UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

May 19, 2014

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

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 – NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000277/2014007 AND 05000278/2014007

Dear Mr. Pacilio:

On April 4, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Peach Bottom Atomic Power Station (PBAPS). The enclosed inspection report documents the inspection results, which were discussed on April 4, 2014, with Mr. Mike Massaro, Site Vice President, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. 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 which were of very low safety significance (Green). Both findings were determined to involve violations of NRC requirements. However, because of the very low safety significance of the violations and because they were entered into your correction action program, the NRC is treating these violations as non-cited violations (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy. If you contest any of the NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the 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 the PBAPS. In addition, if you disagree with the cross-cutting aspect assigned to any finding 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 Title 10 of the *Code of Federal Regulations* (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,

/RA/

Paul G. Krohn, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000277/2014007 and
05000278/2014007 w/Attachment: Supplemental Information

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REGION I

Docket Nos.:	50-277, 50-278
License Nos.:	DPR-44, DPR-56
Report Nos.:	05000277/2014007 and 05000278/2014007
Licensee:	Exelon Generation Company, LLC
Facility:	Peach Bottom Atomic Power Station, Units 2 and 3
Location:	Delta, Pennsylvania
Dates:	March 3 to April 4, 2014
Team Leader:	D. Kern, Senior Reactor Inspector Division of Reactor Safety (DRS)
Inspectors:	W. Cook, Senior Reactor Analyst, DRS G. Ottenberg, Senior Reactor Inspector, DRS J. Ayala, Reactor Inspector, DRS T. O'Hara, Reactor Inspector, DRS H. Campbell, NRC Mechanical Contractor N. Della Greca, NRC Electrical Contractor
Approved by:	Paul G. Krohn, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY

IR 05000277/2014007 and 05000278/2014007; 3/3/2014 – 4/4/2014; Exelon Generation Company, LLC; 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 five NRC region based inspectors and two NRC contractors. The Team identified two findings of very low risk significance (Green) and classified both as non-cited violations (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated January 1, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

Cornerstone: Mitigating Systems

Green. The team identified a Green non-cited violation of Title 10 *Code of Federal Regulations* 50, Appendix B, Criterion III, Design Control, for failure to verify and ensure that the emergency diesel generators (EDGs) were capable of performing their design safety functions at the limits of voltage and frequency allowed by Technical Specifications (TS). Specifically, the existing EDG loading calculation permitted the E2 EDG and associated bus to be loaded up to 3100 KW at nominal frequency and voltage. At the maximum frequency and voltage values permitted by TS, the calculation-allowed maximum load would have exceeded the EDG 30-minute rating limit of 3250 KW and potentially damaged the EDG. Immediate corrective actions included evaluation of EDG loading for TS maximum voltage and frequency and changing design calculation PE-0166 to reduce the maximum permitted E2 EDG load from 3100 kW to 3052 kW at nominal voltage and frequency. Exelon entered the issue into their corrective action program (issue report 1638255) to evaluate the adequacy of the design and ensure that the allowed maximum diesel loading would not exceed the design capabilities of the diesels.

The finding was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the emergency diesels to respond to initiating events to prevent undesirable consequences. The team evaluated the finding in accordance with Inspection Manual Chapter (IMC) 0609, Significance Determination Process, Attachment 0609.04, Initial Characterization of Findings, dated June 19, 2012, for the Mitigating Systems Cornerstone, and IMC 0609, Appendix A, The Significance Determination Process (SDP) for Findings At-Power, dated June 19, 2012. The team determined the finding was of very low safety significance because it was a design deficiency confirmed not to result in a loss of EDG operability. This team assigned a cross-cutting aspect associated with this finding because the performance deficiency continued during the 2012 assessment of WCAP-17308-NP and was reflective of current performance. The team determined this finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation (PI.2), because

engineers did not thoroughly evaluate the EDG loading issue and ensure the resolution addressed its cause commensurate with the safety significance. Specifically, Exelon relied on invalid assumptions to determine the issue was not applicable, and did not thoroughly evaluate the technical issue addressed in the WCAP. (Section 1R21.2.1.1)

Green. The team identified a Green non-cited violation of Title 10 *Code of Federal Regulations* 50, Appendix B, Criterion III, Design Control. Specifically, Exelon did not correctly verify the capability of alternating current motor-operated valves (MOVs) at a degraded voltage corresponding to the lowest voltage allowed by plant Technical Specification setpoints for the degraded grid voltage relays. Exelon initiated issue report 1642720 to evaluate the adequacy of their design and determined that 9 out of the 130 alternating current MOV program valves required further evaluation. The licensee performed an operability evaluation of the affected MOVs, assuming the appropriate voltage, and determined that, although significant design margin was lost, all MOVs remained operable.

The finding was more than minor because the finding was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring the capability of the 480 volt alternating current (AC) MOVs to respond to initiating events to prevent undesirable consequences. The team determined the finding was of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. The team assigned a cross-cutting aspect associated with this finding, because the deficient AC MOV operability evaluations were completed in November 2011 and were reflective of current performance. The finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation (PI.2), because Exelon did not thoroughly evaluate the issue addressed in a previous NCV contained in NRC Inspection Report 2010004, during 2011, for PBAPS such that, the resolution addressed causes and extent-of-condition commensurate with the safety significance. Specifically, the affected MOVs were not evaluated at the required voltage in operability evaluations performed following receipt of a non-cited violation. (Section 1R21.2.1.2)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: 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) 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) analysis 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 team also selected components based on previously identified industry operating experience issues and the component contribution to the large early release frequency (LERF) was also considered. 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, electrical buses, 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 reports (05000277/2006009, 2008007, 2011007 & 05000278/2006009, 2008007, 2011007) to minimize the selection of those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 17 components and six industry operating experience (OE) samples. One component was selected because it was a containment-related structure, system, and component (SSC) and was considered for LERF implications. 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 operating experience. Finally, consideration was given to the uniqueness and complexity of the design and the available defense-in-depth margins.

The inspection performed by the team was conducted in accordance with NRC Inspection Procedure 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 and licensing bases. A summary of the reviews performed for each component, operating experience sample, and the specific inspection findings 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 (17 samples)

.2.1.1 Emergency Diesel Generator E1 (0AG012)

a. Inspection Scope

The team inspected the E1 emergency diesel generator (EDG) to verify that it was capable of meeting its design basis requirements. The design function of the E1 EDG is to provide standby power to safety-related E12 and E13 emergency auxiliary swithchgear 4160V busses for Units 2 and 3, respectively, when the preferred power supply is not available. The team reviewed the EDG loading study and the design capabilities of the EDG to confirm its ability to power the actual loading expected in response to a design basis accident. The team reviewed the brake horsepower basis for selected pump motors to ensure loads were adequately considered in the loading study at conservative motor conditions. The team also reviewed EDG voltage settings and voltage drop calculations to confirm that adequate voltage was available to the accident loads when supplied by the diesel generator. Additionally, the team reviewed the transient analysis and test results to confirm that loads were powered by the diesel generator without loss of capability.

The team reviewed electrical schematics to confirm that the diesel generator started automatically during a loss of offsite power or degraded voltage condition and that the bus loading occurred in accordance with the design requirements and licensing bases. The team reviewed completed Technical Specification (TS) required performance tests to ensure the EDG met all applicable test acceptance criteria. In addition, the team performed interviews with the EDG system engineer, reviewed the system health report and applicable corrective action documents, and performed a walk-down of the E1 EDG and associated support equipment to assess the material condition and potential vulnerability to hazards.

b. Findings

Introduction. The team identified a Green non-cited violation (NCV) of Title 10 Code of Federal Regulations (CFR) 50, Appendix B, Criterion III, Design Control, for failure to verify and ensure that the EDGs were capable of performing their design safety functions at the limits of voltage and frequency allowed by Peach Bottom Technical Specifications (TS). Specifically, the existing EDG loading calculation permitted the E2 EDG and associated bus to be loaded up to 3100 kW at nominal frequency and voltage. At the TS permitted maximum frequency and voltage values the calculation-allowed maximum load would have exceeded the EDG 30-minute rating limit of 3250 KW and potentially damaged the EDG.

Description. Calculation PE-0166, Emergency Diesel Generator Loading for Cases Defined by 8.5.2C/L, Revision 10, identified the loads powered by each of the four EDGs under various emergency conditions as defined in Tables 8.5.2c through 8.5.2l of the updated final safety analysis report (UFSAR). The calculation summary of results stated, "The acceptance criteria for Diesel Generator loading is to maintain the loads on each Diesel below the 2000 hour rating of 3000 kW for each time frame of the postulated accident. The one exception to this rule is the E2 EDG, which is controlled to the 200 hour rating of 3100 kW during the 0 – 10 minutes time frame of the postulated accident." The team observed the calculation did not specifically address EDG loading variations resulting from diesel voltage and frequency changes within the TS–allowed voltage and frequency ranges. Specifically, the various calculation tables listed loads at nominal voltage (4160 Volts) and frequency (60 Hertz), whereas TS allowed diesel operation at voltages varying between 4160 and 4400 Volts (V) and frequencies varying between 58.8 and 61.2 Hertz (Hz).

The team reviewed the impact of the above omission on the performance of the safety-related components reviewed (e.g., pump flow, valve operation, EDG fuel consumption, bus loading, and supply breakers setting) and identified no concerns. However, the team observed that if the EDGs operated at the maximum loading identified in the design calculation and at the maximum voltage and frequency permitted by the TS, the EDGs' capability to perform their design function would be challenged. An increase in frequency causes the motor loads to increase by the cube of the change in frequency and an increase in voltage causes resistive type loads to increase by the square of the change in voltage. The team concluded that at the maximum TS-permitted voltage and frequency the 3100 kW loading permitted by calculation PE-0166 for E2 would be equivalent to approximately 3300 kW, which exceeds the EDG 30-minute rating (3250 kW). The team's calculation assumed that the 3100 kW consisted of 94% motor loads and 6% resistive loads, as estimated by the licensee in a 2007 evaluation. The EDG vendor specified the Peach Bottom EDGs' ratings as 2600 kW continuous, 2000 hours for loads between 2601 and 3000 kW, 200 hours for loads between 3001 and 3100 kW, and 30 minutes for loads between 3101 and 3250 kW. The EDG vendor manual specifies that "any operation over 3250 kW will require engine shutdown for inspection/repair."

Revision 10 of calculation PE-0166, dated January 7, 2014, shows the current E2 EDG loading is 3033 kW for the first interval (0 to 10 minutes), equivalent to 3229 kW at maximum voltage and frequency. This actual load falls within the EDG 30-minute rating and, hence, within its design capabilities. Following the initial 10-minute loading, to ensure that the EDG can meet its post-accident mission time, loading must remain below 3000 kW, as required by the acceptance criteria of the calculation and emergency operating procedure SE-11, Loss of Offsite Power. The calculation states the E2 EDG load is 876 kW for the second interval (10 to 60 minutes) and 2878 kW after the first 60 minutes. These load values are within the 2000-hour rating of the diesel. The EDG frequency; however, must be reduced to ensure that the equivalent loads remain below 3000 kW. Otherwise, at maximum voltage and frequency, the E2 load of 2878 kW would be equivalent to 3064 kW and fall within the EDG 200-hour range. The cumulative effect of operating for 10 minutes in the 30-minute rating range and operating in the 200-hour rating range from time 1 hour until the end of the event could adversely impact the EDG's ability to meet it's 7-days design mission time.

The maximum allowed load for the each of the other three EDGs, as specified in calculation PE-0166, is 3000 kW "for each time frame of the postulated accident." The team verified current accident mitigation loading for the E1, E3, and E4 EDGs was below 3000 kW at 4160 V and 60 Hz. Three thousand kW at nominal voltage and frequency is approximately equivalent to 3194 kW at 4400 V and 61.2 Hz. This load remains within the 30-minute rating; however, the team determined prompt load and/or frequency reduction by operators following the initial 10-minute period was necessary to support availability of the affected EDGs for their full design mission time. The team observed placards posted in the control room, in the vicinity of the EDG controls and metering devices, addressing allowed loads as well as kW ratings of major loads. During interviews and procedure walkthroughs, operators demonstrated consistent knowledge of the importance to monitor EDG load and operating parameters to assure that loading is maintained below the specified 3000 kW limits and that the EDGs are available for their post-accident mission time.

Exelon staff previously reviewed the impact of frequency and voltage on EDG loading on several occasions between 2006 and 2012, using their corrective action program. A focused area self-assessment in 2006 (IR 452577) evaluated the maximum frequency affect and incorrectly concluded all four EDGs were capable of performing their design function at the loads permitted by calculation PE-0166. The team noted the evaluation did not address the effect of maximum voltage and the supporting calculation contained a math error that inadvertently removed 3% resistive loads from the E2 EDG loading. In addition, during 2007 (IR498484) engineers improperly addressed E2 EDG loading on the basis that procedure IC-11-00342 required setting the motor operated potentiometer (MOP) at 60 (+/-0.1) Hz. Also, in 2008 (IR 763421), engineers reviewed the diesel frequency issue in conjunction with their review of NRC Information Notice 2008-002, Findings Identified during Component Design Bases Inspections, but incorrectly concluded the issue was not applicable on the basis of IR 498484. Furthermore, an additional evaluation in 2008 (IR 787321) used once again 60 (+/-0.1) Hz to justify the acceptability of loading the E2 EDG up to a maximum of 3100 kW. Lastly, in 2012, in conjunction with their review of Westinghouse WCAP-17308-NP, Treatment of Diesel Generator Technical Specification Frequency and Voltage Tolerances, engineers did not properly evaluate EDG loading on the basis that procedure IC-11-00342 required setting the MOP at 60 (+/-0.1) Hz.

Exelon initiated IR 1638255 on March 24, 2014, to evaluate this issue. The associated engineering technical evaluation confirmed that the current EDG E2 loading was within the EDG design rating and, hence, operable. The maximum allowed E2 EDG loading for the first 10 minutes was also calculated. Engineers initiated corrective action to limit E2 EDG loading to 3052 kW (in lieu of 3100 kW) at nominal voltage and frequency. The licensee believed that adequate controls already existed to ensure that, following the initial 10-minute period, loads would be maintained below the specified 3000 kW. The team reviewed the technical evaluation and determined that Exelon's conclusions were reasonable.

Analysis. The team determined the failure to correctly translate the TS EDG voltage and frequency ranges (4160-4400 V; 58.8-61.2 Hz) into the EDG design loading calculations was a performance deficiency (PD). Specifically, EDG loading calculation PE-0166 permitted the E2 EDG and associated bus to be loaded up to 3100 KW at nominal frequency and voltage. The resulting E2 EDG loading at the TS permitted maximum frequency and voltage values would have exceeded the EDG 30-minute rating limit of 3250 KW and potentially damaged the EDG. The finding was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the emergency diesels to respond to initiating events to prevent undesirable consequences. The team evaluated the finding in accordance with Inspection Manual Chapter (IMC) 0609, Significance Determination Process, Attachment 0609.04, Initial Characterization of Findings, dated June 19, 2012, for the Mitigating Systems Cornerstone, and IMC 0609, Appendix A, The Significance Determination Process (SDP) for Findings At-Power, dated June 19, 2012. The team determined the finding was of very low safety significance because it was a design deficiency confirmed not to result in a loss of EDG operability.

This team assigned a cross-cutting aspect associated with this finding because the long-standing PD continued during the 2012 assessment of Westinghouse WCAP-17308-NP and was reflective of current performance. The team determined this finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because engineers did not thoroughly evaluate the EDG loading issue and ensure the resolution addressed its cause commensurate with their safety significance. Specifically, Exelon relied on invalid assumptions to determine the issue was not applicable, and did not thoroughly evaluate the technical issue addressed in the WCAP. (IMC 0310, Aspect PI.2)

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, Design Control, requires, in part, that measures be established to ensure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, prior to April 4, 2014, the EDG voltage and frequency ranges permitted by the Peach Bottom Technical Specification were not properly translated into the E2 EDG design loading calculations, which resulted in a loss of design margin and allowed operations that exceeded the 30 minute rating limit potentially damaging the EDG. Immediate corrective actions included evaluation of EDG loading for TS maximum voltage and frequency and changing design calculation PE-0166 to reduce the maximum permitted E2 EDG load from 3100 kW to 3052 kW at nominal voltage and frequency. This violation is being treated as a NCV consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the Exelon corrective action program as IR 1638255. **(NCV 05000277(278)/2014007-01, Deficient E2 EDG Loading Calculation Design Control).**

.2.1.2 Unit 2 Residual Heat Removal Loop 'A' Torus Cooling Return Valve (MO-2-10-039A)

a. Inspection Scope

The team inspected the Unit 2 residual heat removal RHR loop 'A' torus cooling return valve, MO-2-10-039A, to verify its ability to meet the design basis requirements in response to transient and accident events, including closing upon a low pressure coolant injection (LPCI) initiation signal in response to loss of coolant accident (LOCA) conditions, and opening for the suppression pool cooling and spray functions of the RHR system. The team reviewed design calculations, including required thrust calculations and actuator capability calculations, to verify design basis assumptions were appropriately translated into these documents, and to verify that adequate design margin existed. Additionally, the team reviewed selected design inputs into the "set-up window" and results of the motor-operated valve MOV periodic verification testing, to verify that differences between test conditions and design basis conditions, as well as test uncertainty and control switch repeatability, was accounted for when determining required switch settings. The team reviewed degraded voltage conditions and voltage drop calculations to confirm that the MOV and control components would have sufficient voltage and power available to perform its safety function at worst case degraded voltage conditions. The team also reviewed the valve control wiring diagram to ensure the valve would function as designed under the most limiting design basis conditions. The team reviewed the maintenance and functional history of the MO-2-10-039A valve by sampling corrective action reports, the system health report, system operating and abnormal procedures, and surveillance test (ST) procedures and results. The team also conducted a detailed walkdown to visually inspect the physical/material condition of the valve and actuator and to verify the installed configuration was consistent with design inputs.

b. Findings

Introduction. The team identified a Green non-cited violation (NCV) of Title 10 *Code of Federal Regulations* (CFR) 50, Appendix B, Criterion III, Design Control, associated with Exelon's failure to correctly verify the capability of alternating current (AC) MOVs at a degraded voltage corresponding to the lowest voltage allowed by plant Technical Specification setpoints for the degraded grid voltage relays (DGVRs).

Description. Degraded grid voltage relays monitor safety-related 4160 V electrical buses for unacceptably low voltage levels. The DGVRs swap the electrical bus from offsite power to being supplied by the onsite EDGs if bus voltage degrades below the dropout voltage setpoint for a time period in excess of the time delay setpoint. The time delay relay will reset if voltage from offsite power increases above the 'reset' voltage value, thus maintaining the supply of electrical power from offsite power, which is the preferred source. The AC MOVs at Peach Bottom receive power from 480V motor control centers, which receive their electrical supply from the 4160V buses. The 4160 V buses are monitored by the DGVRs required by Technical Specification (TS) 3.3.8.1, Loss of Power Instrumentation.

On November 10, 2010, the NRC issued Peach Bottom Units 2 and 3, inspection report 2010004, which contained a Green NCV of 10 CFR 50, Appendix B, Criterion III, for failure to use voltage levels provided by the DGVR setpoints to determine the operability of safety-related components. Prior to issuance of the NCV, the station credited nonsafety-related load tap changers, which resulted in assuming a higher voltage was available to safety-related equipment than would be available at the DGVR setpoints. Alternating current powered motors, such as those used in MOVs, develop more output torque at higher voltages. Therefore, it was non-conservative to credit non-safety-related load tap changers and the resultant higher voltage, when determining an MOV's ability to perform its safety-related functions.

Following receipt of the NCV in NRC Inspection Report 2010004, Exelon performed operability evaluations during 2011 of 480V AC MOVs at voltages corresponding to the reset voltage of the DGVRs. Engineers incorrectly considered the 480V bus voltage at the DGVR 'reset' voltage of 3856V to be the lowest voltage at which AC MOVs were required to be evaluated when determining MOV actuator output torques. However, Peach Bottom TS 3.3.8.1, relay dropout setpoints were lower than the reset voltages Exelon assumed in design basis capability calculations.

The team determined that Exelon was required to evaluate the 480 V MOVs at a 480 V bus voltage corresponding to 4160V bus voltage of 3737V, which is the lowest voltage the bus could experience, when accounting for in-field setpoint calibration acceptance criteria, relay drift, potential transformer accuracy, and relay and test equipment accuracy. The team noted that 3737V is the actual bus voltage that corresponds to the dropout setpoint value of 3766V in TS Table 3.3.8.1-1, Loss of Power Instrumentation. The team also noted that prior to this inspection, the licensee did not consider that the AC MOVs were required to be evaluated at a voltage corresponding to the 3737V value. However, engineers had used this value as an input in the majority of their MOV program AC MOV calculations for what they believed was analytical margin.

Following the team's identification of the non-conservative voltage assumption, engineers initiated IR 1642720 and determined that 9 out of the 130 AC powered MOV program valves required further evaluation. Exelon performed an operability evaluation of the affected MOVs, assuming the appropriate voltage, and determined that, although significant design margin was lost, all MOVs remained operable. The team reviewed the Exelon's determination and found it to be adequate.

Analysis. The team determined that the licensee's failure to correctly verify the capability of AC MOVs to perform the intended safety function at a degraded voltage corresponding to the lowest voltage allowed by plant technical specification setpoints for the DGVRs was a performance deficiency. The finding was more than minor because the finding was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring the capability of the 480V AC MOVs to respond to initiating events to prevent undesirable consequences. Specifically, the licensee did not assume worst case licensing basis voltages that could be experienced on the safety-related electrical buses, as an input into MOV capability calculations, and when the appropriate voltage was assumed in calculations, significant design margin was lost. The team determined the finding was of very low safety significance (Green) because it was a design deficiency confirmed not to result in a loss of operability.

The team assigned a cross-cutting aspect associated with this finding, because the deficient AC MOV operability evaluations were completed in November 2011 and were reflective of current performance. The finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because Exelon did not thoroughly evaluate the issue addressed in the NCV contained in NRC Inspection Report 2010004, such that, the resolution addressed causes and extent of conditions commensurate with their safety significance. Specifically, the affected MOVs were not evaluated at the required voltage in operability evaluations that were performed following receipt of a non-cited violation, NCV 05000277,278/2010004-03. (PI.2)

Enforcement. Appendix B of 10 CFR 50, Criterion III, Design Control, requires, in part, that design control measures shall provide for verifying or checking the adequacy of design. Additionally, measures shall be established to assure that applicable regulatory requirements and the design basis, are correctly translated into specifications, procedures, and instructions. Contrary to the above, from November 10, 2010, to April 3, 2014, the limiting degraded grid voltage was not correctly translated into MOV design calculations. Exelon did not verify the adequacy of the design of certain 480V AC MOVs at a voltage level that could be experienced by the MOVs as allowed by TS, which resulted in a loss of design margin. Specifically, following modifications to the PB DGV protection in 2010 - 2011, engineers applied a value of 3856 volts to MOV calculations instead of the correct design basis value of 3737 volts. Immediate corrective actions included evaluation of nine affected AC MOVs at the proper voltage to verify component operability. This violation is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the Exelon corrective action program as IR 1642720. **(NCV 05000277/2014007-02; 05000278/2014007-02, Non-Conservative Voltage Assumption Used to Verify MOV Capability)**

.2.1.3 Unit 2 'C' Residual Heat Removal Pump Suppression Pool Suction Valve (MO-2-10-013C)

a. Inspection Scope

The team inspected the Unit 2 "C" RHR pump suppression pool suction valve, MO-2-10-13C, to verify its ability to meet the design basis requirements in response to transient and accident events, including closing upon a manual demand to isolate its associated RHR pump, and remaining open for the safety functions of the RHR system. The team reviewed design calculations, including required thrust calculations and actuator capability calculations, to verify design basis assumptions were appropriately translated into these documents, and to verify adequate design margin existed. Additionally, the team reviewed selected design inputs into the "set-up window" and results of the MOV periodic verification testing, to verify that differences between test conditions and design basis conditions, as well as test uncertainty and control switch repeatability, were accounted for when determining required switch settings. The team reviewed degraded voltage conditions and voltage drop calculations to confirm that the MOV and control components would have sufficient voltage and power available to perform its safety function at worst case degraded voltage conditions. In addition, the team reviewed the valve control wiring diagram to ensure that the valve would function as designed under the most limiting design basis conditions. The team reviewed the maintenance and functional history of the MO-2-10-013C valve by sampling corrective action reports, the system health report, system operating and abnormal procedures, and ST procedures and results. The team also conducted a detailed walkdown to visually inspect the physical/material condition of the valve and actuator and to verify the installed configuration was consistent with design inputs.

b. Findings

No findings were identified.

.2.1.4 Unit 3 Residual Heat Removal Loop 'A' Testable Check Valve (AO-3-10-046A)

a. Inspection Scope

The team inspected the Unit 3 RHR Loop 'A' Testable Check Valve, AO-3-10-046A, to verify its ability to meet its design basis requirements in response to transient and accident events, including opening to provide adequate low pressure coolant injection flow to the reactor vessel and closing to isolate its penetration when containment isolation is required. The team reviewed testing that was performed on the valve to verify the testing adequately demonstrated that the valve was capable of opening and providing required flow during design basis events. The team verified that inservice testing was being performed to exercise the valve, verify leakage met requirements, and to verify position indication in accordance with the licensee's American Society of Mechanical Engineers (ASME) Operations and Maintenance (OM) Code of record.

Additionally, the team reviewed local leak rate testing of the valve to verify the testing and results met the requirements of 10 CFR 50, Appendix J, Option B, as well as TS requirements for containment operability. The team evaluated the maintenance and functional history of the AO-3-10-046A valve, by reviewing a sample of corrective action reports and the system health report. The Maintenance Rule status and performance criteria were reviewed to verify that the licensee was adequately evaluating system and component performance and appropriately characterizing the system status as (a)(1) or (a)(2).

b. Findings

No findings were identified.

.2.1.5 Unit 2 Core Spray Loop 'A' Full-Flow Test Isolation Valve (MO-2-14-026A)

a. Inspection Scope

The Unit 2 "A" and "C" core spray (CS) pumps combined full flow test isolation valve (MO-2-14-026A) returns pump discharge to the suppression chamber. Full flow testing is performed periodically to verify pump operability. The team reviewed this valve to verify its ability to operate if called upon in the event of an emergency. MO-2-14-026A is an MOV, capable of being remotely operated from the control room and locally (torus room) with a manual hand-wheel. The valve receives a closure signal in the event of an automatic CS system initiation (low reactor water level or high drywell pressure) to prevent the diversion of flow back to the suppression chamber. The team reviewed design basis documents, maintenance history, design changes, drawings, and associated surveillance testing for the valve to ensure it was capable of performing intended safety functions. The team also interviewed the system engineer and walked down associated equipment to assess the material condition of the valve, related piping, and associated pipe support structures. The team also reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the valve and to assess Exelon's capability to evaluate and correct past problems with the valve.

b. Findings

No findings were identified.

.2.1.6 Unit 2 Containment Atmosphere Control System Torus and Suppression Chamber Isolation Valves (AO-2-07B-2506 and AO-2-07B-2511)

a. Inspection Scope

AO-2-07B-2506 is the drywell to Standby Gas Treatment System (SGTS) ventilation piping inboard isolation valve; and AO-2-07B-2511 is the suppression chamber (torus) to SGTS ventilation piping inboard isolation valve. These valves are remote manual air-operated 18-inch T-Ring butterfly valves. The T-Ring feature is a circumferential boot seal that pressurizes when the valve is in the closed position to insure an air-tight seal between the valve seat and disc. The team reviewed design basis documents, maintenance history, design changes, drawings, and associated surveillance testing for these valves to ensure they were capable of performing their intended safety functions. The team also interviewed the system engineer and walked down associated equipment to assess the material condition of the valves, related piping, and associated pipe support structures. The team also reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with these valves and to assess Exelon's capability to evaluate and correct past problems with these valves.

b. Findings

No findings were identified.

.2.1.7 Reactor Core Isolation Cooling System Injection Valve (MO-2-13-21)

a. Inspection Scope

The team inspected the Reactor Core Isolation Cooling (RCIC) motor-operated injection valve MOV MO-2-13-21 to verify its ability to meet the design basis requirements in response to transient and accident events. The team reviewed the valve operator design and maintenance settings to ensure that sufficient force would be provided to open and close the valve under actual design accident flow and pressure conditions. The team verified that instrument setpoints were properly translated into valve operator settings, and reviewed completed tests intended to demonstrate component operability. The team reviewed drawings, component calculations, and system calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of valve MO-2-13-21 by reviewing corrective action reports, the RCIC system health report, and the MOV Program Health Report. The team also reviewed operating procedures, and ST procedures and results to verify proper operation of the valve. The team reviewed the RCIC Design Basis Document (DBD) to determine the required stroke time for the MO-2-13-21 valve. The team also conducted a limited walkdown of accessible areas to visually inspect the physical/material condition of the valve and its support systems.

b. Findings

No findings were identified.

.2.1.8 ‘C’ Safety Relief Valve Automatic Depressurization System (ADS) Valve (RV-3-02-071C)

a. Inspection Scope

The team inspected the ‘C’ Safety Relief Valve (ADS valve) (RV-3-02-071C) to verify its ability to meet the design basis requirements in response to transient and accident events. The team reviewed the Safety Relief Valve system DBD, the ADS DBD, and the Nuclear Boiler System DBD to verify the design parameters for the correct operation of the 'C' Safety Relief Valve (ADS valve) (RV-3-02-071C).

The team evaluated the valve's relief setpoint and vendor calibration certification for the last time the valve was changed and replaced with a refurbished safety relief valve. The team reviewed the design calculations to ensure that sufficient valve capacity would be provided to reduce reactor coolant system (RCS) pressure in response to accident conditions and/or to operator initiated actions to reduce RCS pressure under design basis conditions. The team verified that instrument setpoints were properly translated into system procedures and surveillance tests, and reviewed completed surveillance tests which are periodically conducted to demonstrate component operability.

The team reviewed drawings, and component calculations to verify that calculation inputs and assumptions were accurate and justified. The team reviewed the maintenance and functional history of the RV-3-02-071C valve by sampling corrective action reports, the system health report, operating procedures, and ST procedures and results.

b. Findings

No findings were identified.

.2.1.9 Unit 3 'C' Reactor Heat Removal (RHR) Heat Exchanger

a. Inspection Scope

The team performed a walkdown of the area surrounding the Unit 3 'C' RHR heat exchanger to evaluate the general material condition and the operating environment of the heat exchanger. The team reviewed recent system health reports and a sample of issue reports (IR) to understand any reported non-conformances with this heat exchanger.

The RHR heat exchangers (8) are vertical, once through heat exchangers with floating-head shell cover assemblies. The team verified that these heat exchangers are eddy current tested every 4 years and visually inspected during the years when eddy current testing is not scheduled. The team reviewed inspection results to verify that these inspections have been successful in ensuring tube cleanliness and tube structural integrity, with the percentage of plugged tubes ranging from 0.2% to 1.4%.

The team verified that Exelon conducts periodic performance testing on each heat exchanger to ensure that the design basis heat load is capable of being removed by the heat exchangers. The team reviewed the last three completed performance tests to verify that the Unit 3 'C' RHR HX was capable of removing the design basis heat loads as required.

b. Findings

No findings were identified.

.2.1.10 Unit 3 'C' Core Spray Pump (3CP037)

a. Inspection Scope

The team inspected the Unit 3 'C' core spray pump to verify that it was capable of meeting its design bases requirements to provide cooling water to the reactor vessel under postulated accident conditions. Design and licensing documents, including the UFSAR, Technical Specifications and the Design Bases Documents were reviewed to identify quantitative pump performance requirements. Further, design calculations evaluating system hydraulic resistance, coupled with reactor pressure, pump run-out and net positive suction head (NPSH) were also inspected to ensure acceptable pump performance under design basis accident (DBA) conditions. Portions of the documentation for the recent "IN-VESSEL" core spray piping modification (ECR PB 10-00279), were also reviewed to assess potential impact on hydraulic pump performance.

The inservice testing (IST) results, including quarterly and comprehensive tests were reviewed, both to address potential pump degradation, and also to evaluate potential weaknesses regarding NRC Information Notice (IN) 97-90, Use of Non-Conservative Acceptance Criteria in Safety-Related Pump Surveillance Tests. The team met with the Core Spray system engineer manager to discuss and assess overall pump health; topics included the core spray system health report, issue reports, and the PBAPS method used to ensure adequate pump minimum flow (NRC Bulletin 88-04 had identified concerns regarding minimum flow line sizing). Finally, the team reviewed degraded voltage conditions and voltage drop calculations to confirm that the pump motor would have sufficient voltage and power available to perform its safety function at worst case degraded voltage conditions. In addition, the team performed a review of the short circuit calculation and breaker design to confirm its capability to carry maximum calculated load and withstand maximum calculated faults, without damage. The review included an evaluation of protective device coordination to confirm that the pump motor and cables were adequately protected without interruption of service to other components during overload or faulted conditions.

b. Findings

No findings were identified.

.2.1.11 Unit 3 RCIC Pump (30P36)

a. Inspection Scope

The team inspected the Unit 3 RCIC pump to verify it was capable of meeting its design bases requirements to provide cooling water to the reactor vessel under postulated DBAs. Licensing and design documents, including the UFSAR, Technical Specifications and the Design Bases Documents were reviewed to identify quantitative pump performance requirements. Further, design calculations evaluating system hydraulic resistance, coupled with reactor pressure, pump run-out and NPSH were also inspected to ensure acceptable pump performance under DBA conditions. The system engineer manager was interviewed with focus on the overall condition of the pump; topics included system health reports, issue reports, and a field walkdown of the pump.

Concerns identified in NRC documents, Bulletin 88-04 and IN 97-90 were also inspected to verify adequate licensee evaluation of the related industry issues. The team reviewed IST test results to ensure that the test documentation verified acceptable pump performance, including potential pump degradation and required pump performance. The pump test instrumentation was inspected, including the specifications of the RCIC flow element (FE), associated differential pressure transmitter, square root extractor, and overall flow loop specifications to ensure that the resultant flow indications were acceptable to evaluate pump performance.

b. Findings

No findings were identified.

.2.1.12 Unit 3 'C' High Pressure Service Water Pump (3CP042)

a. Inspection Scope

The team inspected the Unit 3 'C' High Pressure Service Water (HPSW) pump to verify that it was capable of meeting its design bases requirements to provide RHR heat exchanger cooling water under postulated transient and design bases accidents. Licensing and design documents, including the UFSAR, Technical Specifications and the Design Bases Documents were reviewed to identify quantitative pump performance requirements. The IST procedures and completed test results, including quarterly and comprehensive tests were reviewed, both to address potential pump degradation, and also to evaluate required hydraulic performance requirements. HPSW pump 3CP042 had exhibited a declining flow performance trend; the licensee had reviewed the data, and identified that the trend was not due to pump performance, but instead, due to degradation of the FE used in the pump testing. The team reviewed portions of the FE replacement documentation to verify that the appropriate replacement element was installed. The FE specifications and associated flow loop instrumentation were inspected to verify loop scaling was consistent with design. The team discussed overall pump health with the system engineer manager and performed in-plant walkdowns of the pump installation. Finally, system health reports were reviewed, in addition to HPSW condition reports to determine if there were any additional adverse trends associated with the pump and to assess Exelon's capability to evaluate and correct past problems with the pump.

b. Findings

No findings were identified.

.2.1.13 125VDC Station Battery (2AD001)

a. Inspection Scope

The team reviewed the design, testing, and operation of the 2A 125 volt direct current (DC) station battery to verify that it was capable of meeting its design function of providing a reliable source of DC power to connected loads under operating, transient, and accident conditions. The team reviewed design calculations to assess the adequacy of the battery's sizing to ensure it could power the required equipment for a sufficient duration, and at a voltage above the minimum required for equipment operation. The team reviewed battery room temperature monitoring to verify that environmental conditions would not adversely affect the life of the battery and that the battery would be capable of performing its intended safety function late in life during normal and postulated accident conditions. The team reviewed battery test results, including discharge tests, to ensure the testing was in accordance with design calculations, plant Technical Specifications, vendor recommendations, and industry standards; and that the results confirmed acceptable performance of the battery. Design and system engineers were interviewed regarding the design, operation, testing, and maintenance of the battery. The team performed a walkdown of the 2AD001 station battery and associated distribution panels to assess the material condition of the equipment. Finally, a sample of issue reports was reviewed to ensure Exelon was identifying and properly correcting issues associated with the 2AD001 station battery.

b. Findings

No findings were identified.

.2.1.14 125VDC Station Battery Charger (2AD003)

a. Inspection Scope

The team reviewed the design, testing, and operation of the 2AD003 station battery charger to verify that it was capable of meeting its design function of providing a reliable source of DC power to connected loads under operating, transient, and accident conditions. The safety-related chargers are full wave, silicon controlled rectifiers that provide power for all DC control functions. The chargers supply all steady state normal DC power and maintain the associated safety-related station batteries fully charged.

The team reviewed design calculations to assess the adequacy of the battery charger. The team reviewed charger room temperature monitoring to verify that environmental conditions would not adversely affect the capable of performing its intended safety function during normal and postulated accident conditions. The team also reviewed battery charger capability test results to verify testing was in accordance with design calculations and chargers were capable of supplying rated capacity for its required time per the requirements in plant technical specifications. Design and system engineers were interviewed regarding the design, operation, testing, and maintenance of the charger. The team performed a walkdown of the 2AD003 station battery charger and associated distribution panels to assess the material condition of the equipment. Finally, a sample of issue reports was reviewed to verify Exelon was identifying and properly correcting issues associated with the 2AD003 battery charger.

b. Findings

No findings were identified.

.2.1.15 4KV E12 Emergency Auxiliary Switchgear (20A15)

a. Inspection Scope

The team inspected the 4 kilovolt (kV) E12 switchgear bus to verify that it was capable of meeting its design basis requirements. The bus provides preferred power to safety-related loads, including RHR pump 2AP35, CS pump 2AP37, HPSW pump 2AP42, and the E124 emergency auxiliary load center 20B10. The team reviewed load flow and short circuit current calculations for maximum load, momentary and interrupting duty, and bus bracing requirements to ensure conformance with the design basis. The team confirmed the use of maximum switchyard voltage for short circuit calculations and reviewed vendor equipment data for adequate margin in breaker momentary and interrupting duty.

The team also reviewed overcurrent relay settings and circuit protection coordination studies to confirm that loads were adequately protected without interruption of service to other loads under overload or faulted conditions. The team reviewed voltage drop calculations and degraded grid voltage relay settings to confirm that adequate voltage was available at the supplied safety-related loads under maximum and minimum grid voltage conditions. The team also reviewed logic and wiring diagrams to confirm that the supply breakers operated in conformance with the design basis requirements. The team reviewed maintenance schedules for switchgear and breakers, maintenance history, system health report, a sample of issue reports, and applicable operability evaluations to verify that equipment was adequately maintained and failures were addressed properly and in a timely manner. The team also reviewed testing procedures and the results of recent tests to confirm the reliability of the equipment. Finally, the team performed a visual inspection of the equipment to assess its installation, material condition, configuration, and vulnerability to hazards.

b. Findings

No findings were identified.

.2.1.16 E324 Emergency Auxiliary 480V Load Center (20B012)

a. Inspection Scope

The team reviewed short circuit calculations and bus/breaker design associated with the E324 emergency auxiliary load center to verify capability of components to carry maximum calculated loads and to withstand maximum calculated faults without damage.

The review included an evaluation of protective device coordination to verify adequate protection of loads and without interruption of service to other components. The team reviewed the voltage drop calculation to verify adequate voltage was available at the bus and safety-related loads under degraded grid voltage conditions. The team also reviewed control wiring diagrams to verify that control of the supply breaker conformed to the design requirements. The team reviewed the load center health report, maintenance history, issue reports, and applicable operability evaluations to verify that equipment was adequately maintained and failures were addressed properly in a timely manner. Finally, the team performed a visual inspection of the load center to assess its installation, material condition, configuration, and vulnerability to hazards.

b. Findings

No findings were identified.

2.1.17 High Pressure Service Water Pump Motor (3CP042-DR)

a. Inspection Scope

The team reviewed the UFSAR and the system design basis document to evaluate the design requirements of the 3CP042-DR HPSW pump and motor. The team reviewed pump curves and verified that the appropriated parameters had been entered in the design calculations. The review addressed available short circuit current versus breaker interrupting capability and included an evaluation of the breaker protective relay settings and breaker coordination study to verify adequate protection of the pump motor without interruption of service to other components during circuit overload or faulted conditions. The team also reviewed the load analysis and voltage drop calculation to confirm that adequate voltage was available at the HPSW motor terminals under degraded grid voltage conditions. Additionally, the team reviewed control logic and wiring diagrams as well as the available control voltage to verify that the control of HPSW motor supply breaker conformed to the design requirements. The team reviewed the system health report and selected issue reports to verify the motor and associated electrical components were adequately maintained and failures were addressed properly in a timely manner. Finally, the team reviewed test procedures and results of recent tests to evaluate the current health of the pump motor and circuit.

b. Findings

No findings were identified.

.2.2 Review of Industry Operating Experience and Generic Issues (6 samples)

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

.2.2.1 NRC Information Notice 2013-14, Potential Design Deficiency in Motor-Operated Valve Control Circuitry

a. Inspection Scope

The team evaluated Exelon's review and disposition of NRC Information Notice (IN) 2013-14. The NRC issued the IN to alert licensees to a potential control circuit design deficiency in motor-operated valves that could result in incorrect valve position indication with the valve in an improper position during a loss of coolant accident. The team reviewed Exelon's evaluation of design basis events and corresponding electrical plant response to the events described in the IN to determine the applicability of the information in the IN. The team also reviewed the expected plant response to a beyond design basis event to determine the extent to which PBAPS was susceptible to the issues stated in the IN.

b. Findings

No findings were identified.

.2.2.2 NRC Information Notice 97-90, Use of Non-Conservative Acceptance Criteria in Safety-Related Pump Surveillance Tests

a. Inspection Scope

The team evaluated Exelon's applicability review and disposition of NRC IN 97-90. The NRC issued the IN to alert licensees to issues relating to testing of safety-related pumps, where, although the IST requirements may have been satisfied, the testing was performed at conditions less restrictive than those required by actual design basis performance requirements. The team reviewed IR 1127102, which documented the licensee's evaluation of this IN. The team verified that the design performance requirements, specifically flow and associated developed pump head, were shown to be satisfied by the testing in place at that time. The team inspected the current instrumentation used to verify pump performance, including flow, suction and discharge pressure loops, and associated accuracies to verify that the concerns of IN 97-90 were still being satisfied.

b. Findings

No findings were identified.

.2.2.3 NRC Information Notice 2012-11, Age Related Capacitor Degradation

a. Inspection Scope

The team evaluated Exelon's applicability and disposition of NRC IN 2012-11. The NRC issued the IN to alert licensees to recent problems involving age-related degradation of capacitors that have been in use beyond the vendor recommended service life. The team identified that Exelon entered IN 2012-11 into the Corrective Action Program (CAP) on 9/18/2012 (IR 1393021) and reviewed the associated actions taken by Exelon to address this issue. The team reviewed the station Performance Centered Maintenance (PCM) templates for the associated capacitors and affected power supplies that have specified shelf and service life applications. The team verified that vendor service life recommendations for electrolytic capacitors and selected power supplies were being adhered to and that these components were being replaced or refurbished on a five to ten years schedule, dependent upon the in-service conditions. The team sampled selected components in the station "Self-Life Program," (Exelon Nuclear Engineering standard PES-S-002) and PCM templates to verify replacement capacitors and associated power supply components were being stored for no more than the vendor specified shelf-life and that in-service components were being replaced in accordance with specified preventive maintenance intervals, consistent with vendor recommendations.

b. Findings

No findings were identified.

.2.2.4 NRC Information Notice 2011-01, Commercial Grade Dedication Issues

a. Inspection Scope

The team evaluated Exelon's applicability review and disposition of NRC IN 2001-11, Commercial Grade Dedication Issues identified during NRC inspections. To address the concerns of the Information Notice, Exelon issued IR 1177993 to perform a formal evaluation of Peach Bottom Commercial Grade Dedication practices. Exelon's evaluation was led by corporate personnel who developed a pilot procedure addressing several points from the Information Notice. The team reviewed Exelon's plans to use the pilot procedure at several plants for approximately three months, following the pilot implementation, plans to incorporate feedback and revise the procedure for Exelon's fleet-wide use.

The team discussed the IN with the Peach Bottom Acquisition Manager and reviewed the existing Exelon commercial dedication procedures. The team reviewed a sample of five Commercial grade dedication plan evaluations for specific components used at

Peach Bottom to ensure that these examples were well-documented, evaluated specific component attributes, when necessary, and provided sufficient information to judge equivalency of the dedicated parts for the intended purposes of the dedication. The team also reviewed the Exelon Root Cause Determination used to determine the cause of a vendor delivering substandard piping to Peach Bottom during the September 2013 refueling outage to verify that Exelon quarantined the piping during receipt inspection and later completed a re-audit of the vendor.

b. Findings

No findings were identified.

.2.2.5 NRC Information Notice 2012-03, Design Vulnerability in Electric Power System

a. Inspection Scope

The team evaluated Exelon's applicability review and disposition of NRC IN 2012-03. The NRC issued the IN to inform licensees of recent operating experience involving the loss of one of the three phases of the offsite power circuit and alert them of potential design vulnerabilities in the voltage monitoring and protection scheme for the 4.16 kV safety-related buses. The issue also resulted in the NRC issuing Bulletin 2012-01, Design Vulnerability in Electric Power System, to request information about the facilities' electric power system design; determine if further regulatory action was warranted; and request comprehensive verification of their compliance with regulatory requirements.

The team reviewed Exelon's evaluation of the IN and NRC Bulletin; confirmed the applicability of the IN to Peach Bottom; verified that Exelon had responded to the NRC Bulletin; and that plans were in place and ongoing to revise the voltage monitoring and protection scheme to correct the design vulnerabilities identified in the NRC communication.

b. Findings

No findings were identified.

.2.2.6 NRC Information Notice 2013-05, Battery Expected Life and Its Potential Impact on Surveillance Requirements

a. Inspection Scope

The team evaluated Exelon's applicability review and disposition of NRC IN 2013-05. The IN was issued to inform licensees about recent issues involving licensees' non-conservative TSs regarding surveillance requirements for direct current power systems due to reductions in battery expected life. The principle causes for the issue were improper sizing of station batteries and inadequate design control resulting in an increase in battery design loads or a decrease in rated battery capacity that would result in a reduced expected life of the batteries. The team evaluated the adequacy of

Exelon's evaluation of the IN by reviewing selected IRs, results of periodic battery performance tests, service tests and regular scheduled surveillance tests, preventive maintenance procedures and templates, vendor recommended maintenance schedules, shelf life control procedures, and by conducting interviews with engineering personnel.

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 identified and entered into their corrective action program. The team reviewed these issues to evaluate whether Exelon had an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, corrective action documents written on issues identified during the inspection were reviewed to evaluate adequate problem identification and incorporation of the problem into the corrective action program. The corrective action documents that were sampled and reviewed by the team are listed in the attachment.

b. Findings

No findings were identified.

4OA6 Meetings, including Exit

On April 4, 2014, the team presented the inspection results to Mr. Mike Massaro, Site Vice President, and other members of the Exelon staff. The team verified that none of the information in this report is proprietary.

Attachment: Supplemental Information

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
C. Dye, Emergency Service Water/High Pressure Service Water System Manager
C. Reynolds, Motor Operated Valve Program Manager
D. Dullum, Senior Regulatory Affairs Engineer
D. Henry, Senior Manager, Design Engineering
D. Sears, Electrical Design Engineer
D. Turek, Shift Operations Superintendent
J. Chizever, Manager, Mechanical Design Engineering
J. Laverde, Mechanical Design Engineer
J. Mlodzinski, Electrical Design Engineer
J. Moore, Assistant Outage Manager
L. Nace, High Pressure Coolant Injection/Reactor Core Isolation Cooling System Manager
M. Herr, Director, Operations
M. Lefever, Core Spray System Manager
M. Long, Senior Manager, Plant Systems Engineering
M. Massaro, Site Vice President
P. Navin, Plant Manager
R. Binz, Inservice Testing/ Appendix J Program Manager
R. Brightup, Air Operated Valve Program Manager
R. Lack, Main Steam/Automatic Depressurization System Manager
R. Stipcevich, Exelon Procurement Manager
S. Belitsky, Director (Acting), Maintenance
T. Moore, Director, Engineering
W. Ford, Residual Heat Removal System Manager

NRC Personnel
B. Smith, Resident Inspector
M. Fannon, Reactor Engineer
S. Hansell, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000277(278)/2014007-01	NCV	Deficient E2 EDG Loading Calculation Design Control (Section 1R21.2.1.1)
05000277(278)/2014007-01	NCV	Non-Conservative Voltage Assumption Used to Verify MOV Capability (Section 1R21.2.1.2)

Audits and Self-Assessments

LS-AA-126-1005, Attachment 1, Peach Bottom Emergency Diesel Generator Equipment Reliability Check-in Assessment, 3/23/12

Calculations

18247-E-015, Diesel Generator System Load Tabulation & Voltage Calculations, Revision 2
EE-0007, 10 CFR 50, Appendix R Electrical Coordination Study, Revision 8
EE-1407-2, Determination of Full Load Current on the Diesel Generators, Revision 0
M-001, Maximum Torus temperatures Allowed (Assuming No Torus Back Pressure) for the ECCS Systems, Revision 7
M-035, Condensate Storage Tank – Minimum Water Level to Prevent Vortex Formation, Revision 1
ME-003, RHR Heat Exchanger Inlet Pressures For All Modes of RHR/HPSW Operation, Revision 1A
ME-299, Calculate the Pressure Drop in psi Between the RCIC Pump Discharge and the RPV for a Flow Rate of 600 gpm, Revision 0
ME-695, WS 15 (U3), NPSH Limits for HPCI and RCIC, Revision 1
MO-2-10-013C, MO-2-10-013C (PBAPS-2) AC Motor Operated GL 96-05 Gate Valve, Revision 5
MO-2-10-039A, MO-2-10-039A (PBAPS-2) AC Motor Operated GL 96-05 Gate Valve, Revision 4
OTC-77, Operating Thrust Calculations, Revision 0
OTC-92, Operating Thrust Calculations, Revision 0
P-S-01A, 125/250 VDC and 24/48 VDC System, Revision 14
P-S-01B, Miscellaneous DC Systems, Revision 2
PE-0048, AC MCC Control Circuit Evaluation, Revision 7
PE-085, Calculation Extending Qualified Life of Agastat Relays Models GP, EGP, TR, and ETR, Revision 1
PE-0088, Medium Voltage Switchgear Protective Devices Set Points, Revision 8
PE-0121, Voltage Regulation Study, Revisions 9 and 9A
PE-122, Verification of Calculated Auxiliary Distribution System Voltage by Test (013189), NRC BTP PSB-1, Revision 1
PE-123, Diesel Generator Loading Profiles ad System Voltage Regulation Study, Revision 1
PE-0166, Emergency Diesel Generator Loading for Cases Defined by 8.5.2C/L, Revision 10
PE-0182, Perform 125V DC Voltage Analysis, Revision 14B
PE-0192, AC System Fault Calculation, Revision 3
PE-0194, Coordination for 4kV 1E Switchgear, Rev 4
PE-0205, Load Study for the Station Auxiliary System (PBAPS), Revision 7
PE-0225, Degraded Grid Relays Setpoints, Revisions 0 and 0A
PE-249, Calculation to Address Post DBA Operability and Qualified Life of Agastat Relays EGP/ETR, Revision 1
PM-620, Determine the Upstream and Downstream Line Pressures for MOV's Within the Scope of GL 89-10, and to Summarize the Total Differential Pressure Analysis of MOV's Performed in Response to GL 89-10, Revisions 5 and 6

PM-727, Emergency Switchgear & Battery Room Maximum Temperature with Loss of Instrument Air, Revision 0
PM-785, Power Rerate Evaluation- LOCA/High Energy Line Break Analysis, Revision 6
PM-859, GL 89-10 MOVs Elevated Motor Ambient Temperature Source Document, Revision 1
PM-1011, Core Spray Pump NPSH, Revision 7
PM-1012, Analysis of Core Spray T-Box, Revision 0
PS-0028, Design Cart to Transport and Support Temporary Batteries, Revision 2

<u>Condition Reports and Corrective Action Notifications</u>

A0007150	1586811	1600820
A0839669	1589007	1612266
A1073445	1598039	1624979
A1395932	1630173	1593647
A1864563	1833347	1440479
A1877780	0452577	1422221
A1905236	0498484	1136993
A1927816	0551313	1558996
A1928055	0581933	1478866
0137938	0624871	1136993
0381023	0757804	1138029
0675495	0787321	1139358
0896894	1119440	1508500
0899886	1184771	1462082
0965732	1280984	1413724
1073844	1291830	1492090
1119440	1322414	1130109
1127102	1323885	1096662
1144389	1325376	1119440
1174102	1333997	1606440
1263007	1335427	1393021
1266604	1361901	1642720
1331025	1381435	1632469*
1387178	1387178	1632495*
1441117	1392865	1632556*
1542564	1426934	1635618*
1553707	1433732	1636284*
1553938	1479328	1636317*
1557104	1548319	1636920*
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LIST OF ACRONYMS

A	Amps
AC	Alternating Current
ADAMS	Document Management System
ADS	Automatic Depressurization System
CAP	Corrective Action Program
CCW	Component Cooling Water
CDBI	Component Design Bases Inspection
CFR	Code of Federal Regulations
CR	Condition Report
CS	Core Spray
CST	Condensate Storage Tank
DBA	Design Basis Accident
DBD	Design Basis Document
DC	Direct Current
DC	Direct Current
DGVR	Degraded Grid Voltage Relay
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
FE	Flow Element
FP	Fire Protection
GL	Generic Letter
HELB	High Energy Line Break
HPSW	High Pressure Service Water
Hz	Hertz
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure
IPEEE	Independent Plant External Events Examination
IR	Issue Report
IST	In-service Testing
kV	Kilovolt
kW	Kilowatt
LERF	Large Early Release Fraction
LOCA	Loss-of-Coolant Accident
LPCI	Low Pressure Coolant Injection
MOV	Motor Operated Valve
NCV	Non-Cited Violation
NPSH	Net Positive Suction Head
NRC	U. S. Nuclear Regulatory Commission
OE	Operating Experience
OM	Operations and Maintenance
PBAPS	Peach Bottom Atomic Power Station
PCM	Performance Centered Maintenance
PD	Performance Deficiency
PM	Preventative Maintenance
PRA	Probabilistic Risk Assessment

RAW	Risk Achievement Worth
RCIC	Reactor Core Isolation Cooling
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RRW	Risk Reduction Worth
SDP	Significance Determination Process
SER	Safety Evaluation Report
SGTS	Standby Gas Treatment System
SI	Safety Injection
SPAR	Standardized Plant Analysis Risk
SRA	Senior Reactor Analyst
SSC	Structures, Systems, and Components
SSE	Safe Shutdown Earthquake
ST	Surveillance Test
SW	Service Water
TDH	Total Developed Head
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
V	Volt
Vac	Volts, Alternating Current
Vdc	Volts, Direct Current