

Limerick 2

4Q/2012 Plant Inspection Findings

Initiating Events

Significance: G Sep 30, 2012

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Establish and Perform Adequate Preventive Maintenance on 480VAC Load Center Power Transformers

A self-revealing NCV of Limerick Technical Specification (TS) 6.8, "Procedures and Programs," was identified for failure to establish and perform adequate preventive maintenance (PM) activities to routinely inspect the 480 volt-alternating current (VAC) load center power transformers. As a result, Limerick experienced a transformer related fault that could have been prevented by PM which resulted in a manual reactor scram of Unit 1 on July 18, 2012. Corrective actions implemented by Limerick as a result of this transformer failure included advancing the thermography window installation schedule to align with each transformers feeder breaker trip test calibration. Limerick also performed thermography inspections on the other load center transformers and developed corrective actions (Issue Report (IR) 1355930 and 1390033) to reinstitute the clean and inspect PM on all load center transformers at an increased frequency of 8 years vice 20 years.

The finding was determined to be more than minor because it was associated with 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. The finding was determined to be of very low safety significance because the finding caused a reactor trip but not the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. This finding was determined to have a cross-cutting aspect because, although the performance deficiency occurred more than three years ago, the performance characteristic associated with ineffective PM implementation continues to exist within Limerick's PM program and is indicative of present performance. The cross-cutting aspect associated with this performance deficiency is in the Resources component of the Human Performance area because the licensee did not ensure that personnel, equipment, procedures and other resources were adequate to assure long term plant safety through maintenance and the minimization of long-standing equipment issues [H.2 (a)]. (Section 40A3.7)

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

Mitigating Systems

Significance: G Dec 31, 2012

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Revise EDG Tank Cleaning Work Instructions

A self-revealing Green NCV of Technical Specification 6.8.1, "Administrative Controls-Procedures," was identified because Exelon did not implement procedure use and adherence requirements when workers changed the scope of work on EDG fuel oil day tanks and did not revise the work instructions when they determined that work could not be performed as written. This resulted in EDG D13 accruing approximately 40 hours of unplanned unavailability

between December 14 and 16, 2012.

This finding was more than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was determined to be self-revealing because it was revealed through the receipt of alarms during operation which required no active and deliberate observation by the licensee. The finding was determined to be of very low safety significance (Green) in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," because the finding did not represent an actual loss of function a single train for greater than the TS allowed outage time.

This finding had a cross-cutting aspect in the area of Human Performance, Work Practices, because Exelon did not ensure that personnel followed procedures [H.4(b)]. Specifically, work order procedural steps to clean the fuel oil tank were not completed and a procedurally required change to written work instructions was not implemented when station personnel determined that the fuel oil tank cleaning would be based on the need to clean the tank as determined by tank inspection results. (Section 1R19)

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

Significance:  Dec 31, 2012

Identified By: NRC

Item Type: FIN Finding

Failure to Administer an NRC Annual Operating Test Simulator Scenario Re-examination That Met Procedural Requirements

The inspectors identified a Green finding of of Exelon procedure TQ-AA-150, "Operator Training Programs," and TQ-AA-155, "Conduct of Simulator Training and Evaluation," based on a determination that the minimum number of scenarios required for simulator re-examination was not administered following a crew failure of the dynamic simulator scenario portion of the annual operating exam during week two of the 2012 Licensed Operator Requalification Training (LORT) Annual Operating Test. The Exelon entered this finding into their corrective action process (IR 1437839), conducted a prompt investigation (PINV), assigned an action to complete the annual operating exam scenario set for the crew in question, and initiated an Apparent Cause Evaluation.

The inspectors determined that the finding was more than minor because it was associated with the Human Performance attribute of the Mitigation Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The risk importance of this issue was evaluated using IMC 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)." Based on this screening criteria, the finding (inadequate retest) was characterized by the SDP as having very low safety significance (Green) because crew remediation was conducted and a partial re-evaluation performed. The finding has a cross-cutting aspect in the area of Human Performance, Work Practices, H.4(b), in that personnel work practices did not support human performance since personnel did not follow their procedural requirements to determine and ensure that simulator scenario re-exam administered following a failed Annual Operating Test was commensurate with the original exam failure.

FIN 05000352, 353/2012005-01, Failure to Administer an NRC Annual Operating Test Simulator Scenario Re-examination That Met Procedural Requirements

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

Significance:  Dec 18, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Evaluation of Voltage to Safety-Related Equipment with Offsite Power Available

The team identified a non-cited violation of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion III, "Design Control," which states, in

part, "design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." The team determined that Exelon did not verify that adequate voltages would be available to safety-related equipment powered from the 4kV, 480vac, and 120Yac distribution systems during a design basis loss-of-coolant accident with offsite power available. Specifically, the team found that Exelon assumed a non-conservative offsite power voltage at the start of the event, used a non-conservative assumption for motor starting times, and did not have calculations that determined the minimum voltage level for the 480 Vac and 120Yac distribution level during post event electrical transients. Following questions from the team Exelon entered the issue into their corrective action program, revised existing calculations, performed new calculations, and completed evaluations to ensure that the minimum voltage level that would be reached during an event would be adequate at all three voltage levels. The team reviewed these calculations and evaluations and concluded the results of the work performed during the inspection were reasonable.

The team determined that the failure to verify adequate voltages at all voltage levels to safety-related equipment during a design basis loss-of-coolant accident was a performance deficiency. This issue was more than minor because it was similar to IMC 0612, Appendix E, "Examples of Minor Issues," Example 3.j, in that the design analysis deficiency resulted in a condition where the team had reasonable doubt of operability of the safety-related busses. In addition, 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 determined the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. This finding had a crosscutting aspect in the area of Human Performance, Resources, because Exelon did not provide complete, accurate and up-to-date design documentation to plant personnel and because these calculations had been recently revised. (IMC 0310, H.2(c)) (Section 1R21.2.1.1 5.1)

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

Significance:  Dec 18, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

480V Motor Control Circuit Breaker Overcurrent Protection

The team identified a finding of very low safety significance (Green) involving a non-cited violation of Limerick Generating Station License Condition 2.C.(3), "Fire Protection," which states Exelon Generation Company shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the UFSAR. Specifically, the team found that Exelon's multiple high impedance fault (MHIF) analysis, developed to verify that post-fire safe shutdown equipment would remain available, used non-conservative overcurrent trip setpoints for 480 volt overcurrent protection devices. Specifically, the team found that molded case circuit breaker overcurrent protection did not protect against all possible fault currents that could be present on downstream equipment. "As a result, fault current greater than that assumed in the MHIF analysis could propagate past the circuit breaker and trip upstream equipment. Exelon entered the issue into their corrective action program and performed an analysis that showed credited equipment would be available. The team concluded the results of the work performed were reasonable.

The team determined that Exelon's selection of breaker trip values for use in the MHIF analysis was non-conservative and was a performance deficiency. Specifically, the post-fire safe shutdown MHIF analysis did not use worst case or maximum fault current to

verify that fire induced fault currents that propagated past branch feeder circuit breakers would not cause the motor control center source breaker to overload and trip. This issue was more than minor because it was similar to IMC 0612, Appendix E, "Examples of Minor Issues," Example 3.j, in that the design analysis deficiency resulted in a condition where the team had reasonable doubt of operability of the MCC during a fire. In addition, this issue was associated with the Fire Protection 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 determined the finding was of very low safety significance (Green) because the finding affected the post-fire safe shutdown category and it had a low degradation rating. This finding did not have a cross-cutting aspect because the design requirements of the breakers had not changed from initial startup and therefore it does not reflect current licensee performance. (Section 1R21.2.1.15.2)

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

Significance:  Sep 30, 2012

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inadequate Post Maintenance Testing Following Circuit Breaker Replacement

A self-revealing NCV of TS 6.8, "Procedures and Programs," was identified because Exelon did not maintain adequate maintenance procedures associated with work performed on the Unit 2 'B' residual heat removal (RHR) pump motor circuit breaker. Specifically, Exelon did not perform appropriate post maintenance testing following the replacement of the Unit 2 'B' RHR pump breaker on November 30, 2011. Despite the circuit breaker replacement affecting necessary pump support equipment operation due to circuit breaker dimensional differences, the procedure did not require a check to assure the support equipment was not adversely affected following the installation. As a result, the Unit 2 'B' RHR pump was inoperable for the low pressure coolant injection function when the pump was operating in the suppression pool cooling mode because the pump's minimum flow valve would not have opened automatically following the receipt of a loss of coolant accident signal. This condition existed from November 30, 2011 until the condition was corrected on June 27, 2012. This issue was entered into the Exelon CAP as IR 1381792. This self-revealing finding was determined to be more than minor because it is associated with the procedure quality 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. The finding was determined to be of very low safety significance (Green) because it did not represent a loss of system function and did not represent an actual loss of function for two separate safety systems out-of-service for greater than its TS Allowed Outage Time. The finding had a cross-cutting aspect in the area of Human Performance, Resources, because Exelon did not provide work packages with sufficient detailed instructions to assure nuclear safety [H.2(c)]. (Section 4OA2.2)

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

Significance:  Jun 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Conduct Timely Corrective Actions to Replace Age Degraded Relays

The inspectors identified a Green NCV of 10 Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," because Exelon failed to conduct timely corrective actions to preclude repetition of a condition adverse to quality involving the replacement of age degraded direct current motor operated valve (DC MOV) relays. Specifically, Exelon experienced multiple failures of ARD type relays that were known to be susceptible to age-related degradation once past their vendor recommended lifetime. Exelon's equipment apparent cause evaluations (EACEs) for the most recent ARD relay failures failed to prioritize the replacement of these relays which led the

preventative maintenance (PM) for the relay replacement to be scheduled as much as 8 years past their vendor recommended lifetime and contributed to the March 2012 relay failure. In addition to the untimely corrective actions, the licensee's extent of condition performed as part of the 2010 EACE was too narrowly focused, contributing to their failure to recognize and address all the relays that were susceptible to age-related failures. Exelon identified the narrowly focused EOC as part of their 2012 EACE and has entered both issues in their corrective action program (CAP) for resolution (AR 1380603, AR 1380605 and ACIT 1341695-14).

The inspectors determined that the failure to implement timely corrective actions was a performance deficiency. The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding was determined to be of very low safety significance (Green) using Attachment 4 to IMC 0609, "Significance Determination Process," because the incomplete corrective actions did not result in an actual loss of safety function. The finding has a cross cutting aspect in the corrective action component of the problem identification and resolution area because the licensee did not thoroughly evaluate problems such that the resolutions address causes and extent of conditions, as necessary, including properly classifying, prioritizing, and evaluating for operability and reportability conditions adverse to quality. [P.1(c)] (Section 1R13)

Inspection Report# : [2012003](#) (*pdf*)

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Significance: N/A Oct 18, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Follow Radiation Protection Procedures for Personnel Monitoring

NRC Letter, dated October 18, 2012 (ML12292A140), documented an NRC Office of Investigation review to determine whether a contract foreman deliberately failed to follow procedures on the use of electron dosimetry while at Limerick (NRC Investigation Report Number 1-2012-030). The NRC concluded that the contract foreman deliberately failed to follow an NRC-required procedure (RP-AA-1008) regarding the use of dosimetry and that the issue was being treated as an NCV. In order to facilitate entering this issue into the NRC's Plant Issues Matrix and assessment process this issue is identified as NCV 05000352, 353/2012005-03, Failure to Follow Radiation Protection Procedures for Personnel Monitoring.

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

Significance: N/A Mar 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Make a 10CFR 50.72(b)(2)(xi) Notification

The inspectors identified a Severity Level (SL) IV NCV of 10 Code of Federal Regulations (CFR) 50.72(b)(2)(xi) because the NRC Operations Center was not notified via the Emergency Notification System (ENS) within four hours of a reportable event related to the health and safety of the public and protection of the environment for which notification to other government agencies was made. Exelon did make a courtesy notification to the NRC resident inspection staff. However, Exelon did not formally report, to the NRC Operations

Center, the notification of other government agencies regarding an abnormal radioactive liquid release, from the Limerick Generating Station common cooling tower blow down line on March 19, 2012. Inspectors performed system walkdowns and conducted an event follow-up inspection on March 20, 2012 to assess the impacts of the overflow event.

This deficiency was evaluated using the traditional enforcement process since the failure to make a required report could adversely impact the NRC's ability to carry out its regulatory mission. The deficiency was evaluated using the criteria contained in Section 6.9(d)(9) of the NRC's Enforcement Policy and determined to meet the criteria for disposition as a SL IV NCV. Exelon took immediate corrective actions pertaining to the abnormal release, including suspension of effluent releases via the cooling tower blow down line and initiation of actions to evaluate the cause and preclude recurrence, as well as the conduct of public dose calculations. Additionally, upon identification by the NRC that the issue was reportable, Exelon subsequently reported the event to the NRC Operations Center on April 11, 2012. Exelon also entered this issue into its corrective action program (IR 1347829).

This violation involved a failure to make a required report to the NRC and is considered to impact the regulatory process. Such violations are dispositioned using the traditional enforcement process instead of the Significance Determination Process. Using the Enforcement Policy Section 6.9, "Inaccurate and Incomplete Information or Failure to Make a Required Report," example (d)(9), which states, "A licensee fails to make a report required by 10 CFR 50.72 or 10 CFR 50.73," the NRC determined that this violation is more than minor and categorized as a SL IV violation. Because this violation involves the traditional enforcement process with no underlying technical violation that would be considered more than minor in accordance with IMC 0612, a cross-cutting aspect is not assigned to this violation. (Section 40A3)

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

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

Significance: N/A Nov 09, 2012

Identified By: NRC

Item Type: FIN Finding

Biennial PI&R inspection summary

The inspectors concluded that Exelon was generally effective in identifying, evaluating, and resolving problems. Exelon personnel identified problems, entered them into the corrective action program at a low threshold, and prioritized issues commensurate with their safety significance. In most cases, Exelon appropriately screened issues for operability and reportability, and performed causal analyses that appropriately considered extent of condition, generic issues, and previous occurrences. The inspectors also determined that Exelon typically implemented corrective actions to address the problems identified in the corrective action program in a timely manner. Notwithstanding, the

inspectors identified one finding in the area of prioritization and evaluation of issues.

The inspectors concluded that, in general, Exelon adequately identified, reviewed, and applied relevant industry operating experience to LGS operations. In addition, based on those items selected for review, the inspectors determined that Exelon's self-assessments and audits were thorough.

Based on the interviews the inspectors conducted over the course of the inspection, observations of plant activities, and reviews of individual corrective action program and employee concerns program issues, the inspectors did not identify any indications that site personnel were unwilling to raise safety issues nor did they identify any conditions that could have had a negative impact on the site's safety conscious work environment.

Inspection Report# : [2012010](#) (*pdf*)

Significance: N/A Jun 15, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to submit an LER revision for conditions Prohibited by TS associated with the HPCI and RCIC Systems

SL-IV: The inspectors identified a Severity Level (SL) IV non-cited violation (NCV) of 10 CFR Part 50.73, "Licensee Event Report [LER] System," because violations of Technical Specifications (TS) 3.5.1 and 3.0.3 for the condition of the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems being simultaneously inoperable were not reported to the NRC within 60 days of discovery. After this was identified by the inspectors, the issue was entered into Exelon's CAP as IR 1377559.

The inspectors determined that the failure to revise LER 05000353/2011-003-00 within 60 days of initial issuance on July 21, 2011 to include the violations of TS 3.5.1 and 3.0.3 in accordance with 10 CFR Part 50.73 was a performance deficiency that was reasonably within Exelon's ability to foresee and correct, and should have been prevented.

Because the issue impacted the regulatory process, in that a violation of Technical Specifications was not reported to the NRC within the required timeframe, and delayed the NRC's opportunity to review the matter in its completion, the inspectors evaluated this performance deficiency in accordance with the traditional enforcement process. Using example 6.9.d.9 from the NRC Enforcement Policy, the inspectors determined the performance deficiency was a SL IV violation, because Exelon personnel did not make a report required by 10 CFR Part 50.73. In accordance with Inspection Manual Chapter (IMC) 0612, Appendix B, traditional enforcement issues are not assigned cross-cutting aspects. The significance of the associated performance deficiency was screened against the ROP per the guidance of IMC 0612, Appendix B, and the inspectors determined it to be minor because it was not similar to Appendix E examples, was not a precursor to a significant event, did not cause a PI to exceed a threshold, did not adversely affect cornerstone objectives, and if left uncorrected would not have lead to a more significant safety concern. As such, no ROP finding was identified and no cross-cutting aspect was assigned. (Section 4OA4)

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

Last modified : February 28, 2013