

Three Mile Island 1

4Q/2012 Plant Inspection Findings

Initiating Events

Significance:  Mar 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Inspection of RCP Flanges

Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings, because Exelon did not specify, in writing, the exact inspection scope and criteria for boric acid inspections of the reactor coolant pump bolted flanges during plant refueling outages. Lack of specific procedural guidance contributed to the failure to detect reactor coolant system leakage from the thermal barrier flange of the 'B' reactor coolant pump (RC-P-1B) prior to November 2011. Exelon's failure to ensure that both the upper and lower RCP thermal barrier flanges were visually inspected for the complete 360 degrees for all RCPs is a performance deficiency within Exelon's ability to foresee and prevent. Exelon completed a boric acid evaluation which showed there was reasonable assurance that the flange could safely operate until the next refueling outage. Additionally, Exelon prepared an adverse condition monitoring plan and is performing periodic remote monitoring of the affected flange for changes in leakage from the degraded gasket. Exelon entered this issue into the corrective action program as IR 01344561.

The finding is more than minor because it is associated with the Equipment Performance attribute (a degraded RCP flange gasket) of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Also, this finding is similar to the more than minor example 4.a in Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix E. The inspectors completed IMC 0609.04, "Phase 1- Initial Screening and Characterization of Findings," and screened the finding as very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Work Control, because Exelon did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported [H.4(c)].

Inspection Report# : [2012002](#) (*pdf*)

Significance:  Mar 31, 2012

Identified By: NRC

Item Type: FIN Finding

Inadequate System Monitoring Results in Multiple IA-P-4 Trips

Green. A self-revealing finding was identified for inadequate performance monitoring of instrument air compressor number four (IA-P-4) in accordance with ER-AA-2003, System Performance Monitoring and Analysis. Specifically, performance monitoring action levels established for loaded and unloaded times in procedure 1104-25, "Instrument and Control Air System," were not adequate to identify the adverse trend in performance and resulted in

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recurring drive-motor overload trips and unplanned accrued unavailability of IA-P-4 on September 28, October 8 and November 29, 2011. Maintenance technicians repaired the air leaks and subsequent IA-P-4 air loading decreased. Corrective actions were implemented to trend loaded and unloaded times of IA-P-4 in the system monitoring plan and implement acoustic monitoring for identification of system air leakage (IR 1295235).

This finding is more than minor because it was associated with the equipment performance attribute of the initiating events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. In accordance with Inspection Manual Chapter 0609.04, "Phase 1 - Initial Screen and Characterization of Findings," the inspectors conducted a phase 1 SDP screening and determined that a detailed phase 2 evaluation was required to assess the safety significance because the finding contributed to both the likelihood of a reactor trip and the likelihood that mitigation equipment would not be available. The inspectors consulted a senior risk analyst (SRA) to perform a detailed phase 2 analysis. The SRA performed a bounding risk analysis using five days of IA-P-4 unavailability. The phase 2 analysis concluded that the significance of the finding was of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to thoroughly evaluate the cause of the IA-P-4 trips such that the resolution addressed the cause [P.1(c)].

Inspection Report# : [2012002](#) (*pdf*)

Mitigating Systems

Significance:  Dec 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Adequacy of Reactor Building Seismic Gap Flood Seal

Green. The inspectors identified a non-cited violation (NCV) of General Design Criterion 2, "Performance Standards," because Exelon had not established measures to ensure that the seismic gap flood seal was adequate to remain watertight during a probable maximum flood (PMF) event, as required by the TMI design. Specifically, the design requirement for the seismic gap seal specified that it was to be watertight. However, the installed seal configuration had measurable leakage when tested. The inspectors determined that the failure to construct, maintain, and inspect the seismic gap flood seal consistent with its design (e.g., watertight) was a performance deficiency within Exelon's ability to foresee and prevent. Exelon entered this issue into their corrective action program, took appropriate interim corrective actions, and completed permanent modifications to restore the watertight function of the seismic gap barrier.

This finding was more than minor because it was similar to the more than minor example 3.j in Inspection Manual Chapter (IMC) 0612 Appendix E, "Examples of Minor Issues," in that the seal's as-built and maintained configuration resulted in a condition where there was reasonable doubt regarding the functionality of the seismic gap seal to remain watertight during a PMF event. Also, this finding was associated with the protection against external factors 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 accordance with IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," the inspectors performed a bounding risk evaluation using an unavailability period of greater than one year for the watertight seal, and determined this finding was of very low safety significance (Green). This finding has a cross-cutting aspect, as described in IMC 0310, in the area of Human Performance, Decision Making, because Exelon failed to verify the validity of underlying assumptions or continued functionality of the seismic gap flood seal following an external flood re-analysis which revised the design basis PMF conditions. [H.1(b)]

Inspection Report# : [2012005](#) (*pdf*)

Significance:  Dec 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Identify and Correct Licensing Basis Flood Barrier and Support Equipment Deficiencies in Intake Screen and Pump House

Green. The inspectors identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, in that Exelon failed to identify and correct conditions adverse to quality regarding the licensing basis external flood barrier integrity. Specifically, Exelon failed to identify and correct 13 unsealed penetrations through the Intake Screen and Pump House (ISPH) flood barrier and multiple deficiencies that challenged the fulfillment of ISPH support equipment capability to maintain the integrity of the licensing basis flood barrier. The deficiencies were entered into the corrective action program and permanent corrective actions were taken to seal the penetrations to restore the external flood barrier integrity and restoration of the support equipment capability for flood protection.

The finding was more than minor because it is associated with the protection against external factors attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon did not identify and correct 13 unsealed penetrations in a licensing basis external flood barrier and its associated support equipment deficiencies such that the barrier is fully capable of maintaining the ISPH free of flood water. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, Exhibit 2 – Mitigating Systems Screening Questions and Exhibit 4 – External Events Screening Questions and determined that a detailed risk evaluation was required based upon the assumed complete failure of the flood barrier would degrade two trains of Decay Heat Removal. A detailed risk evaluation modeled in SAPHIRE 8 using the TMI SPAR model version 8.18 determined the finding to be of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to identify the unsealed penetrations through the flood barrier and multiple deficiencies in supporting equipment in a timely manner commensurate with its safety significance. [P.1(a)]

Inspection Report# : [2012005](#) (pdf)

Significance: TBD Dec 31, 2012

Identified By: NRC

Item Type: AV Apparent Violation

Failure to Identify and Correct Missing Electrical Conduit Flood Seals in the Air Intake Tunnel

TBD. The inspectors identified an apparent violation (AV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, was identified during the TI-187 flooding walkdowns for Exelon's failure to identify and correct an external flood barrier deficiency. Specifically, Exelon failed to identify and correct, during external flood barrier walkdowns, that electrical cable conduits were not flood sealed in the Air Intake Tunnel (AIT), as designed, to maintain the integrity of the external flood barrier. The deficiency was entered into Exelon's corrective action process and permanent corrective actions were taken to seal the electrical conduits and restore the external flood barrier integrity.

The finding was determined to be more than minor because it is associated with the protection against external factors attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon failed, during multiple focused walkdowns, to identify the degraded external flood barrier in the Crouse-Hinds couplings in the AIT that challenged the external flood barrier operability. The significance of the degraded external flood barrier is to be determined and cannot accurately be calculated

until additional testing and analysis of the as-found configuration is complete. Specifically, Exelon is performing additional testing on the capability of as-found foam fire sealant material, present in the conduits at the AIT/Aux Building interface, to mitigate flood water entry into the safety-related structures. These results will be an input into the licensee's flood mitigation aggregate impact review. This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon failed to review the external flood barrier with a low threshold for identifying issues which resulted in the failure to identify the unsealed electrical conduits in the AIT in a timely manner commensurate with its safety significance. [P.1(a)]

Inspection Report# : [2012005](#) (pdf)

Significance:  Sep 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Maintain Combustible Loading in the BWST Tunnel within FHAR Limits

The inspectors identified a Green non-cited violation (NCV) of license condition DPR-50, section 2.C.(4), Fire Protection, for Exelon storing transient combustibles in excess of the fire loading allowed near the borated water storage tank (BWST). Specifically, on July 11, the inspectors identified eight bags of trash/transient combustible materials stored within 50 feet of the BWST which is in excess of the allowed fire loading in accordance with the Fire Hazards Analysis Report (FHAR) and transient combustible control program. The inspectors determined that the failure to maintain combustible loading in the BWST tunnel within the FHAR limits was a performance deficiency that was within Exelon's ability to foresee and correct. Exelon promptly removed the improperly stored transient combustibles and entered the performance deficiency into their corrective action program as issue report 1388097. Corrective actions were implemented to alert technicians of the restrictions on transient combustible materials near the BWST.

This finding was determined to be more than minor since it is similar to more than minor example 4.k of Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix E, because the fire loading was not within the FHAR limits. In accordance with Inspection Manual Chapter (IMC) 0609.04, "Phase 1 – Initial Screen and Characterization of Findings," the inspectors determined the finding affected the administrative controls for transient combustible materials. Additionally, the inspectors determined that this issue was more than minor because it affected the protection against external events attribute of the mitigating systems cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors conducted a phase 1 SDP screening using IMC 0609, Appendix F, "Fire Protection Significance Determination Process," and the inspectors determined that the finding affected the category of Fire Prevention and Administrative Controls in that combustible material was not being properly controlled, the finding had a "low" degradation rating, and the finding was of very low safety significance (Green).

This finding has a cross-cutting aspect in the area of Human Performance, Resources, because Exelon failed to appropriately ensure interdepartmental coordination during the work activities such that the transient combustibles were promptly removed from the BWST tunnel. [H.3(b)]

Inspection Report# : [2012004](#) (pdf)

Significance:  May 25, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Corrective Actions Associated with ESAS relay replacement

The inspectors identified a finding of very low safety significance (Green) involving a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for Exelon's failure to implement prompt corrective actions following the identification of a degraded engineered safeguards actuation system (ESAS) emergency diesel generator (EDG) block load relay. Specifically, Exelon staff did not perform a relay replacement in a timely manner to correct a condition adverse to quality commensurate with its safety significance. This resulted in an EDG block load relay failing a subsequent surveillance test on April 24, 2012. Exelon staff entered this issue into their corrective action program as issue report (IR) 1368183 and replaced the relay on May 31, 2012.

This finding is more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with IMC 0609.04, "Phase – Initial Screen and Characterization of Findings," the inspectors conducted a Phase 1 SDP screening and determined that the finding was of very low safety significance (Green) because the finding was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to external initiating events. Specifically, Exelon staff's past operability evaluation affirmed the relay would have performed its safety function given the degraded relay condition that existed. This finding had a cross-cutting aspect in the area of problem identification and resolution in that Exelon staff actions were not timely in addressing an adverse trend associated with a degraded ESAS block load relay. [P.1(d)]

Inspection Report# : [2012008](#) (pdf)

Significance:  Mar 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Compensatory Actions for Out-of-Service Appendix 'R' Heat Exchanger

Green. The inspectors identified a non-cited violation of license condition DPR-50 section 2.C.(4), Fire Protection, for Exelon's failure to implement compensatory actions during planned maintenance on the 'A' nuclear service heat exchanger (NS-C-1A). Specifically, on May 10, 2010, Exelon failed to return Appendix R breakers to their correct position within the seven day allowed outage time and implement compensatory actions in accordance with administrative procedure (AP) 1038, Fire Protection Program. The inspectors determined Exelon's failure to implement compensatory actions during planned maintenance on NS-C-1A in accordance with AP 1038 was a performance deficiency that was within Exelon's ability to foresee and correct. Exelon performed an extent of condition review and created a requirement to review the fire hazard analysis report for applicability before removing equipment from service. Exelon has entered this issue in the corrective action program for resolution as IR 1347403.

This finding is more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with Inspection Manual Chapter 0609.04, "Phase 1 – Initial Screen and Characterization of Findings," the inspectors conducted a phase 1 SDP screening using Appendix F, Fire Protection Significance Determination Process, and determined that a detailed phase 2 analysis was required due to the elevated calculated delta core damage frequency. The inspectors performed a detailed walkdown of the control cables associated with the nuclear river system valves and identified no fire ignition sources and concluded that the finding was very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Resources, because Exelon failed to ensure complete, accurate, and up-to-date procedures were used to determine if compensatory actions were required for planned work activities [H.2(c)].

Inspection Report# : [2012002](#) (*pdf*)**Significance:**  Mar 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Perform an Adequate Maintenance Risk Evaluation for DH-V-3 Planned Maintenance

Green. The inspectors identified a non-cited violation of 10 CFR 50.65 (a)(4), Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, for Exelon's failure to adequately assess and manage the impact to plant risk during a planned maintenance activity. Specifically, Exelon did not recognize an elevated online maintenance risk activity and implement appropriate risk management actions (RMAs) during maintenance on the decay heat removal (DHR) drop line valve (DH-V-3) on January 16, 2012. The inspectors determined that the failure to perform an adequate risk assessment and implement appropriate RMA's for the planned maintenance on DH-V-3 is a performance deficiency that was within Exelon's ability to foresee and correct. Immediate corrective actions included operator and work planning training on risk evaluations and an extent of condition review to ensure planned maintenance activities that could impact DHR system operability were identified. Exelon entered this issue into the corrective action program for resolution as IR 1314551.

This finding was determined to be more than minor since it is similar to more than minor example 7.e of Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix E because the risk assessment, when adequately performed, resulted in an elevated station risk condition and required RMAs. The finding was evaluated in accordance with Appendix K, Maintenance Risk Assessment and Risk Management Significance Determination Process, of IMC 0609, "Significance Determination Process". The inspectors, in consultation with a senior risk analyst, performed a phase 1 analysis and

concluded that the incremental core damage probability deficit for DH-V-3 with an out-of-service time of 8 hours was less than 1E-6. Therefore, the finding was determined to be of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Work Control, because Exelon failed to incorporate appropriate risk insights into the planning and execution of the DH-V-3 maintenance activity [H.3(a)].

(Section 1R13)

Inspection Report# : [2012002](#) (*pdf*)

Significance:  Mar 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Nonconservative Differential Pressure Value used in DHR/LPI Motor Operated Valves Design Analysis

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, because Exelon had not verified the adequacy of their design with respect to ensuring the capability of the emergency core cooling system piggyback mode of operation during sump recirculation in response to postulated small break loss-of-coolant accident (SBLOCA) conditions. Specifically, the decay heat system low pressure injection (LPI) piggyback motor operated valves (DH-V-7A/B) and containment isolation sump valves (DH-V-6A/B) had not been evaluated to ensure they would open against the maximum expected differential pressures assuming the maximum allowable technical specification (TS) backleakage of system pressure isolation valves (PIVs). Exelon entered the issue into their corrective action program to evaluate the current design and ensure the valves required for piggyback operation could be opened in response to SBLOCA scenarios which may require the transfer to the sump recirculation mode of operation.

The performance deficiency was determined to be 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 evaluated the finding in accordance with IMC 0609, Significance Determination Process, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings." The finding was determined to be of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. This finding was not assigned a cross-cutting aspect because it was a historical design issue not indicative of current performance.

Inspection Report# : [2012007](#) (*pdf*)

Significance:  Mar 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate TOL Sizing Evaluation for Jogging/Throttling Valves

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, because Exelon had not verified the adequacy of the design regarding motor operated valve (MOV) thermal overload relay (TOL) sizing. Specifically, Exelon had not verified that TOL relays on safety-related low pressure injection (LPI) MOV circuits for the LPI injection valves, DH-V-4A(B), were properly sized to support the design function of repetitive jogging and throttling of the MOVs in response to design basis accidents. Exelon entered the issue into their corrective action program to evaluate the condition that the existing design analysis did not address TOL sizing for jogging MOVs. Exelon performed an initial review for operability of the LPI injection valves and included an extent-of-condition review for other engineered safeguards (ES) MOVs that are operated in a jogging mode to ensure the MOVs would not inadvertently trip under reasonable assumptions.

The performance deficiency was determined to be 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 evaluated the finding in accordance with IMC 0609, Significance Determination Process, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings." The finding was determined to be of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. This

finding was not assigned a cross-cutting aspect because it was a historical design issue not indicative of current performance.

Inspection Report# : [2012007](#) (pdf)

Significance:  Mar 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Design Control for Battery Sizing Calculation

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, because Exelon did not verify the adequacy of design with respect to the Battery 1A sizing calculation. Specifically, non-conservative design inputs and incorrect methodologies were used for the safety related Battery 1A sizing calculation which reduced the battery capacity margin. Exelon entered this issue into the corrective action program and concluded that the issues identified did not render any of the batteries inoperable, based on the magnitude of the errors and currently available aging margin.

The performance deficiency was determined to be 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 evaluated the finding in accordance with IMC 0609, Significance Determination Process, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings." The finding was determined to be of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. The finding had a cross-cutting aspect in the area of Human Performance, Resources Component, because Exelon did not ensure that accurate design documentation was available. Specifically, Exelon inadequately revised the battery sizing calculation in 2009.

Inspection Report# : [2012007](#) (pdf)

Significance:  Mar 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Design and Maintenance of SBO Diesel Generator Battery

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50.63, "Loss of all Alternating Current Power," because Exelon did not ensure that necessary support systems had sufficient capability to mitigate a station blackout (SBO). Specifically, Exelon did not ensure that the design and maintenance of the SBO diesel generator starting battery was adequate to ensure that the SBO diesel generator would be able to start and load within the required time following an SBO. Exelon entered this issue into the corrective action program and concluded that the issues identified did not render the SBO emergency diesel generator (EDG) inoperable, based on testing performed during the inspection to validate the operability of the SBO EDG output breaker, the adequate performance of the battery during SBO diesel generator surveillances, the adequate acceptance test results, and adequate monthly monitoring.

The performance deficiency was determined to be more than minor because it was associated with the design control and procedure quality attributes 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 evaluated the finding in accordance with IMC 0609, Significance Determination Process, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings." The finding was determined to be of very low safety significance (Green) because it did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding was not assigned a cross-cutting aspect because the most significant causal factor of the finding was the inadequate design verification for adequate voltage to the battery loads, which was not reflective of current performance. The design calculation was last revised in March 2008.

Inspection Report# : [2012007](#) (pdf)

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

Miscellaneous

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