August 8, 2003

Mr. John L. Skolds
President and CNO
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION - NRC INSPECTION REPORT 05000277/2003012, 05000278/2003012

Dear Mr. Skolds:

On June 27, 2003, the NRC completed a team inspection at the Peach Bottom Atomic Power Station. The enclosed report documents the inspection findings which were discussed on June 27, 2003, with Messrs. R. West and J. Stone, and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, compliance with the Commission's rules and regulations, and with the conditions of your license. Within these areas, the inspection involved examination of selected procedures and representative records, observation of activities, and interviews with personnel.

On the basis of the samples selected for review, the team concluded that in general, problems were properly identified, evaluated and corrected. The team identified one self-revealing finding of very low safety significance (Green) concerning the failure to properly correct an equipment deficiency that subsequently resulted in a challenge to the plant and to operators. Specifically, a solenoid associated with a reactor feed pump turbine (RFPT) overspeed trip device exhibited degradation during RFPT overspeed testing on two occasions, however, your staff failed to determine the root cause for this problem until a third problem occurred that resulted in a RFPT trip and plant transient.

In addition, several examples of minor equipment problems were identified by the team that were not previously entered into the corrective action program. Further, examples were identified where problem evaluations were narrowly focused or did not contain sufficient technical bases for the associated conclusions; and there were some instances where corrective actions were not aggressive in resolving certain problems in a timely and effective fashion. None of these deficiencies resulted in a challenge to system operability.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Raymond K. Lorson, Chief
Performance Evaluation Branch
Division of Reactor Safety

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

Enclosure: Inspection Report 05000277/2003012, 05000278/2003012
w/Attachment: Supplemental Information

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President and CNO, Exelon Generation Company, LLC
Senior Vice President, Operations Support
Vice President, Mid-Atlantic Operations Support
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	05000277, 05000278
License Nos:	DPR-44, DPR-56
Report No:	05000277/2003012, 05000278/2003012
Licensee:	Exelon Generation Company, LLC
Facility:	Peach Bottom Atomic Power Station Units 2 and 3
Location:	1848 Lay Road Delta, Pennsylvania
Dates:	June 9-13 and June 23-27, 2003
Inspectors:	Stephen M. Pindale, Senior Reactor Inspector (Team Leader) Robert M. Berryman, Reactor Inspector Geoffrey M. Go, Project Engineer (Intern) Todd J. Jackson, Project Engineer Daniel L. Schroeder, Reactor Inspector Craig W. Smith, Senior Reactor Inspector
Approved by:	Raymond K. Lorson, Chief Performance Evaluation Branch Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000277/2003-012, 05000278/2003-012; 06/09/2003 - 06/27/2003; Peach Bottom Atomic Power Station, Units 2 and 3; biennial baseline inspection of the identification and resolution of problems.

This inspection was conducted by four regional inspectors and one senior resident inspector. One Green finding was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using 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.

Identification and Resolution of Problems

The team determined that, in general, Exelon properly identified, evaluated and corrected problems. Nevertheless, the NRC identified several minor deficiencies that had not been entered into the corrective action program. Exelon adequately prioritized and evaluated problems that were entered into the corrective action program, however, some problem evaluation documents did not contain sufficient detail to support the associated conclusions. Corrective actions, when specified, were generally implemented in a timely manner. Exelon's audits and self-assessments were found to be acceptable. On the basis of interviews conducted during the inspection, workers at the site felt free to input safety findings into the corrective action program.

A. NRC Identified and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. A self-revealing finding was identified because Exelon did not identify and correct a mis-wired solenoid during troubleshooting and maintenance activities conducted in September 1999 and November 2001. This resulted in a reactor feed pump trip and plant transient following a subsequent solenoid failure on November 4, 2002.

  This finding is greater than minor because it was associated with an attribute and affected the objective of the Initiating Events Cornerstone in that the equipment deficiency resulted in a plant transient. The finding is of very low safety significance (Green) because, although it caused a plant perturbation, it did not increase the likelihood of a primary or secondary system loss of coolant accident initiator, did not contribute to a combination of a reactor trip and loss of mitigation equipment functions, and did not increase the likelihood of a fire or internal/external flood (Section 4OA2.c).

Report Details

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution

a. Effectiveness of Problem Identification

1. Inspection Scope

The inspection team reviewed the procedures describing the corrective action program at the Peach Bottom Atomic Power Station (PBAPS). The team reviewed items selected from various licensee processes and activities to determine if personnel were properly identifying, characterizing and entering problems into the corrective action program for evaluation and resolution. Exelon uses both the action request (AR) and condition report (CR) processes for identifying problems at PBAPS. However, the primary process for evaluating and prescribing the associated corrective actions was the CR process.

The team reviewed logs, control room deficiencies and operator work-arounds, system health reports, temporary modifications, operating experience reviews, and procedures. In addition, the team interviewed plant staff and management to determine their understanding of and involvement with the corrective action program. The specific documents reviewed and referenced during the inspection are listed in the attachment to this report.

The team reviewed a sample of nuclear safety assessment audits and assessments, as well as departmental and program self-assessments. This review was to determine whether Exelon's reviews were entered into the corrective action program, and whether the corrective actions were properly completed to resolve the self-identified deficiencies. The team evaluated the effectiveness of the audits and self-assessments by comparing the associated results against self-revealing and NRC-identified findings.

The team conducted several plant walkdowns of safety-related, risk significant areas to determine if observable system equipment and plant material adverse conditions were identified and entered into the corrective action program. Team members attended daily review and management meetings, where ARs and CRs were reviewed for screening and assignment. The team attended these meetings to understand the threshold for identifying problems and to assess management involvement with the corrective action program. The team also assessed the interface between the corrective action program and the work control process.

2. Findings and Observations

No findings of significance were identified.

Overall, Exelon's effectiveness at problem identification was acceptable. Audits and self-assessments were self-critical and generally consistent with the team's findings.

Nevertheless, the team identified several minor hardware deficiencies during plant walkdowns that were not entered into the corrective action program. Some examples included:

- High pressure coolant injection (HPCI) system torus suction valve MO-3-23-58-OP flex conduit was found pulled away from junction box, exposing the motor operator cable insulation (insulation was intact);

- The feedback lever on torus water cleanup valve CV-3-14A-5071 was detached from the valve stem;

- Control room cooler outlet block valve HV-0-44B-13556A was severely corroded on its external surface.

In response to these and additional deficiencies identified by the team, Exelon initiated ARs or CRs, as appropriate, for evaluation. These problem identification deficiencies were considered minor since they did not affect the operability of the associated mitigating systems.

b. Prioritization and Evaluation of Issues

1. Inspection Scope

The team reviewed the ARs and CRs listed in the attachment to this report to assess whether Exelon adequately prioritized and evaluated problems. These reviews evaluated the causal assessment of each issue (i.e., root cause analysis or apparent cause evaluation); and for significant conditions adverse to quality, the extent of condition and determination of corrective actions to preclude recurrence. The team selected the ARs and CRs to cover the seven cornerstones of safety identified in the NRC Revised Oversight Program. The team also considered risk insights from the PBAPS probabilistic risk assessment to help focus the inspection sample. Additionally, the team attended the daily meetings to observe the AR and CR review process and to understand the basis for assigned significance levels and root cause levels.

The team also selected a sample of CRs associated with previous NRC non-cited violations (NCV) to determine whether Exelon evaluated and resolved problems associated with compliance to applicable regulatory requirements. The team reviewed Exelon's evaluation of industry operating experience information for applicability to PBAPS. The team also reviewed Exelon's assessment of equipment operability, reportability requirements, and the potential extent of the problem.

2. Findings and Observations

No findings of significance were identified.

The team determined that, in general, Exelon adequately prioritized and evaluated the issues and concerns entered into the corrective action program. Personnel were generally effective at classifying and performing operability evaluations and reportability determinations for discrepant conditions. However, the team noted some examples where documented problem evaluations did not contain sufficient depth in cause determination or did not contain sufficient information to support the associated conclusions. Some examples included:

- AR A163671 (Low Level Alarm Setpoint on Diesel Storage Tank is Set Low - Below Technical Specification Minimum Value): The extent of condition section stated that this issue was common to all four diesel generators, however, it did not determine whether other systems or components may have been similarly affected by this type of setpoint methodology application;

- AR A123488 (Diesel Fire Pump Blocked with Battery Charger Energized): Since the cause and corrective actions were believed to have been known, the licensee stated that no additional evaluation beyond the initial review was performed. However, the team noted that the licensee did not evaluate whether human performance contributed to this configuration control error;

- Emergency switchgear ventilation exhaust fan 'A' (safety-related fan) was spinning backwards while in a standby mode (believed to be due to discharge damper back-leakage). No analysis beyond a "rough engineering judgement" was documented to evaluate the impact of this condition during a fan start attempt (AR A1083057);

- The technical bases for a maintenance preventable functional failure determination on a diesel generator oil cooler vent line failure (CR 100050) and the determination that a safety evaluation was not required for a temporary modification associated with a diesel generator automatic trip circuit upon cardox system actuation (AR A1400975) did not definitively support the associated conclusions.

The team independently evaluated the above items, and concluded that, although there were apparent weaknesses with certain aspects of Exelon's analyses, none of the items resulted in adverse safety or operability consequences.

c. Effectiveness of Corrective Actions

1. Inspection Scope

The team reviewed the corrective actions associated with selected CRs to determine whether the actions addressed the identified causes of the problems. The team also reviewed Exelon's timeliness in implementing corrective actions and their effectiveness in precluding recurrence of significant conditions adverse to quality. Furthermore, the team assessed the backlog of corrective actions to determine, if any, individually or collectively, represented an increased risk due to the delay in implementation. The team also reviewed non-cited violations issued since the last inspection of the PBAPS corrective action program to determine if issues placed in the program had been properly evaluated and corrected.

2. Findings and Observations

The team identified one finding that affected the Initiating Events cornerstone objective and resulted in a perturbation in plant stability by causing a plant transient (discussed below).

In addition to the finding, the team identified some minor instances where corrective actions were not aggressive in effectively resolving certain problems. Three examples of this type of weakness are identified below.

- The Unit 2 '2AD001' and '2CD001' 125 VDC batteries have experienced deficiencies for several years, initially occurring in 1993. The lid seals on the batteries had deteriorated, allowing electrolyte to leak out of the cells and cause periodic, intermittent grounds on the battery and associated DC bus. Exelon, with vendor support, completed a repair that appeared effective in stopping the electrolyte leakage, however, the leakage problem appeared again in June of 1999. Since June of 1999, over 35 battery ground alarms have been received. Although Exelon installed ground detection and monitoring equipment, the lid seal degradation continued to challenge plant staff. The team determined that the continued and on-going condition associated with the actuation of the ground detection alarms could de-sensitize operators to potentially more significant battery and bus problems. Exelon had conducted an operability determination in 1994, however, the team identified that the existing evaluations for the batteries, including the 1994 operability determination, did not contain sufficient documented technical bases to support Exelon's position that the batteries and associated DC bus were operable. Subsequent review of the technical details surrounding the electrolyte leakage and associated equipment impact by the team did not identify an operability concern. However, the team concluded that Exelon's evaluations lacked sufficient technical basis and Exelon efforts, to date, have not effectively resolved the battery electrolyte leakage problems.

- Water from an undetermined source was leaking (drips per minute) into the '2AD001' and '2CD001' battery room (through a nonsafety-related junction box).

The search to identify the source for the leakage stopped at the feedwater pump rooms.

- The speed limiter associated with the Unit 3 HPCI turbine was previously (June 14, 2002) found to be set at 4600 rpm instead of 4100 rpm (the equipment was operable but degraded). However, the speed limiter setpoint was not adjusted until May 12, 2003, 11 months after discovery, although the necessary test equipment to correct this discrepancy was installed. There were no adverse consequences to this delayed action.

.1 Failure to Identify and Correct a Mis-Wired Solenoid Valve, Resulting in a Subsequent Plant Transient

Introduction

A Green self-revealing finding was identified because Exelon's troubleshooting and maintenance activities did not identify and correct a mis-wired solenoid during overspeed testing of the 3B reactor feed pump turbine (RFPT) in September 1999 and November 2001.

Description

On September 27, 1999, and again on November 27, 2001, Exelon's troubleshooting and maintenance activities did not identify and correct a mis-wired solenoid on the 3B RFPT overspeed lockout valve during RFPT '3B' overspeed testing. Subsequently, on November 4, 2002, the solenoid failed during RFPT '3B' overspeed testing, causing an actual RFPT trip and unplanned transient.

During RFPT '3B' overspeed testing on September 27, 1999, Exelon observed smoke being emitted from the RFPT overspeed lockout valve solenoid. The lockout valve functions to prevent an actual overspeed trip of the RFPT during testing of the overspeed device. Exelon replaced the solenoid, but did not discover the solenoid wiring problem. During a subsequent RFPT '3B' overspeed test, conducted on November 27, 2001, Exelon again observed smoke being emitted from the solenoid. Once again, Exelon replaced the solenoid and the solenoid wiring problem remained undetected. Exelon discovered the mis-wired solenoid after it exhibited a third performance problem during a '3B' RFPT overspeed test on November 4, 2002, when its failure caused a trip of the '3B' RFPT and resulted in an unplanned plant transient. The improper wiring allowed excessive current flow to the solenoid windings which damaged the solenoid.

Analysis

The team determined that the performance deficiency associated with this issue was inadequate troubleshooting and maintenance activities performed, in response to 3B RFPT solenoid failures in September 1999 and November 2001, that did not identify the wiring problem that caused the failures. Troubleshooting procedure, MA-AA-716-004, revision 1, "Conduct of Troubleshooting," required that the cause(s) for equipment problems be properly identified and corrected. This finding is greater than minor because it was associated with an attribute and affected the objective of the Initiating Events Cornerstone in that equipment performance inadequacies resulted in a perturbation in plant stability by causing a plant transient. The finding was assessed using Phase I of the Significance Determination Process for Reactor Inspection Findings for At-Power Situations and was determined to be of very low safety significance (Green). While the finding resulted in an actual plant perturbation, the team determined that the finding did not increase the likelihood of a primary or secondary system loss of coolant accident initiator, did not contribute to a combination of a reactor trip and loss of mitigation equipment functions, and did not increase the likelihood of a fire or internal/external flood. This finding is in Exelon's corrective action program as CR 130102. **(FIN 50-277; 50-278/03-12-01: Inadequate Corrective Action for Equipment Performance Problems with a Reactor Feed Pump Turbine Overspeed Solenoid)**

Enforcement

No violation of regulatory requirements occurred. The team determined that the finding did not represent a non-compliance because it occurred on nonsafety-related secondary plant equipment.

d. Assessment of Safety Conscious Work Environment

1. Inspection Scope

During this inspection, the team interviewed plant staff to determine if conditions existed that would result in personnel being hesitant to raise safety concerns to their management and/or the NRC.

2. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

The team presented the inspection results to Messrs. R. West and J. Stone, and other members of PBAPS staff on June 27, 2003. During the inspection, no proprietary information was examined or retained by the team.

ATTACHMENT: SUPPLEMENTAL INFORMATION

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

R. Bleeker, Electrical Engineer
W. Campbell, FIN Team Supervisor
A. Charles, Maintenance Rule Coordinator
C. Demars, Corrective Action Program Coordinator - Operations
J. Felice, Corrective Action Program Coordinator
D. Henry, I&C Manager
K. Leach, Maintenance Planning
K. O'Dowd, System Engineer
F. Sturniolo, Fire Protection Engineer
T. Turek, Predictive Maintenance Engineer

ITEMS OPENED AND CLOSED

Opened and Closed

50-277,278/03-12-01	FIN	Inadequate Corrective Action for Equipment Performance Problems with a Reactor Feed Pump Turbine Overspeed Solenoid (Section 4OA2.c)

LIST OF DOCUMENTS REVIEWED

Procedures

LS-AA-115	Operating Experience Procedure, Rev. 1
LS-AA-125	Corrective Action Program Procedure, Rev. 5
LS-AA-125-1001	Root Cause Analysis Manual, Rev. 3
LS-AA-125-1002	Common Cause Analysis Manual, Rev. 2
LS-AA-125-1003	Apparent Cause Evaluation Manual, Rev. 2
LS-AA-125-1004	Effectiveness Review Manual, Rev. 1
LS-AA-125-1006	CAP Process Expectations Manual, Rev. 3

Audits and Self-Assessments

AT134409	Operability (2003 Self Assessment)
AT134951	Operations Management (2003 Self Assessment)
AT 108345	Conduct of Operations (2002 Self Assessment)

NOSA-PB-03-01 Corrective Action Audit, March 13, 2003
NOSA-PB-03-1Q Nuclear Oversight Continuous Assessment Report, Jan. - March, 2003
NOSA-PB-02-4Q Nuclear Oversight Continuous Assessment Report, Oct. - Dec., 2002

Condition Reports

060013	102916	118812	137738	149621
060718	102921	120209	137738	149630
061058	103836	121630	137744	150040
071435	107190	122689	137744	150168
081006	107780	123346	137762	150378
081985	107780	123488	137771	150654
081986	108210	123490	137784	150817
082564	108221	123645	137789	151566
082568	108887	123667	137801	151634
083005	109571	123667	137936	151635
083213	109870	123902	139305	151761
083879	110140	123955	139451	151883
084060	110334	124114	140062	152159
084565	110400	124209	140062	152551
084715	111028	124496	140118	153675
084715	111103	124600	140319	153693
085430	111375	124839	140319	153872
086306	111928	125083	140319	153893
086897	111936	126238	140319	153923
086922	111993	126671	141192	154174
087475	112059	126761	141814	154416
087532	112458	126967	142688	154579
087673	112458	127558	143475	154668
089481	112681	127686	144907	154779
089925	112928	128913	144907	156118
091079	112954	130102	145002	156593
091101	113292	130825	145891	156977
091801	114470	131449	145922	157143
092158	114786	131575	145952	157184
094252	114935	131802	146109	157687
094844	115872	132817	146678	157790
095316	115874	133239	146780	157790
097946	116144	133630	147035	157910
100050	116688	134545	147039	158580
100187	116757	134545	147107	159255
100424	117785	134851	147752	159683
100424	117842	135771	148695	159797
100715	118039	137110	148779	159863
101012	118164	137136	148961	159921
102348	118295	137379	149255	160681
102783	118529	137423	149365	160784

160844 162074 162311 164605
161939

Non-Cited Violations (NCV) and Findings (FIN)

NCV 2001-007-01
NCV 2001-009-01
NCV 2001-010-01
NCV 2001-015-01
NCV 2002-002-02
NCV 2002-003-01
FIN 2002-004-01
NCV 2002-006-01
NCV 2002-011-02
FIN 2003-002-02
NCV 2003-007-01

Action Requests

A123488
A163671
A1083057
A1315882
A1345256
A1355640
A1372746
A1398780
A1400975
A1406292
A1421100
A1421821
A1423574

System Health Overview Reports Reviewed

Residual Heat Removal (RHR) & RHR Sample, May 2003
Reactor Core Isolation Cooling, May 2003
High Pressure Coolant Injection, May 2003
Emergency Diesels, May 2003

Miscellaneous

Specification NE-008	Nuclear Safety Related Specification for Installation, Testing, and Maintenance of Safety Related and Non Safety Related Instrument and Process Tubing and Tubing Supports
ECR: PB 03-00071 000	Temporary Configuration of Cardox Fire Protection Systems, 6/9/03
6280-M-315	Piping & Instrument Diagram - Unit 3 Emergency Service Water and High Pressure Service Water Systems, Rev. 1

LIST OF ACRONYMS

AR	Action Request
CAP	Corrective Action Program
CR	Condition Report
CFR	Code of Federal Regulations
FIN	Fix-It Now
HPCI	High Pressure Coolant Injection
IPE	Individual Plant Examination
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PBAPS	Peach Bottom Atomic Power Station
RFP	Reactor Feed Pump
RFPT	Reactor Feed Pump Turbine
RHR	Residual Heat Removal
ROP	Reactor Oversight Process
SDP	Significant Determination Process
VDC	Volts - Direct Current