Limerick 1
3Q/2013 Plant Inspection Findings

Initiating Events

Significance: G Sep 30, 2013
Identified By: Self-Revealing
Item Type: FIN Finding
Inadequate and Untimely Corrective Actions Associated With the Unit 1 Instrument Air System
A self-revealing finding of very low safety significance was identified for Exelon's failure to take adequate and timely corrective actions to address the inadvertent depressurization of the Unit 1 Instrument Air (IA) headers. This led to a repeat depressurization of the Unit 1 IA headers when the service air compressor tripped on July 7, 2013, causing the operators to enter ON-119, "Loss of Instrument Air," and reduce reactor power by 20 percent until IA header pressure could be restored and maintained. Exelon's corrective actions for this issue included replacing all of the IA dryer pre-filters, creating an activity to perform dryer performance monitoring prior to any IA maintenance outage, and recalibrating all of the IA dryer pre-filter differential pressure (D/P) switches. Exelon was also in the process of evaluating a replacement component for the IA dryer D/P switches and investigating the effectiveness of the prioritization of their maintenance backlog strategy. Exelon has entered this issue into their corrective action program (CAP) as Issue Report (IR) 1569901.

Exelon's corrective actions to address the inadvertent depressurization of the Unit 1 IA headers on October 9, 2012, were ineffective and untimely, representing a performance deficiency that was within their ability to foresee and correct. This performance deficiency was determined to be more than minor because it affected the Equipment Performance attribute of the Initiating Events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, unnecessary transients on the IA header increase the likelihood of a loss of IA, an unplanned down power or a potential rapid plant shutdown due to plant instability. The finding is of very low safety significance (Green) per IMC 0609, Appendix A, Exhibit 1 - Initiating Events Screening Questions, because it did not involve the complete or partial loss of a support system that contributes to the likelihood of, or cause, an initiating event and affected mitigation equipment. The finding had a cross-cutting aspect in the area of Human Performance, Resources, because Exelon did not ensure that personnel, equipment, procedures, and other resources were adequate to assure nuclear safety. Specifically, Exelon did not adequately maintain engineering and maintenance backlogs to support safety, which led to IRs (1426043 and 1426045) to check the operation of the Unit 1 IA dryer pre-filter D/P switches not being performed in a timely manner [H.2(a)]. Exelon did not complete work associated with these IRs and failed to utilize internal operating experience concerning the creation of a time-based preventative maintenance (PM) in order to replace the pre-filters and functionally check the D/P switches prior to conducting maintenance. (Section 1R04)
Inspection Report# : 2013004 *(pdf)*

Significance: G Nov 09, 2012
Identified By: NRC
Item Type: FIN Finding
Failure to Take Timely Corrective Actions to Address the 144D Load Center ODM contingency actions
Green. The inspectors identified a finding of very low safety significance (Green) for Exelon's failure to complete an evaluation of the off-normal bus alignment prior to the summer period. Consequently, on July 18, 2012, LGS experienced a fault of the 124A load center (LC) transformer which led to an unplanned manual scram. Exelon's root

cause evaluation for this event identified that a contributing cause was the electrical configuration being in an off-normal bus alignment (114A LC cross-tied to the 124A LC) for an extended period due to the failure of the 144D transformer, which placed more load on the degraded 124A connection and contributed to its failure. Exelon has entered the issue into the corrective action program (AR 1437657).

This finding was more than minor because it is similar to examples 4.f and 4.g of IMC 0612, Appendix E, "Examples of Minor Issues," in that operators inserted a manual scram per procedural requirements following the loss of the reactor recirculation pumps (RRP) associated with the 124A LC transformer failure. Additionally, the finding was more than minor because it is associated with the equipment performance attribute 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. This finding was of very low safety significance (Green) because the finding did cause a reactor trip but did not cause a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. This finding had a cross-cutting aspect in the Problem Identification and Resolution cross-cutting area, Corrective Action Program component, because Exelon did not take appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity [P.1(d)]. Specifically, Exelon's failure to restore the normal 124A LC alignment or evaluate the effects of continuing the off-normal alignment during the summer period in a timely manner placed additional loading on the transformer contributing to the failure. (Section 4OA2.1.c)

Inspection Report# : 2012010 *(pdf)*

Mitigating Systems

Significance: G Sep 30, 2013
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Correct a Condition Adverse to Quality associated with Defective Material Being Reinstalled into a Safety - Related System
The inspectors identified a Green NCV of Title 10 of the Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," associated with Exelon staff's failure to correct a condition adverse to quality (CAQ) associated with defective material being reinstalled into a safety-related system after the component failed. Specifically, Exelon's corrective actions to address the defective material issues in both Apparent Cause Evaluation (ACE) IR 900755 and Equipment Apparent Cause Evaluation (EACE) IR 1365093 did not prevent the installation of a previously failed circuit board into a safety-related system. This circuit board ultimately failed again, causing operators to declare the Redundant Reactivity Control System (RRCS) inoperable. Exelon's corrective actions included revising procedural guidance for RRCS channel-checks, utilizing an alert system for continuous performance monitoring of al RRCS system parameters, conducting an extent of cause for all existing RRCS out-of-band log entries, revising the maintenance strategy to use new RRCS cards and a time-directed PM to replace failed or old cards and benchmarking the industry maintenance strategy for RRCS. Exelon is also revising material receipt procedures, training all warehouse personnel on the receipt inspection process and performing extent of conditions of all other repairable stock codes. Exelon has entered this issue into their CAP as IR 1569907.

The inspectors determined that Exelon's corrective actions to address a CAQ associated with defective material issues in both ACE IR 900755 and EACE IR 1365093, was a performance deficiency that was within their ability to foresee and correct, and should have been prevented. The performance deficiency was determined to be more than minor because it affected the Procedure Quality and Human Performance attributes of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent

undesirable consequences (i.e. core damage). Further, if left uncorrected, the performance deficiency could have the potential to lead to a more significant safety concern. The performance deficiency was also similar to IMC 0612, Appendix E, example 4.g, in that Exelon's corrective actions were inadequate and failed to correct a CAQ. The finding is of very low safety significance (Green) per IMC 0609, Appendix A, Exhibit 2 - "Mitigating Systems Screening Questions," because RRCS was determined to maintain its operability and functionality, does not represent a loss of system and/or function and does not represent an actual loss of function of a single train for greater than its TS allowed outage time. The finding had a cross-cutting aspect in the area of PI&R, CAP, because Exelon did not take the appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with the safety significance [P.1(d)]. Specifically, Exelon did not take appropriate corrective actions to address the use of new RRCS circuit boards and did not ensure the corrective actions for the D23 Emergency Diesel Generator (EDG) rectifier failure would ensure all failed components that are sent to the vendor for analysis and sent back to the site with no failure mode were evaluated by engineering prior to re-installation. (Section 1R15)
Inspection Report# : 2013004 *(pdf)*

Significance: G May 24, 2013
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Fire Brigade Transportation
The NRC identified a Green, Non-Cited Violation (NCV) of License Condition 2.C.(3) of the Limerick Generating Station operating license, in that Exelon did not provide adequate procedural guidance for transporting the fire brigade and equipment to the spray pond pump house. Specifically, the existing fire procedure had incorrect guidance which would have needlessly delayed the fire brigade response. In response to this issue, Exelon initiated IR 1511763 and took prompt action to revise the affected procedures.

The finding was more than minor because it negatively affected the protection against external factors (fire) attribute of the mitigating systems cornerstone as related to the objective of ensuring the reliability and availability of the Essential Service Water pumps and Residual Heat Removal Service Water pumps. The finding was determined to be of very low safety significance (Green) in accordance with Section D of Exhibit 2 in Appendix A of IMC 0609, "The Significance Determination Process for Findings at Power," because the fire brigade's response time was mitigated by other defense-indepth elements such as: area combustible loading limits were not exceeded, installed fire detection systems were functional, and alternate means of safe shutdown were not impacted. The finding did not have a cross-cutting aspect because it was not indicative of current performance. (Section 1R05.03)
Inspection Report# : 2013007 *(pdf)*

Significance: G May 24, 2013
Identified By: NRC
Item Type: FIN Finding
Failure to Establish Preventive Maintenance for Safe Shutdown Transfer/Isolation Switches
The NRC identified a Green finding for the failure to establish a preventive maintenance strategy for fire safe shutdown transfer/isolation switches in accordance with the Exelon procedure ER-AA-200, Preventive Maintenance Program. As a result, Exelon failed to ensure that the local control circuits for several 4KV breakers would be isolated from the effects of fire damage. In response to this issue, Exelon generated IR 01515025, and initiated actions to evaluate the switches and implement appropriate

maintenance programs.

This finding was more than minor because it was associated with the protection against external factors (fire) 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. Specifically, by failing to establish a preventive maintenance strategy for fire safe shutdown transfer/isolation switches, Exelon did not ensure that the local control circuits for several 4KV breakers would be isolated from the effects of fire damage. The team determined that the finding was of very low safety significance (Green), based on IMC 0609, Appendix F, "Fire Protection Significance Determination Process," task number 1.3.1 because Exelon had demonstrated a reasonable expectation of functionality for these switches by recently testing comparable switches. The finding did not have a crosscutting aspect because it was not indicative of current performance. (Section 1R05.06)
Inspection Report# : 2013007 *(pdf)*

Significance: G Mar 31, 2013
Identified By: NRC
Item Type: FIN Finding
Failure to Adequately Assess Battery Charger Operability in a Timely Manner
The inspectors identified a Finding (FIN) of very low safety significance (Green) for the failure to adequately assess the operability of multiple safeguard battery chargers in a timely manner after an issue report (IR) was generated for battery charger testing concerns. Specifically, although the IR documented as-found current limit settings for safeguard battery chargers that were below Technical Specification (TS) minimum values, the operability basis documented that no operability concern existed because the battery chargers had passed their most recent TS surveillance tests and no explanation for the unexpected test results was given. Following questions from the inspectors regarding the operability bases of the battery chargers, Exelon staff performed an in-depth operability determination which factored in battery charger maintenance history, preventive maintenance practices, past operating experience, and vendor input. Exelon personnel entered this issue into their corrective action plan (CAP) as IR1486275 and plan to perform an evaluation to address the shortcomings in the initial operability determination.

The performance deficiency 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). This finding was also similar to examples 3.j and 3.k of IMC 0612, Appendix E. Specifically, in the absence of any further engineering evaluation, there was reasonable doubt of operability of multiple safeguard battery chargers at power operations. This finding was evaluated in accordance with NRC IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and determined to be of very low safety significance (Green) because the finding does not affect the operability of the system, does not represent a loss of system and/or function, and does not represent an actual loss of function of at least a single train for greater than its technical specification allowed outage time.

The inspectors determined the finding has a crosscutting aspect in Human Performance, Decision-Making, because Exelon personnel did not make a safety-significant decision using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure that safety was maintained. Specifically, Exelon personnel did not adequately assess the operability of multiple safeguard battery chargers in a timely manner after an IR was generated for battery charger testing concerns that called into question the operability of safeguard battery chargers [H.1(a)]. Enforcement action does not apply because the performance deficiency did not involve a violation of a regulatory requirement.

Inspection Report# : 2013002 *(pdf)*

Significance: G 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: G 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 Federat Regutations (10 CFR) Part 50, Appendix B, Criterion lll, "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 safetyrelated 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 lssues," Example 3.j, in that the design analysis deficiency resutted 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 qualificalion 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. (lMC 0310, H.2(c)) (Section 1R21.2.1.1 5.1)
Inspection Report# : 2012007 *(pdf)*

Significance: G 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 faults 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 lssues," 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)*

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)*

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)*

Last modified : December 03, 2013