UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

April 25, 2011

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

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION – NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000277/2011007 AND 05000278/2011007

Dear Mr. Pacilio:

On March 11, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. The enclosed inspection report documents the inspection results, which were discussed with Mr. Thomas Dougherty, Site Vice President, and other members of your staff on March 11, 2011.

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. In conducting the inspection, the team examined the adequacy of selected components and operator actions to mitigate postulated transients, initiating events, and design basis accidents. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

This report documents two NRC-identified findings that were of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these as non-cited violations (NCV), consistent with Section 2.3.2 of the NRC's Enforcement Policy. If you contest any 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 U. S. 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, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at PBAPS. In addition, if you disagree with the cross-cutting aspect assigned to one of the findings in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I and the NRC Resident Inspector at PBAPS.

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

Lawrence T. Doerflein

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure: Inspection Report 05000277/2011007 and 05000278/2011007
w/Attachment: Supplemental Information

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Sincerely,

/RA/

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-277; 50-278
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REGION I

Docket No.:	50-277, 50-278
License No:	DPR-44, DPR-56
Report No:	05000277/2011007 and 05000278/2011007
Licensee:	Exelon Generation Company, LLC
Facility:	Peach Bottom Atomic Power Station, Units 2 and 3
Location:	Delta, Pennsylvania
Dates:	February 14, 2011 – March 11, 2011
Inspectors:	S. Pindale, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader J. Richmond, Senior Reactor Inspector, DRS M. Balazik, Reactor Inspector, DRS J. Brand, Reactor Inspector, DRS S. Kobylarz, NRC Electrical Contractor W. Sherbin, NRC Mechanical Contractor
Approved by:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000277/2011007, 05000278/2011007; 02/14/2011 – 03/11/2011; Peach Bottom Atomic Power Station, Units 2 and 3; Component Design Bases Inspection.

The report covers the Component Design Bases Inspection conducted by a team of four NRC inspectors and two NRC contractors. Two findings of very low risk significance (Green) were identified, which were also considered to be non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects were determined using IMC 0310, "Components Within the Cross-Cutting Areas." 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 4, dated December 2006.

NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a finding of very low safety significance involving a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," in that, Exelon did not ensure the ability to transfer fuel oil between underground fuel oil storage tanks. Specifically, Exelon had not performed adequate analyses or testing to demonstrate adequate net positive suction head available ($NPSH_A$) for the EDG fuel oil transfer pumps. In response, Exelon entered this issue into their corrective action program and performed an evaluation to assure the fuel oil transfer pump $NPSH_A$ was adequate.

  The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 SDP screening, in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. This finding does not have a cross-cutting aspect because the most significant contributor of the performance deficiency is not reflective of current licensee performance. (1R21.2.1.1)

- Green. The team identified a finding of very low safety significance involving a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," in that Exelon did not verify the adequacy of the seismic design for temporary battery cells that had been placed in-service in safety-related station batteries that were required to be operable. Specifically, Exelon did not evaluate whether mechanical stress could be transferred from one temporary battery cell to another via rigid bus bars attached to the cell terminal posts and, as a consequence, did not verify that damage to a cell post or cell case would not result during a seismic event. During the inspection period, the temporary battery cells were not in-service and were not required to be operable. In response, Exelon entered this issue into the corrective action program and performed a preliminary calculation to verify seismic adequacy.

This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 SDP screening, in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality.

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon did not thoroughly evaluate the problem such that the resolution addressed the cause. Specifically, a 2009 issue report identified that the battery cells on the cart did not have seismic spacers between the cells and did not have steel tie-rods installed for a cell clamp assembly, similar to the station battery. The issue report incorrectly determined that plastic tubes in between the two cells would provide an adequate seismic restraint. [IMC 0310, Aspect P.1(c)] (1R21.2.1.2)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components for review using information contained in the Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3 Probabilistic Risk Assessment (PRA) and the U. S. Nuclear Regulatory Commission's (NRC) Standardized Plant Analysis Risk (SPAR) model. Additionally, the PBAPS Significance Determination Process (SDP) Phase 2 Risk-Informed Inspection Notebook (Revision 2.1a) was referenced in the selection of potential components for review. In general, the selection process focused on components that had a Risk Achievement Worth (RAW) factor greater than 1.3 or a Risk Reduction Worth (RRW) factor greater than 1.005. The components selected were located within both safety-related and non-safety related systems, and included a variety of components such as pumps, breakers, heat exchangers, transformers, and valves.

The team initially compiled a list of components based on the risk factors previously mentioned. Additionally, the team reviewed the previous component design bases inspection report (05000277/2008007 and 05000278/2008007) and excluded the majority of those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 19 components and 4 operating experience (OE) items. The team's evaluation of possible low design margin included consideration of original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. The assessment also included items such as failed performance test results, corrective action history, repeated maintenance, maintenance rule (a)(1) status, operability reviews for degraded conditions, NRC resident inspector insights, system health reports, and industry OE. The team also selected some components for large early release frequency (LERF) considerations, including the core spray injection, high pressure coolant injection steam isolation, and hardened vent valves. Finally, consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins.

The inspection performed by the team was conducted as outlined in NRC Inspection Procedure (IP) 71111.21. This inspection effort included walkdowns of selected components, interviews with operators, system engineers and design engineers, and reviews of associated design documents and calculations to assess the adequacy of the components to meet design basis, licensing basis, and risk-informed beyond design basis requirements. Summaries of the reviews performed for each inspection sample and the specific inspection finding identified are discussed in the subsequent sections of this report. Documents reviewed for this inspection are listed in the Attachment.

.2 Results of Detailed Reviews

.2.1 Results of Detailed Component Reviews (19 samples)

.2.1.1 E2 Emergency Diesel Generator – Mechanical, 0BG12

a. Inspection Scope

The team reviewed the adequacy and appropriateness of design assumptions and calculations related to emergency diesel generator (EDG) fuel oil consumption, air start system capability, and room ventilation. The team reviewed design calculations to ensure underground fuel oil tank capacities were sufficient to meet required fuel oil consumption rates. Hydraulic design requirements for fuel oil transfer pumps related to vortexing in the tank outlet piping and net positive suction head (NPSH) were reviewed to verify the design capability of the EDG fuel oil transfer pumps. The EDG fuel oil chemistry tests were reviewed to verify testing was conducted in accordance with facility procedures and license requirements; and that the results were consistent with the assumptions contained in the fuel oil consumption calculation. The team performed a review of maintenance and surveillance test procedures to ensure that the thermal performance of EDG heat exchangers, cooled by emergency service water, was adequate. The preventive maintenance program for lube oil and fuel oil filters was reviewed to ensure filters were replaced when necessary. Field walkdowns were performed of the EDG to independently assess the material condition of the EDG and associated equipment. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the EDG and to assess Exelon's capability to evaluate and correct problems.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," in that Exelon did not ensure the ability to transfer fuel oil between underground fuel oil storage tanks. Specifically, Exelon had not performed adequate analyses or testing to demonstrate adequate NPSH available ($NPSH_A$) for the EDG fuel oil transfer pumps.

Description: The fuel oil transfer pumps transfer fuel from buried fuel oil tanks to the EDG day tanks or, when required, can be used to transfer fuel oil from one storage tank to another. Each of the four EDGs has an associated underground fuel oil tank that was originally designed to supply seven days of fuel, and a fuel oil transfer pump located in the EDG room. There are no automatic trips of the fuel oil transfer pumps on low tank level. Fuel oil pump $NPSH_A$ and vortex calculations are important to ensure that the EDGs have adequate volume of fuel oil available following a design basis event and that adequate margin is available to prevent air entrainment when fuel tank levels approach the tank bottom.

Calculation PM-0123, "Diesel Generator Fuel Oil Consumption for 6 Days and 7 Days Operation with LOCA Dependent Loads," Rev. 0, indicated that the total volume of all four EDG fuel oil storage tanks contain sufficient quantity of fuel oil for seven days of EDG operation. However, fuel oil would need to be transferred between the underground tanks using the fuel oil transfer pumps in order to support operation of the EDG that has a higher electrical load using procedure AO 52D.1, "Transferring Diesel Fuel Oil Between Storage Tanks," Rev. 7.

The team reviewed procedure AO 52D.1 and underground fuel oil storage tank level alarm setpoints, and determined that no specific guidance existed in the procedure to alert operators when the fuel oil storage tank levels reach the vortex limit, or when there was insufficient $NPSH_A$ at the pump impeller. Issue Report (IR) 01185526 was written during the inspection to evaluate and correct the issue.

The team reviewed calculations for potential vortex formation at the fuel oil transfer pump suction and for $NPSH_A$. Calculation PM-0046, "Diesel Generator Fuel Oil Storage Tank Volume Determinations," Rev. 1, determined the usable volume of the storage tanks based on a vortex limit of 14 inches above the tank bottom. The vortex limit was based on a pump suction flow rate of 10 gpm. In 2006, IR 00476280 was written to evaluate a pump flow rate of 10 gpm as potentially non-conservative because the pump in-service testing (IST) acceptance criterion was about 45 gpm. The 10 gpm flow rate was specified by the architect/engineer on the original fuel oil pump data sheet as the design input for the minimum pump flow rate. This IR stated that the appropriate fuel oil flow rate that should be used in the vortex calculation was about 24 gpm, based on a 1991 test, which measured actual flow when the pump was providing fuel oil to the day tank (i.e., the normal flow path). The IR preliminarily concluded that the present level of 14 inches was sufficient for pump suction flow rate of 24 gpm. The team performed an evaluation of the vortex limit of 24 gpm to 45 gpm pump suction flow rates, and determined that the present level of submergence was satisfactory for vortex prevention.

Regarding $NPSH_A$, Exelon determined that they did not have a calculation for the fuel oil transfer pumps, and in response, initiated IR 011185519. A preliminary evaluation performed by Exelon identified that the $NPSH_A$ at a pump flow rate of 24 gpm had a margin of less than one inch of suction lift when compared to the fuel oil tank level at which unusable volume is determined (14 inches above tank bottom). The team identified that the pump flow rate could potentially be greater than 24 gpm during the transfer from one tank to another tank due to the pumps' design capability of 45 gpm and the specific transfer pump and associated tank configuration. Higher flow rates, such as those that might occur during fuel oil transfer from one underground tank to another, could result in not having adequate $NPSH_A$ at the pump suction. Insufficient $NPSH_A$ at the pump suction could lead to fluid cavitation at the pump impeller, leading to degradation of pump hydraulic performance, with subsequent pump failure. In response, Exelon demonstrated to the team that the 1991 flow test provided reasonable assurance that the existing piping, tank, and throttle valve configuration bounds the assumed fuel oil transfer pump flow rate at 24 gpm.

Analysis: The team determined that the failure to properly evaluate the $NPSH_A$ considerations for the EDG fuel oil transfer pumps for operation following a design basis event was a performance deficiency that was reasonably within Exelon's ability to foresee and prevent. The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In addition, this issue was similar to Example 3.j of Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues," which determined that calculation errors would be more than minor if, as a result of the errors, there was reasonable doubt on the operability of the component. For this issue, there was a reasonable doubt on the operability of the fuel oil transfer pumps at low fuel oil storage tank levels because the required NPSH was originally specified at flow rate of 10 gpm, but historical test results and design data indicated that the pump flow rate could have been between 24 gpm and 45 gpm. Higher pump flow rates require additional $NPSH_A$ because the dynamic pressure loss in the inlet piping is a function of the fluid velocity. The higher flow rates would require additional submergence of the suction pipe in the tank, resulting in more unusable oil in the underground tanks. In response to this issue, Exelon performed a preliminary calculation to demonstrate that the existing $NPSH_A$ with the pump operating at a flow rate of 24 gpm would result in acceptable pump performance. Exelon also initiated actions to improve procedure guidance when transferring EDG fuel oil. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function, and was not the result of any willful violation of NRC requirements.

In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," a Phase 1 SDP screening was performed and determined the finding was of very low safety significance (Green) because it was a design deficiency confirmed not to result in loss of operability or functionality. This finding did not have a cross-cutting aspect because the most significant contributor of the performance deficiency was not reflective of current licensee performance.

Enforcement: 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures be provided for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents. Contrary to the above, prior to March 11, 2011, the measures established to verify the adequacy of the design of the EDG fuel oil transfer pumps were not adequate. Specifically, Exelon did not verify design requirements (EDG fuel oil transfer pump $NPSH_A$) were satisfied by either appropriate engineering calculations or in-situ testing. Because this violation is of very low safety significance (Green) and was entered into the licensee's corrective action program as IRs 01185519 and 01185526, this violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000277/2011007-01, 05000278/20110007-01, Failure to Demonstrate the Capability of the EDG Fuel Oil Transfer Pumps to Fulfill Their Safety Functions Under all Conditions)**

.2.1.2 Unit 3 'B' 125 Vdc Battery, 3BD01

a. Inspection Scope

The team reviewed the design, testing, and operation of the Unit 3 'B' 125 Vdc battery (3BD01), to verify it could perform its design basis function to provide direct current (DC) power to connected loads during normal, transient, and postulated accident conditions, including station blackout events. Specifically, the team reviewed design calculations, including battery sizing, load profile studies, voltage drop calculations, and battery terminal connection resistances, to evaluate whether the battery capacity was adequate for the equipment load and duration required by design and licensing bases, and to assess whether adequate voltage was available to meet minimum voltage specifications for connected loads during worst case loading conditions. The team also reviewed the battery hydrogen generation analysis to determine whether hydrogen concentration levels would stay below acceptable levels during normal and postulated accident conditions.

The team reviewed battery tests, including modified performance and service discharge tests, and routine surveillance tests to assess whether the testing and maintenance was sufficient and performed in accordance with approved procedures, vendor recommendations, industry standards, and design and licensing requirements. The team compared the service test and modified performance test load profiles to the load profile studies for the loss-of-coolant accident with a concurrent loss-of-offsite power and the station blackout design assumptions to verify the load testing enveloped the predicted worst case loading conditions. The team interviewed design and system engineers regarding the design, operation, testing, and maintenance of the battery. Field walkdowns of the battery were performed to independently assess the material condition of the battery cells and associated electrical equipment. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the battery and to assess Exelon's capability to evaluate and correct problems.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," in that Exelon did not verify the adequacy of the seismic design for temporary battery cells that had been placed in-service in safety-related station batteries that were required to be operable. Specifically, Exelon did not evaluate whether mechanical stress could be transferred from one temporary battery cell to another via rigid bus bars attached to the cell terminal posts and, as a consequence, did not verify that damage to a cell post or cell case would not result during a seismic event. During the inspection period, the temporary battery cells were not in-service and were not required to be operable.

Description: In 1990, Exelon fabricated four steel battery carts to transport and support two battery cells per cart. As needed, Exelon moved the cells on the four carts into a battery room, connected the temporary cells to an in-service safety-related battery, and then removed a row of permanent cells from service (i.e., disconnected). While the temporary cells were in-service and considered operable, they remained in the battery carts. This method allowed Exelon to replace an entire battery, a row at a time, while the reactor plant remained at power (i.e., on-line battery replacement). Since 1990, Exelon has used this method to replace all four station batteries in each unit twice (total of 16 full battery replacements), and also for corrective maintenance when an individual cell needed to be removed from service while maintaining the battery operable.

The team identified that the two cells, in a single battery cart, did not have any seismic restraints or seismic spacer plates (e.g., Styrofoam sheets) between the cells, as required by the battery vendor for the seismically qualified station battery racks. The two cells were mechanically connected to each other via rigid bus bars attached to the cell posts. Calculation PS-028, "Design of Battery Cart to Transport and Support Temporary Batteries," Rev. 1, documented Exelon's seismic analysis for the temporary cells when installed in the battery carts. That analysis verified that a cart with two cells (i.e., evaluated as a single unit) would not tip over during a seismic event, but did not evaluate independent movement, such as sliding, between the two cells (e.g., relative motion cell to cell). If independent movement were to occur, then mechanical load and stress would be transferred from one cell to the other via the bus bars attached to the cell terminal posts, and could result in damage to a post or case.

During the inspection period, the temporary battery cells were not in-service and not required to be operable. The most recent usage was in November 2006, when temporary cells were installed in the 2B Battery. Exelon entered this issue into their corrective action program as IR 1182989, and performed a preliminary calculation to verify seismic adequacy. The team reviewed the calculation and found it reasonable.

Analysis: The team determined that the failure to evaluate whether temporary battery cells would remain operable during a seismic event prior to substituting the cells into an in-service station battery during on-line battery replacement or maintenance was a performance deficiency that was reasonably within Exelon's ability to foresee and prevent. The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In addition, this issue was similar to example 3.k of IMC 0612, Appendix E, "Examples of Minor Issues," which determined that calculation errors would be more than minor if, as a result of the errors, there was reasonable doubt on the operability of the component. For this issue, there was a reasonable doubt on the operability of the temporary battery cells during a seismic event, in that a knowledgeable seismic engineer could not determine the adequacy of design based on a review of the existing seismic analysis, design details, or available vendor information. In response to this issue, Exelon performed a preliminary calculation to assess past seismic adequacy, which utilized material properties, such as coefficient of friction, which were not available from typically utilized engineering reference sources or material properties handbooks. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function, and was not the result of any willful violation of NRC requirements.

In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," a Phase 1 SDP screening was performed and determined the finding was of very low safety significance (Green) because it was a design deficiency confirmed not to result in loss of operability or functionality.

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon did not thoroughly evaluate the problem such that the resolution addressed the cause. Specifically, in 2009, IR 844207 identified that the battery cells on the cart did not have Styrofoam (i.e., seismic) spacers between the cells and did not have steel tie-rods installed for a cell clamp assembly, similar to the station battery. The IR incorrectly determined that plastic tubes in-between the two cells would provide an adequate seismic restraint. [IMC 0310, Aspect P.1(c)]

Enforcement: 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that design control measures shall provide for verifying the adequacy of design, such as by design reviews, or the use of alternate or simplified calculational methods. Contrary to the above, from 1990 until 2011, Exelon did not verify the adequacy of the seismic design for temporary battery cells that had been placed in-service in safety-related station batteries that were required to be operable. Calculation PS-028, "Design of Battery Cart to Transport and Support Temporary Batteries," Rev. 1, verified seismic adequacy of the cart to support the total weight of two battery cells, but did not evaluate independent movement, such as sliding, between the two cells (i.e., relative motion cell to cell). Specifically, Exelon did not evaluate whether mechanical load and stress could be transferred from one temporary battery cell to another via rigid bus bars attached to the cell terminal posts and, as a consequence, did not verify that damage to a cell post or cell case would not result during a seismic event. The most recent usage was in November 2006, when the temporary cells were installed in the 2B Battery. Because this violation was of very low safety significance (Green) and was entered into Exelon's corrective action program (IR 1182989), this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC's Enforcement Policy. **(NCV 05000277/2011007-02, 05000278/2011007-02, Temporary Battery Cart Seismic Configuration Deficiency)**

.2.1.3 Unit 3 Core Spray / Residual Heat Removal Room Coolers, 3DE057 / 3DE058

a. Inspection Scope

The core spray and residual heat removal (RHR) pump rooms are cooled by fan coil units that remove heat to the emergency service water (ESW) system during postulated accident conditions. The team reviewed room heat load calculations and pump room cooler thermal performance calculations to verify the units were capable of supplying sufficient cooling to the rooms. Recent thermal performance test results were reviewed to determine whether the room coolers were capable of performing adequately during postulated accident conditions. The team performed a walkdown of the room cooler areas to assess material condition and cleanliness of the fan coil fins. The team also reviewed corrective action documents and health reports to determine if there were any adverse trends associated with the room coolers and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.4 'B' Emergency Service Water Pump, 0BP57

a. Inspection Scope

The team ensured river levels met vendor requirements associated with ESW pump suction submergence and NPSH design requirements to ensure the pump was capable of performing its safety function. The team verified that appropriate seismic analysis was performed on the pump/motor assembly. Hydraulic calculations were reviewed to ensure design requirements for flow, pressure, and vibration were appropriately translated into acceptance criteria in pump in-service testing (IST) procedures. The team reviewed pump structure ventilation calculations to ensure environmental conditions were adequately maintained. Design change history and IST results were reviewed to assess potential component degradation and impact on design margins; and an associated ESW pump replacement test was also reviewed to verify the pump's ability to perform its design safety function. The team also conducted a walkdown of the ESW pump to assess the material condition and to verify the installed configuration was consistent with the plant drawings, and the design and licensing bases. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the pump and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.5 Unit 2 Condensate Storage Tank, 20T10

a. Inspection Scope

The condensate storage tank (CST) functions as the preferred source of water for the high pressure coolant injection (HPCI) pump and the reactor core isolation cooling (RCIC) pump. The team reviewed design documents, including the HPCI pump and RCIC pump vortex calculation when aligned to the CST, CST drawings, and tank level uncertainty calculations. The team also reviewed results of recent visual inspections of the CST, and conducted a walkdown of the tank area to observe material condition. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the CST and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.6 Unit 3 High Pressure Service Water Pump, 3DP042

a. Inspection Scope

The team inspected the 'D' high pressure service water (HPSW) pump (3DP042) to determine whether it could fulfill its design basis function of delivering cooling flow to the associated residual heat removal heat exchangers and to provide water to the residual heat removal system to flood the primary containment after a postulated accident. The team reviewed applicable portions of the Updated Final Safety Analysis Report (UFSAR), the Technical Specifications, the Technical Requirements Manual, design basis documents, and calculations to identify the design basis requirements for the pump. The team interviewed the system engineer and reviewed pump testing results to assess pump performance. The team walked down the HPSW pump, the pump motor, and the pump structure to independently assess Exelon's configuration control, the material condition, the pump's operating environment, and flood protection. The pump submergence requirement was reviewed to ensure adequate $NPSH_A$. The stress analysis of the pump and discharge piping restraints were reviewed to evaluate maximum loading. The team reviewed IST results to ensure that the pump operation was within the specified parameters. In addition, pump cooling requirements and operating procedures were reviewed to ensure adequate pump operating temperatures. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the HPSW pump and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.7 Service Water Intake

a. Inspection Scope

The team inspected the service water intake to determine whether it could fulfill its design basis function of supplying cooling water to safety-related and nonsafety-related systems during normal and accident conditions. The team reviewed applicable portions of the UFSAR, the Technical Specifications, the Technical Requirements Manual, design bases documents, and calculations to identify the design basis requirements for the service water intake structure. Silting levels within the service water bay were reviewed to ensure proper HPSW and ESW pump operation. The team reviewed procedures and instrumentation to ensure proper manual isolation of the service water bay portion of the intake structure in the event of a high or low water level in Conowingo Pond to ensure availability of cooling water to the supplied safety-related systems. Additionally, the team performed a walkdown of accessible areas on the intake structure to assess configuration control and the material condition of risk-significant structures, systems, and components. Material condition of inaccessible areas was assessed by performing a review of periodic inspection reports performed by Exelon and independent contractors. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the service water intake structure to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.8 Unit 2 Core Spray Injection Valve, MO-2-14-012A, and High Pressure Coolant Injection Steam Isolation Valve, MO-2-23-016 (2 samples)

a. Inspection Scope

The team inspected two Unit 2 motor-operated valves (MOVs), the loop 'A' core spray (CS) injection valve (MO-2-14-012A) and the HPCI steam isolation valve (MO-2-23-016), to verify the valves were capable of performing their design basis functions. Valve MO-2-14-012A is a normally closed valve with a safety function to open for CS injection and a safety function to close for primary containment isolation. MO-2-23-016 is a normally open valve with a safety function to close on a HPCI isolation signal.

The team reviewed the UFSAR, the Technical Specifications, design basis documents, drawings, and procedures to identify the design basis requirements of each valve. The team reviewed periodic MOV diagnostic test results, stroke-timing test data, and logic test results to verify acceptance criteria were met. The team verified the MOV safety functions, torque switch settings, performance capability, and design margins were adequately monitored and maintained for each MOV. The team verified that diagnostic testing results were used to trend stem nut wear to ensure an adequate stem nut replacement frequency. The team reviewed MOV weak link calculations to ensure the ability of the MOVs to remain structurally functional while stroking under design basis conditions. The team verified that the valve analysis used the maximum differential pressure expected across the valves during worst case operating conditions. Thermal binding, pressure locking, and temperature induced pressure locking analyses were reviewed to determine susceptibility. Additionally, the team reviewed degraded voltage conditions, thermal overload sizing, and voltage drop calculation results to confirm that the MOVs would have sufficient voltage and power available to perform their safety function at degraded voltage conditions.

The team discussed the design, operation, and maintenance of the MOVs with engineering staff to evaluate performance history, maintenance, and overall component health of the MOVs. The team also conducted a walkdown of MO-2-14-012A and remotely viewed MO-2-23-016 to assess the material condition and to verify the installed configurations were consistent with the plant drawings, and the design and licensing bases. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the valves and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.9 'B' Emergency Service Water Pump Motor, 0BP57

a. Inspection Scope

The team inspected the 'B' ESW pump (0BP57) motor to determine whether it could fulfill its design basis function of providing adequate horsepower for the pump to deliver cooling flow to the associated EDG heat exchangers and room coolers. The team interviewed the system engineer and reviewed IRs that had been written for the ESW pump motor to assess its performance. The team walked down the ESW pump, the pump motor, and the pump structure to independently assess Exelon's configuration control, the pump motor's operating environment, and its material condition. The team reviewed ESW system sizing calculations and a design modification that replaced the 'B' pump to determine and evaluate the required capacity for the break horsepower required by the pump motor during design basis conditions. The UFSAR and Technical Specifications were reviewed to ensure consistency between the pump parameters and the design basis flow requirements.

The team reviewed the 4160 Vac system load flow calculation and motor nameplate data to confirm that adequate voltage would be available at the motor terminals for design basis conditions. The team also reviewed the motor overcurrent relay setting calculation, relay settings, and recent overcurrent relay calibration tests to evaluate whether the protective relays would provide for reliable motor operation at design basis minimum voltage conditions. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the ESW pump motor and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.10 E2 Emergency Diesel Generator – Electrical, 0BG12

a. Inspection Scope

The team inspected the E2 EDG to confirm that it was capable of meeting its design basis accident load requirements. The EDG was designed to provide standby power to safety-related 4160 Vac emergency auxiliary switchgear E22 (Unit 2) and E23 (Unit 3) when the preferred power supply is not available. The team reviewed the UFSAR, station single line diagrams, EDG vendor rating documentation, station operating procedures, and the generator nameplate data to confirm consistency in the load ratings. The team reviewed the brake horsepower basis for selected pump motors to ensure loads were adequately considered in the loading study at worse case motor load conditions. The team reviewed the EDG load study for the worse case design basis loading conditions and the periodic surveillance testing to confirm the EDG load capability. The team walked down the EDGs to independently assess Exelon's configuration control, the generator's operating environment, and its material condition. The team also reviewed the design basis and periodic testing for the components that could trip the EDG during a design basis postulated accident to ensure that they would operate reliably. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the generator and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.11 4160 Volt Emergency Auxiliary Switchgear E22, 20A16

a. Inspection Scope

The team inspected 4160 Vac emergency auxiliary switchgear E22 to confirm that it was capable of meeting its design basis requirements. Switchgear E22 was designed to distribute power to safety-related pump motors and load centers during design basis conditions. The team reviewed design basis load flow and short circuit current calculations to determine the design basis for maximum load, momentary and interrupting duty, and bus bracing requirements, and reviewed switchgear equipment vendor ratings for conformance with the design basis. The team also reviewed design basis inputs for conservatism and reviewed vendor equipment data to confirm adequate margin in breaker momentary and interrupting duty. The team reviewed protective relaying calculations for breaker coordination for incoming line and load center feeder breakers, preventive maintenance for selected breakers, component replacements, and the results of inspections/tests to confirm the reliability of the equipment. The team performed a walk down of the switchgear to independently assess Exelon's configuration control, the operating environment, and its material condition. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the switchgear, to confirm that the switchgear and breakers were properly maintained, and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.12 Unit 2 'A' Reactor Protection System Motor-Generator Set / Scram Solenoid Pilot Valves

a. Inspection Scope

The team reviewed the Technical Specifications and Bases, other design and licensing bases documentation, and surveillance requirements for the reactor protection system electric power monitoring assemblies for motor generator set undervoltage to confirm the design basis voltage at the scram solenoid pilot valves (SSPV). The team reviewed the results of recent plant testing that determined maximum voltage drop to hydraulic control unit (HCU) fuses and the results of testing that was conducted by Exelon to determine vendor (Automatic Switch Company (ASCO) and Automatic Valve Company (AVCO)) solenoid electrical data, including pickup and dropout voltages. The team reviewed the vendor drawings and rating data for the original ASCO and the replacement AVCO solenoids to confirm the capability of the solenoids to operate over the range of voltage expected at the solenoid valves. The team reviewed the engineering change request that implemented the design change for AVCO valves to replace the ASCO valves for the SSPVs, and vendor solenoid operator rating data for the replacement AVCO valves, to confirm that the Technical Specification undervoltage trip value supported continuous operation of the AVCO solenoid valves. The team performed a walk down of the HCU SSPVs to independently assess Exelon's configuration control, the operating environment, and the material condition. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the SSPVs, to confirm that the HCUs were properly maintained, and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.13 Unit 3 'B' 125 Vdc Battery Bus, 3BD17

a. Inspection Scope

The team reviewed the design and operation of the 'B' 125 Vdc battery bus (3BD17), and associated distribution panels to evaluate whether the loading of the DC bus was within equipment ratings and to determine whether the bus could perform its design basis function to reliably power the associated loads under worst case conditions. Specifically, the team reviewed calculations and drawings, including voltage drop calculations, short circuit analysis, and load study profiles, to evaluate the adequacy and appropriateness of design assumptions. The team also reviewed the DC overcurrent protective coordination studies to verify there was adequate protection for postulated faults in the DC system.

The team interviewed system and design engineers, and walked down the 125 Vdc battery bus and distribution panels to independently assess the material condition and determine whether the system alignment and operating environment was consistent with design basis assumptions. Finally, the team reviewed corrective action documents and system health reports to determine whether there were any adverse operating trends and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.14 Unit 3 'B' 125 Vdc Battery Chargers, 3BD003-1 and 3BD003-2

a. Inspection Scope

The team reviewed the design, testing, and operation of the 125 Vdc battery chargers 3BD003-1 and 3BD003-2, to verify they could perform their design basis function to provide DC power to connected loads during normal, transient, and postulated accident conditions. The team reviewed design calculations, drawings, and vendor specifications as related to battery charger sizing, short circuit fault current, load profile studies, and voltage drop to evaluate battery charger capability.

Maintenance and test procedures were reviewed to determine whether maintenance and testing was adequate to ensure reliable operation; and that they were performed in accordance with regulatory requirements, industry standards, and vendor recommendations. The team compared as-found and as-left inspection and test results to established acceptance criteria to verify the charger's capability conformed to design basis assumptions and requirements. In addition, the team interviewed system and design engineers, and walked down the battery chargers to independently assess the material condition, and determine whether the system alignment and operating environment were consistent with the design basis assumptions. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the chargers and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.15 Unit 2 High Pressure Coolant Injection Valves, MO-2-23-019 and MO-2-23-020

a. Inspection Scope

The team reviewed the design, testing, and operation of the HPCI system injection valves (MO-2-23-019 and MO-2-23-020) to verify they could perform their design basis functions during normal, transient, and postulated accident conditions. Both valves were included in Exelon's safety-related MOV program. Valve MO-2-23-019 is a normally closed valve with a safety function to open for HPCI injection and a safety function to close for primary containment isolation. Valve MO-2-23-020 is a normally open valve, with a safety function to open (if closed) for HPCI injection.

The team reviewed Exelon's MOV program procedures, MOV design specifications, torque switch settings, and MOV calculations to assess thrust and torque limits and actuator settings. The team compared those values to applicable design conditions, such as maximum expected differential pressures, predicted stem nut wear, and weak link analysis, to verify worst case system conditions were adequately incorporated into test procedure acceptance criteria and component design. The team reviewed periodic IST and MOV diagnostic test results, and stem lubrication and operator grease inspection results to verify the MOV performance conformed to design and regulatory requirements, predicted expectations and assumed margins. In addition, the team reviewed motor data, degraded voltage conditions, thermal overload configuration, and voltage drop calculations to verify the MOVs would have sufficient power available to perform their safety function at worst case degraded voltage conditions. Exelon's analyses for valve thermal binding, pressure locking, and temperature induced pressure locking were also reviewed to determine susceptibility to these phenomena. The team reviewed HPCI logic functional test results to verify valve controls were appropriately tested and would function as required.

In addition, the team interviewed system and design engineers, and walked down the MOVs to independently assess the material condition and determine whether the operating environment was consistent with the design basis assumptions. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the MOVs and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.16 Unit 2 Torus Hardened Vent Valve, AO-2511 and Containment Emergency Vent Outboard Isolation Valve, AO-80290

a. Inspection Scope

The Unit 2 torus hardened vent valve (AO-2511) and the associated containment emergency vent outboard isolation valve (AO-80290) were reviewed to verify their ability to operate if called upon in the event of an emergency. These vent valves are manually operated valves that were designed to allow operators to vent primary containment during a postulated accident that involved the loss of decay heat removal. The team reviewed the design basis document, maintenance history, design changes, drawings, and associated surveillance testing for the valves to ensure they were capable of performing their intended safety function. The team also interviewed operators and the system engineer, and walked down associated equipment to assess the material condition of the valves, related piping, associated pipe support structures, and air and backup nitrogen supply lines.

The team reviewed the associated emergency operating procedure and assessed the manual operator actions required to operate the valves to ensure the operators were provided with clear guidance to perform the actions as credited in the design and licensing bases. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the valves and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.17 Unit 3 'C' Residual Heat Removal Pump, CP35

a. Inspection Scope

The team inspected the 'C' RHR pump (CP35) to determine whether it could fulfill its design basis function of taking suction from the torus (suppression pool) and delivering low pressure, high volume, cooling water flow to the associated heat exchangers and the reactor vessel. The team reviewed NPSH and differential pressure calculations to ensure consistency with design basis requirements and IST results. The team interviewed the system engineer, and reviewed pump test results and completed IRs associated with the RHR pump to assess the pump's performance. The team walked down the four Unit 3 RHR pumps and motors, and other accessible portions of the RHR system to independently assess Exelon's configuration control, the pumps' operating environment, and the RHR system material condition. In addition, the team reviewed system flow calculations, the UFSAR, and the Technical Specifications to ensure the pump parameters were consistent with design basis assumptions.

b. Findings

No findings were identified.

.2.1.18 Emergency Cooling Water Pump Discharge Valve, MO-0-48-0841, and Emergency Cooling Water Pump Discharge Check Valve, CKV-CC-V506

a. Inspection Scope

The team inspected the emergency cooling water pump discharge MOV, MO-0-48-0841, and its associated pump discharge check valve, CKV-CC-V506, to verify the valves were capable of performing their design basis function. These normally closed valves were designed to open to provide a flow path for pump discharge flow during emergency cooling water (ECW) pump operation. The ECW system provides a reliable backup source of cooling water in the event both ESW pumps fail to achieve adequate discharge pressure.

The team reviewed the UFSAR, the Technical Specifications, design basis documents, drawings, and procedures to identify the design basis requirements of each valve. The team reviewed the check valve inspection results, and periodic MOV diagnostic test results and stroke-timing test data to verify acceptance criteria were met. The team verified the MOV safety function, performance capability, torque switch configuration, and design margins were adequately monitored and maintained in accordance with Exelon's MOV program. The team reviewed MOV weak link calculations to ensure the ability of the MOV to remain structurally functional while stroking under design basis conditions. The team verified that the MOV valve analysis used the maximum differential pressure expected across the valve during worst case operating conditions. Additionally, the motor data, degraded voltage conditions, and voltage drop calculation results were reviewed to confirm that the MOVs would have sufficient voltage and power available to perform their safety function at degraded voltage conditions.

The team discussed the design, operation, and maintenance of the valves with engineering staff to evaluate component performance history, maintenance, and overall component health. The team also conducted walkdowns of the valves and associated equipment to assess the material condition and to verify the installed configurations were consistent with the plant drawings, and the design and licensing bases. Finally, the team reviewed corrective action documents to determine if there were any adverse trends associated with the valves and to assess Exelon's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.2 Review of Industry Operating Experience and Generic Issues (4 samples)

The team reviewed selected OE issues for applicability at PBAPS Units 2 and 3. The team performed a detailed review of the OE issues listed below to verify that Exelon had appropriately assessed potential applicability to site equipment and initiated corrective actions when necessary.

.2.2.1 10 CFR 21 Report, Linear Indications on Opposed Piston EDG Bearings

a. Inspection Scope

The team reviewed Exelon's applicability review and disposition of a Fairbanks Morse 10 CFR 21 Notification (Log No. 2011-05-00) related to a bearing defect. The nature of the identified defect was linear indications (hot tears) that were observed by a Fairbanks Morse production inspector on an EDG main bearing. The indications went across the entire edge and extended about one inch deep into the bearing.

The team verified that Exelon reviewed the 10 CFR 21 notification, which concluded that none of the suspected bearings were currently installed in the Peach Bottom EDGs, but two cam bearings from the vendor were in the warehouse, and were similarly subject to the notification. The team reviewed Exelon's actions, which included quarantining the bearings so that they would not be used, to ensure the 10 CFR 21 report was appropriately addressed.

b. Findings

No findings were identified.

.2.2.2 NRC Information Notice 2010-03, Failures of Motor-Operated Valves Due to Degraded Stem Lubricant

a. Inspection Scope

The team evaluated Exelon's applicability review and disposition of NRC Information Notice (IN) 2010-03. The IN was issued to inform licensees of recent failures and corrective actions for MOVs due to degraded lubricant on the valve stem and actuator stem nut threaded area. The team assessed the adequacy of Exelon's evaluation of IN 2010-03 by reviewing specific IRs, results of MOV inspections and diagnostic testing results, and by conducting interviews with engineering personnel.

b. Findings

No findings were identified.

.2.2.3 NRC Information Notice 2007-01, Recent Operating Experience Concerning Hydrostatic Barriers

a. Inspection Scope

The team performed a detailed review of Exelon's evaluation of NRC IN 2007-01. This IN discussed events involving water leaking into areas containing safety-related equipment due to deficient hydrostatic (water tight) barriers. The barriers were either degraded, missing, or composed of non-watertight materials such as fire stops (e.g., silicone foam). The team reviewed the UFSAR, the Technical Specifications, design basis documents, vendor specifications, drawings, and procedures to identify the design basis requirements for external flood seals. The team discussed the design, operation, and maintenance of the external flood seals with engineering staff to evaluate their performance history, maintenance, and overall component health. The team also walked down portions of safety-related buildings such as the EDGs, pump structure, and RHR to assess the material condition of visibly accessible external and internal flood protection seals.

The team verified that Exelon had appropriately evaluated the OE and had completed engineering evaluations, modifications, and repairs for identified deficiencies to minimize and limit the impact of potential external flood events. The team also reviewed Exelon's corrective actions to address previously identified leaking electric conduit seals leading to the bottom of a safety-related pump structure motor control center (MCC-E224-P-A).

b. Findings

No findings were identified.

.2.2.4 NRC Information Notice 2006-29, Potential Common Cause Failure of Motor-Operated Valves as a Result of Stem Nut Wear

a. Inspection Scope

The team assessed Exelon's review and follow-up actions to address the issue described in NRC IN 2006-29. This IN detailed ineffective maintenance practices which resulted in undetected excessive stem nut wear that had the potential for common cause failure of multiple MOVs. Specifically, the team reviewed Exelon's maintenance procedures, engineering program documents, and completed MOV diagnostic test results which evaluated stem nut wear, and interviewed engineering personnel that implemented the MOV diagnostic program at PBAPS to determine whether Exelon was appropriately monitoring MOVs for excessive stem nut wear issues.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of problems that Exelon had previously identified and entered into the corrective action program. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, IRs written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system. The specific corrective action program documents that were sampled and reviewed by the team are listed in the Attachment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

The team presented the inspection results to Mr. Thomas Dougherty, Site Vice President, and other members of Exelon staff at an exit meeting on March 11, 2011. The team reviewed proprietary information, which was returned to Exelon at the end of the inspection. The team verified that none of the information in this report is proprietary.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

W. Bennett, Mechanical Maintenance
R. Bogar, Senior Engineer
R. Brower, Design Engineering Manager
J. Chizever, Design Engineering Manager
H. Coleman, Design Engineer
J. Coyle, Design Engineer
C. Dye, System Engineer
T. Fleischmann, Mechanical Maintenance
W. Ford, System Engineer
T. Grimme, System Engineer
X. Haro, System Engineer
E. Haupin, Program Engineer
C. Howell, Design Engineering
K. Kaufman, System Engineer
P. Kester, Design Engineer
R. Lack, System Engineer
M. Long, Programs Branch Manager
J. Lyter, Operations Support Engineer
L. Nace, System Engineer
T. Purcell, Design Engineer
M. Ruff, Program Engineer
R. Smith, Regulatory Assurance Engineer
D. Tyson, Design Engineer
T. Veale, Design Engineer
R. Wagner, Design Engineer
D. Wheeler, Maintenance Rule Coordinator

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

NCV	05000277/2011007-01 05000278/2011007-01	Failure to Demonstrate the Capability of the EDG Fuel Oil Transfer Pumps to Fulfill Their Safety Functions Under all Postulated Conditions (Section 1R21.2.1.1)
NCV	05000277/2011007-02 05000278/2011007-02	Temporary Battery Cart Seismic Configuration Deficiency (Section 1R21.2.1.2)

LIST OF DOCUMENTS REVIEWED

Calculations and Evaluations:

1187-M-003, RHR System - Orifice Design, Rev. 0
1187-M-004, HPSW System - RHR Modification MO-89, New Internals, Rev. 1
1187-M-008, RHR Mode B and C Nozzle Pressure Drop and Adjustment, Rev. 0
1187-M-010, HPSW - RHR System Modification, Rev. 0
1187-M-011, RHR System Orifice, Rev. 0
18247-EC-104 (102), ECCS Pump Room Cooling Parametric Study, Rev. 1
18247-M-035, CST Minimum Water Level to Prevent Vortex Formation, Rev. 1
22.33, ESW System Network Analysis, Rev. 0
32-1H, Design of Support 2-32GB-S67 and 3-32GB-S-67 for Stress Calc 32-1, Rev. 0
33-03C, Analysis of ESW Pump Anchor Bolts and Supports, Design of New Supports, Rev. 1
6280-M11-55-3, Seismic Analysis, HPSW Pumps, Rev. 0
A0004660, Silt Level Effects on the Circulating and Intake Bay Components, 11/12/90
A1486268, Evaluate for Replacement A200 Parts for 2DB-R-B on the 250VDC Bus, 12/12/10
A1607566, ESW/HPSW Bay Mud Level Measurements, 2/18/92
A1695348 Eval-01, Determine Whether Spacers are Needed for 00D452 Batteries, 2/26/10
BLP-12,012, HPSW Technical Specification, 10/28/74
ECR 10-308, Minor revision to PE-17, Battery Capacity Analysis, Rev. 0
ECR 96-00990-0, Pressure Locking/Thermal Binding Design Analysis for PBAPS, Rev. 2
EWR A0036401, Temporary Battery Cable Torque Requirements, 5/3/91
EWR A0158039, Battery Cell Change-out with One or Two Units at Power, 10/7/94
EWR P-51694, Intercell Connection Resistance, 5/9/90
G-080-VC-146, Safe and Alternate Shutdown Analysis, Rev. 0
LIS-0401A Manual Calculation, EDG Fuel Oil Storage Tank Level, Rev. 0
MDE-86-0786, Safe and Alternate Shutdown Analysis, Rev. 1
ME-02371-01, Minimum Acceptable Flow Rate for ESW Flow to RHR Room Coolers, Rev. 0
ME-0538, Primary Containment Venting Flow Rates for Various Vent Paths, Rev. 0
ME-171, MOD 1788, Determine RHR Pump Required Discharge Pressure, 10/8/85
ME-3, RHR Heat Exchanger Inlet Pressures for All Modes of RHR/HPSW Operation, Rev. 1
ME-507, Acceptance Criteria for IST of RHR Pumps (LPCI Mode), Rev. 3
OTC-50, Operating Thrust Calculations, Rev. 1
PE-0087, Determine CST Working Volume for New Settings of CST Level Switches, Rev. 0
PE-0121, PBAPS Voltage Regulation Study, Rev. 7
PE-0166, Emergency Diesel Generator Loading for Cases Defined by UFSAR 8.5.2C/L, Rev. 7
PE-017, 125/250 Vdc Battery Capacity Analysis, Rev. 12
PE-0192, AC System Fault Study, Rev. 1J
PE-0194, Coordination for 4kV 1E Switchgear, Rev. 4
PE-088, 4160 Emergency Aux. Switchgear 20A17 Bus 32 Protective Relay Settings, Rev. 8
PE-090, Cable Withstand Current Rating, Rev. 2
PE-140, 125/250 Vdc System What If Cases, Rev. 10
PE-181, 125 Vdc Voltage Analysis, Rev. 3
PE-191, 125/250 Vdc System Fault Current, Rev. 2
PE-196, 125/250 Vdc System Coordination, Rev. 2
PEAM-0004, HPCI and RCIC Loads During Fire Safe Shutdown Event, Rev. 0
PEAM-0008, Station Blackout Time Line for HPCI and RCIC Loads, Rev. 0

PI-00034, Level Uncertainty Calculation for LT-3-23-074 (CST Level Trip), Rev. 1
PI-00089, Level Uncertainty Calculation for LT-3-13-170 (CST Level), Rev. 1
PM-0046, EDG Fuel Oil Storage Tank Volume Determinations, Rev. 1
PM-0047, EDG Fuel Oil Consumption for 7 Days Continuous Operation at Full Load, Rev. 0
PM-0123, Diesel Generator Fuel Oil Consumption for 6 Days and 7 Days Operation with LOCA Dependent Loads, Rev. 0
PM-034, Required BHP (Mechanical) RHR Pump(s) for Different Modes of Operation, 10/11/89
PM-0410, Identify Licensing Requirements for Diesel Generator Air Start System, Rev. 0
PM-0533, EDG Operability Curves with Reduced ESW Flow Rates, Rev. 1
PM-0589, RHR Heat Exchanger Performance Evaluation, Rev. 4
PM-0620, Determine Upstream and Downstream Line Pressures for GL 89-13 MOVs, Rev. 16
PM-0760, Power Rerate Evaluation - SBO Analysis, Rev. 1
PM-0958, RHR/Core Spray Pump Room Temperatures Post-LOCA with 95° River Water, Rev.2
PM-1010, RHR Pump NPSH, Rev. 6A
PM-104, Emergency Heat Sink Temperatures/Revised Flow Rates and Heat Loads, Rev. 3
PM-1048, Design Basis for Internal Flood Protection, HPSW/ESW Pump Structure, Rev. 0
PM-391, Determine Minimum Water Level in Emergency Cooling Tower Reservoir, Rev. 13
PM-589, RHR Heat Exchanger Performance Evaluation, Rev. 4
PM-620, Determine Differential Pressures for MOVs, Rev. 16
PM-736, Battery Room Hydrogen Concentration, Rev. 2
PM-824, Maximum Anticipated Bearing Oil Temperature of the HPSW Pumps, Rev. 1
PS-028, Design of Battery Cart to Transport and Support Temporary Batteries, Rev. 1
PS-155, Seismic Evaluation of Battery Racks for Cell Change-out Activity, Rev. 1
SR-124, Seismic Weak Link Report, Rev. 4
VO-00182 OTC-46, Crane-Aloyco Operating Thrust Calculations, Rev. 1

Completed Surveillance, Maintenance, and Modification Testing:

Daily Operator Rounds Logs for 3B Battery (2/17/11)
MIDAS Calculation and Diagnostic Trace Results for MO-2-14-012A (9/21/06, 9/28/10)
MO-2-23-019 MIDACALC As-left Test Setup Review, Rev. 1
MO-2-23-019 MIDACALC Results, Rev. 1
MO-2-23-020 MIDACALC As-left Test Setup Review, Rev. 1
MO-2-23-020 MIDACALC Results, Rev. 1
MOV Post-Test Data Review Worksheet for MO-2-14-012A (9/21/06)
MOV Post-Test Data Review Worksheet for MO-2-23-016 (9/28/10)
RCM 072, Trash Rack Inspection (6/26/09)
RT-0-100-505-2, Emergency Operating Procedure Tool Inventory (7/8/2010)
RT-I-033-631-3, RHR Room Cooler ESW Heat Transfer Test (1/24/11)
RT-I-033-632-3, Core Spray Room Cooler ESW Heat Transfer Test (2/2/09, 2/2/11)
RT-M-033-675-2, Unit 2 Pump Intake Structure Inspection and Cleaning (9/25/10)
RT-O-032-310-3, HPSW Oil Cooler Heat Transfer Capability Test (8/27/10)
RT-O-033-600-2, Full Flow Test of ESW to ECCS Coolers and EDG Coolers (1/02/11)
RT-O-052-252-2, E2 EDG Inspection Post Maintenance Functional Test (5/8/10)
SI2F-23-76-XXCQ, Calibration Check of HPCI Steam Line High Flow DPIS 2-23-76 (12/15/10)
SI2M-54-E22-XXC4, Calibration Check and Functional Test of E22 Bus and E224 Bus Meters and Overcurrent Relays (1/9/08)

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0867814	1084973	1119887	1166272	1180126*
0879701	1105880	1120123	1173818	1181305*
1010281	1106382	1120916	1174102	1182989*
1050043	1106815	1120923	1175594*	1183169
1071130	1107538	1126992	1176959*	1183364 *
1071343	1108049	1139681	1177549	1184319 *

1184761*	660310	A00452577	A1167100	A1659013
1184834*	668388	A00894291	A1249047	A1701061
1185240*	772999	A01023025	A1355640	A1716992
1185791 *	820382	A01107323	A1397382	A1762647
1187639 *	822488	A01135118	A1410253	A1777591
060051	859015	A01135676	A1412800	A1777593
189814	879701	A01141508	A1423232	A1777856
307815	883424	A01150893	A1468210	A1777857
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LIST OF ACRONYMS

AC	Alternating Current
CFR	Code of Federal Regulations
CS	Core Spray
CST	Condensate Storage Tank
DC	Direct Current
ECW	Emergency Cooling Water
EDG	Emergency Diesel Generator
ESW	Emergency Service Water
HCU	Hydraulic Control Unit
HPCI	High Pressure Coolant Injection
HPSW	High Pressure Service Water
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure
IR	Issue Report
IST	In-service Testing
kV	kilo-Volts
MOV	Motor-Operated Valve
NCV	Non-cited Violation
NPSH	Net Positive Suction Head
$NPSH_A$	Net Positive Suction Head Available
NRC	Nuclear Regulatory Commission
OE	Operating Experience
PBAPS	Peach Bottom Atomic Power Station
PRA	Probabilistic Risk Assessment
RAW	Risk Achievement Worth
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RRW	Risk Reduction Worth
SDP	Significance Determination Process
SPAR	Standardized Plant Analysis Risk
SSPV	Scram Solenoid Pilot Valve
UFSAR	Updated Final Safety Analysis Report
Vac	Volts, Alternating Current
Vdc	Volts, Direct Current