriate instrument selection and use including self-verification of instrument operability.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

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

a. Inspection Scope

**Cornerstone: Mitigating Systems** (2 Samples)

The inspectors sampled PBAP's submittals for the safety system functional failures PI for both Units 2 and 3. For the functional failures, the inspectors looked at the period from the first quarter 2005 through the third quarter 2006. To verify the accuracy of the PI data reported during that period, PI definitions and NEI 99-02, "Regulatory Assessment Indicator Guideline," Revision 4, were used to verify the basis in reporting for each data element.

The inspectors reviewed licensee event reports (LERs) issued during the referenced time frame for safety system functional failures. The LERs reviewed are listed in the attachment. The inspectors also discussed the methods for compiling and reporting the PI with cognizant licensing personnel. The inspectors compared graphical representations from the most recent PI report to the raw data to verify that the data was correctly reflected in the report.

Enclosure

**Cornerstone: Occupational Radiation Safety** (1 Sample)

The implementation of the Occupational Exposure Control Effectiveness PI Program was reviewed. The inspectors reviewed corrective action program records for occurrences involving high radiation areas, very high radiation areas, and unplanned personnel radiation exposures since the last inspection in this area. The inspectors also selectively reviewed exposure records. The review was against the applicable criteria specified in NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 4. The purpose of this review was to verify that occurrences that met NEI criteria were recognized and identified as PIs.

**Cornerstone: Public Radiation Safety** (1 Sample)

The implementation of the RETS/ODCM Radiological Effluent Occurrences PI was reviewed. The inspectors reviewed CAP records and projected monthly and quarterly dose assessment results due to radioactive liquid and gaseous effluent releases for the past four quarters. The inspectors selectively reviewed the 2005 Annual Radioactive Effluent Release Report. The inspectors also reviewed and discussed potential abnormal releases via groundwater or effluents. The review was against the applicable criteria specified in NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 4. The purpose of this review was to verify that occurrences that met NEI criteria were recognized and identified as PIs.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 - 2 Annual Samples; 1 Semi-annual Sample)

.1 Annual Sample: Unit 2 High Pressure Coolant Injection (HPCI) Lube Oil  
71152 - 1 Sample)

a. Inspection Scope

On May 14, 2004, during post-maintenance testing of the Unit 2 HPCI turbine, the turbine governor bearing and turbine shaft were damaged due to the mis-positioning of a lube oil supply ball valve. The inspectors reviewed a sample of the short term corrective actions taken subsequent to the failure as well as the long term actions taken and planned to assess if they adequately addressed the cause of the failure. The inspectors conducted interviews with plant personnel, reviewed applicable procedure changes, and walked down the HPCI turbine skid in both units. Additionally, the inspectors reviewed test results after the implementation of ECR 05-00140, which removed ball valves and replaced them with orifices in the Unit 2 HPCI lube oil system.

b. Findings and Observations

No findings of significance were identified.

The inspectors concluded that PBAPS had identified the cause of the issue and had taken appropriate short and long term corrective actions. The inspectors noted the ECR implemented for Unit 2 was also planned for Unit 3. The design change ensured lube oil could not be inadvertently isolated by a valve mis-positioning event. However, the inspectors noted a minor procedural weakness associated with a change which had been made to the HPCI pump, valve and flow quarterly test for both units. PBAPS, as part of short term corrective actions for the lube oil failure in 2004, had previously revised the procedures to run the motor driven auxiliary oil pump prior to the start of the turbine to ensure an adequate oil supply existed. However, a precaution was not included to alert operators that if an initiation signal were to occur during that section of the test, it would likely result in a high steam flow isolation of the system because the stop valve would be open. PBAPS entered the issue into their CAP for resolution as IR 558911.

.2 Annual Sample: Unit 3 Safety Relief Valve (SRV) Test Failures (71152 - 1 Sample)

a. Inspection Scope

The inspectors reviewed the immediate and long term actions taken by PBAPS to identify the cause and implement corrective actions to address an October 2, 2005, bench test failure of Unit 3 SRV-71E to properly re-close (IR381079). The inspectors conducted interviews with plant personnel, reviewed vendor data sheets, and data compiled from investigations, to determine if the problems identified were adequate to explain the failure mechanism observed during the bench test. The inspectors also reviewed PBAPS's extent-of-condition review and actions taken to communicate the issue both internally and externally to the industry.

Additionally, the inspectors reviewed actions taken in response to the determination in October 2005, that four SRVs were found to lift outside of their technical specification required as-found setpoints (IR 381063). Specifically, the inspectors reviewed the assessment of past operability with respect to code limits for the reactor coolant pressure boundary and the potential affect on the function of the high pressure systems. The inspectors also reviewed data from the last several refueling outages for both units, to ensure PBAPS had appropriately analyzed the safety consequences of any condition where SRV's were identified to be outside their allowable setpoints.

b. Findings and Observations

No findings of significance were identified.

The inspectors concluded that PBAPS had identified the most probable cause of the failure of the SRV to reseal and had taken appropriate corrective actions, including communication of the issue externally in accordance with their process. The inspectors

determined that PBAPS had appropriately determined the safety consequences with respect to the SRV's which were found to be outside their allowable tolerances.

.3 Semi-Annual Review to Identify Trends (71152 - 1 Sample)

a. Inspection Scope

The inspectors reviewed a list of approximately 6500 IRs that PBAPS initiated and entered into the CAP action tracking system (Passport) from June 1, 2006, through December 1, 2006. The list was reviewed to complete the required semi-annual PI&R trend review. Approximately 43 of the Passport IRs were reviewed in detail to verify whether the issues were adequately identified and evaluated and corrective actions were planned. 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." A list of IRs reviewed to identify potential adverse trends is included in the report attachment.

b. Assessment and Observations

Issue reports numbered IR 534509, 533343, 534435 and 533285 describe FME issues and may indicate an adverse trend. Issues numbered IR 534622, 534736, 536913 and 551703 describe primary containment isolation valve (PCIV) leakage test failures that may indicate an adverse trend. The inspectors noted that potential adverse trends associated with FME and PCIV issues were also identified as potential adverse trends in the last semi-annual trend review that was documented in NRC Inspection Report 2006-03. Potential adverse equipment trends were identified for relief valves (IR 538543, 538538, 537127 and 538660) and relays (IR 371932, 473360, 569879, and 565945).

The inspectors also reviewed a list of the approximately 5050 evaluations that remain open in the site work management system (PIMS). Approximately 2250 of these evaluations were indicated as overdue. This condition was entered into the CAP as IR 571596. Aged procedure improvement recommendations were noted as a potential adverse trend. The inspectors reviewed a list of the approximately 6000 assignments associated with Passport IRs in the CAP. The inspectors noted that each department had assignments that were identified as improvements or enhancements that have remained open for approximately two to seven years. The inspectors observed that PBAPS had identified an enhancement to address a potential adverse trend regarding conflicts between Exelon documents and former PECO or station documents (IR 569168).

.4 Routine Review of Items Entered Into the CAP

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.

4OA3 Event Followup (71153 - 2 Samples)

.1 Unit 2 - Loss of Primary Containment Integrity - October 7, 2006 (71153 - 1 Sample)

a. Inspection Scope

On October 7, 2006, the inspectors responded to the site for an Unusual Event (UE) resulting from a loss of Unit 2 primary containment integrity. The loss of primary containment integrity was initially believed to be caused by two longitudinal cracks that were approximately 3.5 inches long. Subsequent laboratory examination also revealed a circumferential piping crack in the shared HPCI/RCIC flush return line to the torus.

At the time of the event, power was being held at approximately 22 percent to conduct a RCIC full flow test to the torus following the refueling outage. During the test, at 5:41 PM, an equipment operator (EO) observed water spraying from the HPCI\RCIC piping at a 45-degree elbow approximately one foot from where the line enters the torus. At this time, the EO notified the main control room (MCR). Upon discovery, the test was terminated and the flush line isolation valve was closed. Closing this valve isolated water to the test line terminating the leak. However, there is no isolation valve between the torus and the crack in the elbow, so primary containment integrity could not be maintained. At 5:50 PM, the MCR entered the off normal procedure (ON)-110, "Loss of Primary Containment" and entered the TS Action statement entry for loss of primary containment. At 6:02 PM, the UE was declared for a loss of primary containment. In accordance with Technical Specifications, the plant was shut down and reached Mode 4 (cold shutdown) October 8, 2006. Upon reaching cold shutdown, containment integrity was no longer required and the plant exited the UE.

The inspectors reviewed the licensee event report (LER) 2-06-03 and PBAPS's root cause investigation report (IR 541265-29) to understand the causes for this event. The inspectors noted that the identified root cause was an inadequate surveillance procedure development and approval that changed the use of this common HPCI\RCIC line to the torus from its original design purpose as a partial flow flush line to a full flow test line. Operation of this piping at flow velocities higher than intended was not identified when the surveillance test frequency was increased. The report states that in addition to the high flow rates, cavitation and turbulence contributed to the erosion as the failure mechanism.

The inspectors reviewed a technical evaluation (IR 541265-61) that identified initiating events where the existing through-wall cracks in the common HPCI\RCIC line would fail and provide a flow path from inside the torus to outside the torus. The evaluation assumed that flow through the downcomers or through the SRV tailpipes would cause sufficient hydrodynamic load to result in the failure of this pipe. The inspectors reviewed a technical evaluation (IR 541265-62) that determined the amount of time required to

lower suppression pool level and uncover the common HPCI\RCIC line, assuming no inventory make-up.

b. Findings

The inspectors reviewed self-revealing through-wall cracks in a Unit 2 common HPCI\RCIC flush line that discharges into the torus. PBAPS determined that high flow rates, cavitation and turbulence contributed to the erosion that was the failure mechanism. PBAPS concluded that inadequate surveillance procedure development and approval, which changed the use of this common HPCI\RCIC line to the torus from its original purpose as a partial flow flush line, to its use as a full flow test line, was a causal factor for the through-wall cracking.

At the close of this inspection period, the inspectors were reviewing design basis and system vendor documents to understand the potential performance deficiencies. Additionally, the inspectors and a regional risk analyst were reviewing the technical evaluations provided, and other analyses of the condition to characterize the impact of the potential performance deficiencies. This issue is unresolved pending review of the PBAPS analyses and vendor documents by the inspectors to characterize the issue.

**Unresolved Item (URI) 05000277/20060005-02, Loss of Primary Containment Integrity.**

.2 Personnel Performance (71153 - 1 Sample)

a. Inspection Scope

The inspectors reviewed selected applicable plant records, corrective action documents and approved procedures while evaluating the performance of operations personnel in response to non-routine evolutions. The inspectors assessed personnel performance to determine what occurred and how the operators responded, and to determine if plant personnel's response was in accordance with plant procedures and training. The following non-routine evolution was observed or reviewed:

- During the evening of September 21, 2006, nondestructive examination (NDE) personnel working on the reactor cavity work platform (RCWP) reported (IR 534509) that a calibration standard that was not tied off to the RCWP where it had been earlier in the day. The calibration standard was fabricated using stainless steel plate and plexiglass that were approximately 8 x 8 inches square. The calibration standard had been tethered with approximately 80 feet of 1/4 inch diameter rope. The calibration standard had been used in the annulus region of the reactor vessel. The material was not found during visual searches of the core, the annulus region and the connected piping. A boroscope inspection was performed and pieces of the lost material were found in the 2 'D' RHR pump and a downstream valve. The pieces were retrieved or evaluated as acceptable before plant restart. PBAPS was continuing with this cause analysis and review (IR 534509) of human performance issues involving foreign material exclusion practices at the end of this inspection period.

Enclosure

b. Findings

No findings of significance were identified.

4OA5 Other Activities

.1 Mitigating Systems Performance Index – Temporary Instruction (TI) 169 (1 Sample)

a. Inspection Scope

The purpose of this TI is to validate the unavailability and unreliability input data and to verify accuracy of the first reporting results for the 2006 second quarter. On November 3, 2006, the inspectors completed an on-site review of the PBAPS Mitigating Systems Performance Index (MSPI) program in accordance with TI-169. The objective of the inspection was to verify that PBAPS has correctly implemented the MSPI guidance for reporting unavailability and unreliability of the monitored safety systems. This was accomplished by reviewing a selected sample of unavailability and unreliability data for the period from 2002 to the end of the second quarter of 2006. The monitored safety systems reviewed for this inspection included:

- Emergency Diesel Generators
- Emergency Service Water
- Unit 2 and Unit 3 High Pressure Coolant Injection
- Unit 2 and Unit 3 Reactor Core Isolation Cooling
- Unit 2 and Unit 3 RHR – Suppression Pool Cooling Mode
- Unit 2 and Unit 3 HPSW

The inspectors conducted interviews with each of the assigned system managers to determine the methods used to manage the unavailability and unreliability of the MSPI monitored components. Surveillance procedures, operator actions and system automatic realignment scenarios were reviewed to determine that the exclusion of unavailability during these scenarios was appropriate. Operations procedures were reviewed to confirm that credited operator actions for excluding train unavailability were described in written instructions and were uncomplicated.

The Consolidated Data Entry (CDE) system, managed by the Institute of Nuclear Power Operations via an internet website, was reviewed to confirm that unavailability and unreliability data had been entered accurately by the system managers for all of the MSPI monitored systems. The inspectors reviewed a sample of CDE derivation reports to ensure the calculations of the unavailability and unreliability indices were correct.

This completes the Region I inspection requirements for this TI.

b. Findings and Observations

No findings of significance were identified. In accordance with the reporting requirements of TI-169, the following are the observed results of five areas that were specifically inspected to verify the accuracy of the PBAPS MSPI data:

- (1) Calculations of baseline planned unavailability hours were reviewed to ensure that baseline data for the MSPI indices were calculated correctly. One instance was found where 41 hours of total train unavailability was inadvertently excluded from the baseline planned unavailability calculation. PBAPS has written an Issue Report (IR 551589) in the CAP to revise the MSPI basis document to reflect the correct values.

In addition, the inspectors reviewed MSPI monitoring of the cooling water systems (HPSW and emergency service water) to determine if PBAPS had correctly accounted for planned and unplanned unavailability resulting from cascading support system inoperability. The PBAPS's system managers identified an error in the total train unavailability values reported for HPSW and RHR systems due to incorrectly accounting for unavailability hours in the cooling water system. PBAPS captured this in their CAP (IR 547710 and 551884).

- (2) The inspectors reviewed control room narrative logs, short duration time clock logs, and action requests to verify the accuracy and completeness of the reported actual unavailability data for the MSPI systems through calendar year 2005. No errors were identified.
- (3) The inspectors reviewed a selected sample of PBAPS's unreliability data to confirm that PBAPS accurately classified: valve and breaker demand failures; emergency diesel generator start failures, load and run failures and run failures; and pump demand failures and run failures. No errors were identified.
- (4) The inspectors reviewed the reported MSPI data for the second quarter of 2006 to verify that the data was accurate. No significant errors which resulted in a change to the indicated (Green) index colors were identified.
- (5) The inspectors reviewed PBAPS's MSPI basis document and associated piping and instrumentation diagrams. No significant errors were identified which would result in: a change to the MSPI systems' boundaries; an addition of a monitored component; or a change in the reported index color.

2. Shutdown Risk Management - Implementation of Temporary Instruction (TI) 2515/167

a. Inspection Scope

The objective of TI 2515/167, "Assurance of Industry Implementation of Key Shutdown Voluntary Initiatives," was to confirm, through interviews and review of refueling outage documents, that licensees are continuing to implement the key voluntary shutdown

initiatives as described in NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," and in Generic Letter (GL) 88-17, "Loss of Decay Heat Removal (Generic Letter No. 88-17) 10 CFR 50.54(f)." The information will be used to validate the probabilistic risk assessment (PRA) of shutdown operations, presented in SECY 97-168, "Issuance for Public Comment of Proposed Rulemaking Package for Shutdown and Fuel Storage Pool Operation." The inspectors evaluated PBAPS's process and procedures implemented to manage shutdown risk during P2R16 against the probabilistic risk assessment base and voluntary initiative cases as described in TI 2515/167.

The information gathered while completing this TI between November 27 and 29, 2006, was retained by the Office of Nuclear Reactor Regulation (NRR) for further review and evaluation. This completes the Region I inspection requirements for this TI.

b. Findings

No findings of significance were identified.

40A6 Meetings, Including Exit

Exit Meeting Summary

On January 19, 2007, 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.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Exelon Generation Company personnel

R. Braun, Site Vice President  
J. Grimes, Plant Manager  
N. Alexakos, Manager, Engineering-Programs  
J. Armstrong, Regulatory Assurance Manager  
C. Behrend, Engineering Director  
C. Hardee, Radiological Engineering Manager  
J. Hunter, Operations Training Manager  
C. Jordan, Chemistry Manager  
D. Lewis, Operations Director  
M. Lyate, Radiation Support Manager  
G. Stathes, Maintenance Director  
S. Taylor, Manager, Radiation Protection  
A. Wasong, Training Director

NRC personnel

J. Trapp, Branch Chief, DRP, Branch 4

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

Opened

05000277/2006005-02	URI	Unit 2 Loss of Primary Containment Integrity. (Section 4OA3)
---------------------	-----	---

Opened and Closed

05000277/2006005-01	NCV	Failure to Follow Operability Determination Procedure. (Section 1R15)
---------------------	-----	--

Closed

None.

Discussed

None.

## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather**

WC-AA-107, Rev 2, Seasonal Readiness  
RT-O-040-620-2, Outbuilding HVAC and Outer Screen Inspection for Winter Operation  
MA-PB-1003, Rev. 14, Winter Readiness and Storm Response Guidelines for the Peach Bottom Facility  
OP-PB-108-111-1001, Rev. 2, Preparation for Severe Weather  
OP-AA-108-111-1001, Rev. 2, Severe Weather and Natural Disaster Guidelines  
SO 48.4.A, Rev 4, Draining Emergency Service Water and High Pressure Service Water Return Lines to Emergency Cooling Tower for Winter Freeze Protection  
System Engineering Winter Readiness Review  
AR 00557358, Winter Readiness Exceptions - PBAPS 2006

### **Section 1R04: Equipment Alignment**

ST-O-011-301-3, Standby Liquid Control Pump Functional Test for IST  
R0801709, E134-W-A (3694): Perform MCU Inspection on Standby Liquid Control Pump 3AP40  
SO-COL-11.1.A-3, Standby Liquid Control System Lineup  
COL 14.1.A-3A, Rev. 11, Core Spray System Loop A

### **Section 1R05: Fire Protection**

RT-F-101-922-2, Fire Drill  
OP-AA-201-003, Fire Drill Performance  
TQ-AA-210-4105, Course Attendance Sheet  
Fire Drill Scenario No.: 2006-05, Unit 2 RBCCW Room, Radwaste Building 116' Elevation  
Prefire Strategy Plan (PF)-4B, U2 RBCCW Room, Radwaste Building 116' Elevation, Fire Zone 4B  
PF-78H, Cable Spreading Room & Computer Room, Turbine Building 150' Elevation, Fire Zone 78H  
PF-132, Diesel Generator Building, 127' Elevation, Fire Zone 132  
PF-13D, 3A/C Core Spray rooms, Rx Bldg 91' 6" Elevation, Fire Zones 13D & 13E  
PF-164, Prefire Strategy Plan 2 Startup Switchgear Building, Fire Zone 164  
PF-89, Rev. 2, Prefire Strategy Plan, Lube Oil Tank Room, TB3-116, Fire Zone 89  
PF-158, Rev. 3, Prefire Strategy Plan, Recombiner Bldg 135' El, Fire Zone 158  
PF-59, Rev. 2, Prefire Strategy Plan, Unit 2 RX Bldg, HPCI Room 88' El., Fire Zone 59  
RT-O-037-320-3, Rev. 5, Monthly Inspection of Unit 3 Turbine Building Fire Extinguishers (Completed 11/30/06)  
RT-O-037-322-2, Rev. 5, Monthly Inspection of Radwaste Area Fire Extinguishers (Completed 11/24/06)  
PF-117, Rev. 4, Prefire Strategy Plan, Unit 3 Emerg Batt/SWGR Rms, TB3-135, Fire Zone 117  
PF-12C, Rev 3, Prefire Strategy Plan, Unit 3 RX Recirc Pump MG Set Rm, Radwaste Bldg, 135' El, Fire Zone 12C

RT-O-037-321-3, Rev. 5, Monthly Inspection of Unit 3 Reactor Building Fire Extinguishers  
(Completed 11/29/06)

RT-O-037-321-2, Rev. 5, Monthly Inspection of Unit 2 Reactor Building Fire Extinguishers  
(Completed 11/29/06)

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

T-117, Level/Power Control

GP-9-2, Fast Reactor Power Reduction (Unit 2)

GP-4, Manual Reactor Scram

**Section 1R12: Maintenance Effectiveness**

IR 00543926, 2B HPSW Motor Oil Cooler Supply Line Leak

IR 00532761, Plant Operations with Leak in Class 3 Pipe

IR 00532363, 2B HPSW Pump Cooling Water Leak

IR 00536910, Extent of Condition Inspection from 2B HPSW Leak

AR A1585919, Extent of Condition Inspection from 2B HPSW Leak

AR A1588921, 2B HPSW Motor Oil Cooler Supply Line Leak

AR 00554253, Replace 2A HPSW Pump Cooling Water Piping (EACE 532363-02)

IR A1380938, Below Min-Wall UT Thickness Reading of HPSW Piping During the NDE

Ultrasonic Examinations Performed Under Work Order R0877328

IR 00169758, Below Min-Wall Thickness Readings Detected in HPSW Piping

IR 00522379, RMPFF Due to Moore 352 Controller Failure

IR 00209005, Failure of HPCI During ST-O-023-301-3

IR 00497648, CAD Injection Controller Failure

IR 00535329, Disassemble 2 "D" RHR Pump Suction Hand Valve for Lost FME

IR 00534509, FME Integrity Lost When Calibration Standard Was Not Unaccounted For

IR 00535437, Plan A Contingency Inspection of the 2 "D" RHR Pump Impeller

IR 00535575, Contingent IR for Unit 2 Shutdown Cooling Piping FME Search

IR 00535354, NOS ID'D - Refuel Floor FME Drop Log Issues

IR 00535446, Plan a Contingency Boroscopic Inspection of 2DE024: RHR Side

IR 00535259, Disassemble 2 'D' RHR Pump Discharge Check Valve For Lost FME

ST-O-07C-450-2, CAD Injection and Vent Valves In-Service Test, Rev 0

Instrument Calibration Sheets for the Following Instruments - I/P-2532A-C, I/P-3483, I/P-2485, I/P-2483, I/P-3487, I/P-2487, HCS-2483, I/P-3532A-C, LC-3804B, FCS-0-19-4-069C, I/P-3485

ER-AA-310-1004, Maintenance Rule - Performance Monitoring

ER-AA-310-1005, Maintenance Rule - Disposition Between (a)(1) and (a)(2)

ER-AA-310, Implementation of the Maintenance Rule

ER-AA-310-1003, Maintenance Rule - Performance Criteria Selection

ER-PB-310-1010, Maintenance Rule Implementation

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

IR 00542343, Main Generator Hydrogen Consumption Excessive

IR 00542932, Hydrogen Seal Oil System Over Pressurization Post Scram

Adverse Condition Monitoring and Contingency Plan for Main Gen Bushing/Seal Oil Issue  
IR 00568035, RV-2-11-39B Lifting During RT-O-011-301-2  
IR 00538543, SLC RV Failed as Found Test  
IR 00560911, RV-3-11-39B Setpoint Lower than the Required 1,443 psig  
IR 00560953, RV-2-11-39B Setpoint lower than the Required 1,443 psig  
IR 00331542, OPEX Review - OE19666 - SLC Accumulator Leakage  
AR A0354772, RV-2-11-39A, Remove/Bench Test relief valve  
ST-O-011-301-2, Rev. 16, Standby Liquid Control Pump Functional Test for IST  
ST-O-011-301-3, Rev. 17, Standby Liquid Control Pump Functional Test for IST  
P&ID - M335, Rev 29, Generator H2 and CO2 Purge System, Sheet 1 of 2  
P&ID - M335, Rev 24 Generator H2 and CO2 Purge System, Sheet 2 of 2  
GE Vendor Drawing - 943D758, Arrangement of Shaft Sealing System  
GEK 45934F, Shaft Seal Assembly, Installation and Maintenance

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

OP-AA-106-101-1006, Operational and Technical Decision Making (OTDM)  
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  
ST-O-052-201-2, E-1 Diesel Generator Slow Start and Full Load Test  
ST-O-011-301-3, Standby Liquid Control Pump Functional Test for IST  
SO 52A.8.C Diesel Generator Running Inspection  
AR A1564759 - Considerable Lube Oil Leaks During Run  
IR 00532876, RV-2-10-035B, Lifted During Shutdown Cooling Run  
IR 00533284, Recommendation to Minimize Chances of RHR RV Lifting  
AR A1554928 - Considerable Lube Oil Leaks During 1-Hour run  
P&ID - M361, Sheet 2, Rev. 67, Residual Head Removal System  
Areva Engineering Information Record 51-9032375-000, Lost Part Analysis for Peach Bottom  
Unit 2 - Dowel Pin from Transducer Housing for Jet Pump Diffuser  
Plant Operations Review Committee (PORC) Meeting Minutes 06-20, P2R16 Startup PORC #3,  
dated October 2, 2006  
AR A1486782, AO-2-10-046A, RHR Loop 'A' Injection Check Valve  
WO C0211506, AO-2-10-046A, Investigate and Repair Indication  
IR 00560911, RV-3-11-39B Setpoint Lower than the required 1,443 psig  
IR 00331542, OPEX Review - OE19666 - SLC Accumulator Leakage  
AR A1564759, Considerable Lube Oil Leaks during Run  
AR A1554928, Considerable Lube Oil Leaks during 1 hour run  
IR 00560911, RV-3-11-39B Setpoint Lower than the Required 1,443 psig  
IR 00568035, RV-2-11-39B Lifting During ST-O-011-301-2  
IR 00538543, SLBC RV Failed as Found Test  
IR 00560953, RV-2-11-39B Setpoint Lower than the Required 1,443 psig  
IR 00331543, OPEX Review, OE19666 - SLC Accumulator Leakage  
IR 00565212, NRC Resident Concern with Operability Determination  
TRT 05-023, Record Selected Operating Parameters (Pressure Fluctuations, Discharge  
Pressure, Flowrate) of the 3 'A' SLC Train at Specified Accumulator Pressure  
AR A0354772, SLC Pump 2AP040 Discharge to SLC Tank Relief

AR A1593801, SLC Pump 3AP040 Discharge to SLC Tank Relief  
WO R0235682, RV-2-11-39A, Remove/Bench Test Relief Valve  
ST-O-011-301-3, Rev.17, Standby Liquid Control Pump Function Test for IST  
ST-O-011-301-2, Rev.16, Standby Liquid Control Pump Function Test for IST

**Section 1R17: Permanent Plant Modifications**

ECR 06-00277, Unit 2 Yard Drain Sump and Oil Filtration Skid  
AR A1534786, Expanded Water Intrusion from J-4301 Box and Assoc Conduits  
IR 00573217, U-2 Yard Drain Sump Pump would not start  
CC-AA-103, Rev. 12, Configuration Change Control for Permanent Physical Plant Changes

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

ST-O-007-410-2, Rev. 22, PCIS Valves Cold Shutdown Inservice Test  
WO R0984379, Unit 2 Drywell & OBMSIV RM: Retorque Valve Packing  
WO R0847590, Line Bleed COND (MO-2-02-077)  
RT-O-052-254-2, Rev 20, "E4 Diesel Generator Inspection Post-Maintenance Functional Test"  
M-052-002, "Diesel Engine Maintenance"  
WO R0968501, "RT-O-052-254-2, E-4 D/G Insp Post-Maintenance Functional Test"  
WO R0801709-2 - E134-W-A (3694), Perform MCU Inspection  
ST-O-011-301-3, Standby Liquid Control Pump Function Test  
IR 207837-57, PBAPS EDG Action Plan  
IR495141-03, Request Bolt Failure Analysis from Power Labs  
WO CO219205, HV-2-32-22224B, Replace Downstream Pipe/Fittings  
WO C0219241, Investigate\Repair APRM-1-PB2  
Troubleshooting, Rework and Testing (TRT) Control Form, Post-Maintenance Testing Activities  
    Required to Demonstrate Functionality of a Replacement Voter to Support Tech Spec  
    Operability of the Power Range Neutron Monitoring System  
SI-2N-60A-APRM-11FS, Functional Check of Average Power Range Monitor (APRM) "1"  
AR A1592838, APRM 1 Logic Module Causing Hi-Hi/Inop Trip when Moved  
AR A1592861, ½ SCRAM from Failure of APRM1  
AR A1589378, APRM Surveillance Test Failure  
IR 557904, ½ SCRAM from Failure of APRM-1  
IR 545613, APRM Surveillance Test Failure for "Rod Withdraw Block" Alarm Failure  
IR 557638, APRM 1 Logic Module Causing Hi-Hi/Inop Trip when Moved

**Section 1R22: Surveillance Testing**

ST-O-013-301-2, RCIC Pump, Valve, Flow and Unit Cooler Functional and In-Service Test  
    (record copy, 10/07/2006, aborted)  
ST-O-013-301-2, RCIC Pump, Valve, Flow and Unit Cooler Functional and In-Service Test  
    (record copy, 10/07/2006, partial)  
ST-O-013-301-2, RCIC Pump, Valve, Flow and Unit Cooler Functional and In-Service Test  
    (record copy, 10/10/2006, partial)

**Section 1R23: Temporary Plant Modifications**

WO C0219157, CHK-2-10-046A, Lift Leads per TCP ECR 06-00409

**Section 2OS1: Access Controls**

RP-AA-460, Rev 11, Controls for High and Very High Radiation Areas  
RP-AA-460-1001, Rev. 1, Additional High Radiation Exposure Control  
RP-PB-300-100, Rev.0, Removing Items from the Spent Fuel Pool, Reactor Cavity, and  
Equipment Pit  
RP-AA-220, Rev3, Bioassay Program  
RP-AA-250, Rev.3, External Dose Assessments from Contamination  
RP-AA-350, Rev. 7, Personnel Contamination Monitoring, Decontamination and Reporting

**Section 2OS2: ALARA Planning and Controls**

Unit 2 Outage Exposure Estimates and Results  
Peach Bottom Exposure Reduction Plan, Rev. 0

**Section 4OA1: Performance Indicator Verification**

LER 2-05-01, Unit 2 Automatic Scram Due to Incorrect Assumptions When Aborting a Main  
Turbine Test  
LER 2-05-02, Recirculation Motor/Pump Modification Activities Unanalyzed for Postulated  
Seismic Conditions  
LER 2-05-03, E-2 Emergency Diesel Generator Technical Specification Required Actions not  
Performed  
LER 3-05-01, Loss of High Pressure Coolant Injection System Function as a Result of  
Inoperable Flow Controller  
LER 3-05-02, Technical specification Non-Compliance Due to a Unit 3 HPCI Suction Valve Logic  
Limit Switch Out of Adjustment  
LER 3-05-03, Residual Heat Removal System Small Bore Piping Leak due to Weld Deficiency  
LER 3-05-04, Laboratory Analysis Identifies Safety Relief Valve Setpoint and Performance  
Deficiencies  
LER 3-06-01, Technical Specification Non-Compliance Due to Inoperable Primary Containment  
Isolation Valve

**Section 4OA2: Problem Identification and Resolution**

IR 00534509, FME Integrity Lost When Cal Standard was not Unaccounted for  
IR 00534622, Multiple MSIV LLRT Failures C, B  
IR 00539277, ADS Valve Pneumatic System Leakages Potentially Reportable  
IR 00541265, Leak from Pipe Downstream MO-2-23-031  
IR 00542932, Hydrogen Seal Oil System Over Pressurization Post-Scram  
IR 00507555, Valve Manipulation Outside of Procedure Causes ½ Group 1 PCIS Isolation  
IR 00520130, Fire Brigade Did Not Assemble in Timely Manner  
IR 00520322, FME E3 EDG Fire at Roof Exhaust Penetration

A-7

IR 00521270, FME Small Amount of Metal Chips from Upper Guide Bearings in E33  
IR 00522044, FME Metal Shavings Found on the New FP Filter Elements  
IR 00522379, RMPFF Due to Moore 352 Controller Failure  
IR 00527970, MO-3-13-015 Packing Leak Contained Using Backseat  
IR 00532999, AO-2-01A-086B Failed Its As Found LLRT  
IR 00533001, AO-2-01A-086D Failed Its As Found LLRT  
IR 00533285, FME Grinding Not Controlled in the RCIC Room  
IR 00533309, Torus FME Issues and Recovery Plan  
IR 00533343, PB Not Meeting Expectations for the Control of FMEA 1 Zones  
IR 00533603, AO-2-01A-080A Failed LLRT  
IR 00533607, AO-2-01A-080D Failed As Found LLRT  
IR 00534323, Ultra-Low Sulfur Diesel Fuel Introduced into E1 and E4 Tanks  
IR 00534435, NOS ID: FME Performance Escalation  
IR 00534461, Historical FME Discovered During IVVI  
IR 00534736, MO-2-06-038B Failed Offscale During ST/LLRT 20.06.03  
IR 00535605, FME - Ultrasonic Transducer Disconnected From Actuating ARM  
IR 00536257, Historical Foreign Material Located in the RPV Bottom Head  
IR 00536749, Overfill of the Lower Bearing Reservoir Spilling Oil On Seal  
IR 00536885, PCIV - Outboard MSIV 86C Failed its As-Found LLRT - P2R16  
IR 00536913, PCIV - AO-2-10-046B Failed with Through Valve Leakage  
IR 00537127, "As-Found" Setpoint of Dresser Valve Out of +/-1% Range  
IR 00537245, Foreign Material Found on Steam Dryer  
IR 00537316, Wrong Valves Cut Out for Replacement  
IR 00537386, RV-2-02-071G Air Supply Failed Leak Test During ST  
IR 00537553, RV-2-02-71B Actuator Failed Leak Test  
IR 00538543, SLBC RV Failed As-Found Test  
IR 00538538, RV Failed As-Found Test  
IR 00537701, Historical Foreign Material Found  
IR 00538318, P2R16 Torus Proper FME  
IR 00538543, SLBC RV Failed As Found Test  
IR 00538566, During Performance of ST-M-16B-2502, CHK-2-16B-46598A Leaks  
IR 00538660, SRV: S/N 83 Failed to Re-seat During its Solenoid Test Lift  
IR 00538681, FME Discovered in RHR Piping  
IR 00542978, MSIV AO-2-01A-080D Rework During P2R16  
IR 00543926, 2B HPSW Motor Oil Cooler Supply Line Leak  
IR 00546538, IR Generated for GE Issues During 2R16  
IR 00549373, Inadequate Quarantine of Failed ADS Valve Components  
IR 00551703, PCIV - U3 RHR DW Spray Valve MO-26B has Split Indication in the MCR  
IR 00554800, Potential External Flood Vulnerability Found for EDG Building  
IR 00569879, 4Kv Undervoltage Relay Failure and No IR's Written  
IR 00565945, 4 Kv Undervoltage Relay Failures and No IRB  
IR 00569168, Exelon Versus Station or PECO Documents May Have Conflict

Modification

ECR 05-00140, Replace HPCI Lube Oil System Ball Valves with Orifices, Rev. 3

Procedures

ST-0-023-301-2, HPCI Pump, valve, Flow and Unit Cooler Functional and In-service Test, Rev. 45, completed on 10/10/06  
RT-0-023-302-2, HPCI Turbine Overspeed Trip reset Time Check/Adjustment and HPCI Auxiliary Oil Pump and Manual Trip Lever Tension Test, Rev. 14  
RT-0-23A-450-2, HPCI Lube Oil System Setup and Functional, Rev. 7

Condition Reports

381079  
350646  
279193  
382864  
221323  
382886  
325378

**Section 4OA3: Event Followup**

IR 542272, Misunderstanding Re: NRC Requests for "Bridge" Calls for UE  
IR 542835, Process for Welding Planning Package Needs Improvement  
IR 541265, Leak from Pipe Downstream MO-2-23-031  
PEA-23656, Failure Analysis of the Peach Bottom U2 HPCI/RCIC Flush Line (Ref. CR 541265; AR A1587644; WO C0219131, dated October 26, 2006  
IR 541936, ANII Review of Work Performed Under Issue 541265  
WO C0219131, MO-2-23-031, Replace/Repair Pipe Crack  
AR A1587644, Leak From Pipe Downstream MO-2-23-031

Drawings

DWG ISI-400, ASME Section XI ISI Boundaries Containment Details, Unit 2, Rev. 0  
DWG ISI-359, ASME Section XI ISI Boundaries Reactor Core Isolation Cooling System, Unit 2 & Common, Rev, 12  
DWG ISI-365, ASME Section XI ISI Boundaries High Pressure Coolant Injection System, Unit 2 & Common, Rev. 9

**Section 4OA5: Other**

AR 547710  
IR 551884  
IR 551589  
IR 539199  
IR 509345  
IR 175881  
IR 182904  
IR 209005

IR 221323  
IR 308116  
IR 341918  
IR 454957  
IR 532363

M-315, Emergency and High Pressure Service Water System P&ID, Rev. 65  
M-359, Reactor Core Isolation Cooling System P&ID, Rev. 49  
M-360, Reactor Core Isolation Cooling System – Pump P&ID, Rev. 54  
M-361, Residual Heat Removal System P&ID, Rev. 80  
M-365, High Pressure Coolant Injection System P&ID, Rev. 61  
M-366, HPCI Pump-Turbine Details P&ID, Rev. 56

Peach Bottom Monthly Operating Report, December 2002  
Peach Bottom Monthly Operating Report, December 2003  
Peach Bottom Monthly Operating Report, December 2004  
Peach Bottom MSPI Basis Document, Rev. 1

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 4  
NRC TI 169, Mitigating Systems Performance Index Verification, Issued 07/25/06  
NRC TI 167, “Assurance of Industry Implementation of Key Shutdown Voluntary Initiatives,”  
Issued 04/21/2006  
ST-I-37G-394-2, Diesel Generator Cardox System Simulated Actuation and Air Flow Test,  
Rev. 4  
ST-O-032-301-2, HPSW Pump, Valve and Flow Functional In-Service Test, Rev. 20  
ST-O-052-311-2, E-1 Diesel Generator Slow Start Full Load and IST Test, Rev. 18  
SO 52A.1.B, Diesel Generator Operations, Rev. 36  
ST-O-023-301-2, HPCI Pump, Valve, Flow and Unit Cooler Functional and In-Service Test,  
Rev. 45  
SI2L-23-74-XXCQ, Calibration Check of HPCI Condensate Storage Tank Level Instruments LS  
2-23-74 and LS 2-23-75, Rev. 10  
SO 23.7.B-2, Transfer of HPCI Pump Suction From the Condensate Storage Tank to the Torus,  
Rev. 7  
SI2K-13-TDR-A1C2, Calibration/Functional Check of RCIC Steam Line Flow Time Delay Relay  
13A-K007, Rev. 2  
LS-AA-2200, MSPI Data Acquisition and Reporting, Rev. 0  
OP-AA-108-104, Technical Specification Compliance, Rev. 0  
IR 563192, Observations During NRC Shutdown Risk Inspection  
GP-6.2, Rev. 39, Shutdown Operations - Shutdown Condition Tech Spec Actions  
P2R16 Post Outage Assessment Report, November 10, 2006  
NUMARC 91-06, Guidelines for Industry actions to Assess Shutdown Management, December  
1991  
ER-AA-600-1023, Rev. 4, ORAM-Sentinel and Paragon Model Capability  
ON-125, Rev. 7, Loss or Unavailability of Shutdown Cooling - Procedure  
GP-25, Rev. 8, Installation of Trips/Isolations to Satisfy Tech Spec/TRM Requirements for  
Inoperable Instrumentation  
SO 10.3-2 COL, Rev. 3, Residual Heat Removal System Fuel Pool Cooling Mode

AO 10.12-2, Rev. 2, Alternate Shutdown Cooling  
 GP-20, Rev. 14, Temporarily Defeating ECCS Auto Initiation Signal During Outages  
 OT-100, Rev. 11, Reactor Low Level - Procedure  
 AO 1A.1-2, Rev. 0, Control of Reactor Cavity Level Using the Main Steam Line Drains  
 AO 10.3-2, Rev. 8, Residual Heat Removal System to Fuel Pool Cross-Connect Operation  
 GP-29, Rev. 1, Temporarily Defeating the RHR Shutdown Cooling Automatic Reactor Pressure -  
 High Isolation  
 AO 10.4-2, Rev. 17, Residual Heat Removal System - Fuel Pool to Reactor Mode  
 GP-6, Rev. 14, Refueling Operations  
 P2R16 Shutdown Safety Schedule, Dated November 17, 2006  
 DWG 6280-M-363, Rev. 40, Sheets 1 and 2, P & I Diagram Fuel Pool Cooling & Clean-up  
 OU-PB-104, Revision 0, Peach Bottom Atomic Power Station Shutdown Safety Management  
 Program  
 OU-PB-104-1001, Revision 0, Peach Bottom Atomic Power Station Shutdown Risk Management  
 for Outages  
 OU-AA-103, Revision 6, Shutdown Safety Management Program

**LIST OF ACRONYMS**

ADAMS	Agency-wide Documents Access and Management System
ALARA	as low as is reasonably achievable
APRM	average power range monitor
AR	action request
ASME	American Society of Mechanical Engineers
CAP	corrective action program
CDE	consolidated data entry
CFR	Code of Federal Regulations
EDG	emergency diesel generator
EO	equipment operator
FB	fire brigade
FME	foreign material exclusion
GL	generic letter
HPCI	high pressure coolant injection
HPSW	high pressure service water
IMC	Inspection Manual Chapter
IR	issue report
IST	In-Service Test
LERs	licensee event reports
LLRT	local leak rate testing
MCR	main control room
MG	motor generator
MSPI	Mitigating Systems Performance Index
MSIV	main steam isolation valve
NCV	noncited violation
NDE	nondestructive examination
NEI	Nuclear Energy Institute

NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OD	operability determination
OTDM	Operational Technical Decision Making
PARS	Publicly Available Records
PBAPS	Peach Bottom Atomic Power Station
PCIV	primary containment isolation valve
PIs	performance indicators
PIMs	site work management system
PORC	plant operations review committee
PRA	probabilistic risk assessment
RCIC	reactor core isolation cooling
RCWP	reactor cavity work platform
RHR	residual heat removal
RMPFF	repetitive maintenance preventable functional failure
RV	relief valve
RWM	rod worth minimizer
SLC	standby liquid control
SDP	significance determination process
SRV	safety/relief valve
SSC	structure, system, and component
TS	Technical Specification
TI	Temporary Instruction
TRM	Technical Requirements Manual
UE	unusual event
UFSAR	Updated Final Safety Analysis Report
URI	unresolved item
WO	work order