Limerick 2
1Q/2016 Plant Inspection Findings

Initiating Events

Significance: G Mar 31, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
Main Turbine Digital Electrohydraulic Control System Modification Failed to Revise the Plant Startup Procedure
A self-revealing Green NCV of LGS Unit 2 technical specification 6.8.1 was identified because Exelon failed to maintain a plant startup procedure. Specifically, the implementing procedure for normal plant startup from hot shutdown or cold shutdown to rated power was not maintained when a modification to the Unit 2 turbine electrohydraulic control system was performed and required changes to the plant startup procedure were not identified and implemented. Exelon initiated issue report (IR) 2602637, revised the startup procedure to properly incorporate the software changes made at the factory acceptance test, validated the software changes that were made were technically correct, trained all operators on the new procedural changes, and reviewed operating procedures for extent of condition.

This finding is more than minor because it is associated with the procedure quality attribute of the initiating events cornerstone and affected the objective to limit the likelihood of events that upset plant stability during power operations. Specifically, the procedure directed actions intended in the software for rapid reactor depressurization that resulted in a reactor trip. Using IMC 0609, “Significance Determination Process,” Appendix A, Exhibit 1, “Initiating Events Screening Questions,” the inspectors determined that this finding was of very low safety significance (Green) because the finding did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Specifically, although the finding caused a Level 8 trip of the feedwater pumps followed by a reactor trip, the rate of water injection from the condensate pumps was sufficient when the reactor was tripped to safely shutdown and operators were able to reset the feedwater pumps. The inspectors determined that this finding has a cross-cutting in the area of Human Performance, Change Management, because leaders did not use a systematic process for implementing the modification so that nuclear safety remained the overriding priority. [H.3] (Section 4OA3)

Inspection Report# : 2016001 *(pdf)*

Mitigating Systems

Significance: G Mar 31, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Inadequate Work Staging and Housekeeping Walkdowns During Pre-Outage Preparations
The inspectors identified a Green NCV of technical specification 6.8.1 for Exelon’s failure to properly control, store, and stage material in accordance with station procedures within Class I buildings during refueling outage preparation. Specifically, Exelon personnel did not secure numerous rolling carts staged in both units, did not secure welding

blankets in the common pipe tunnel to prevent blocking floor drains, and did not properly build scaffolds to include engineering approval for scaffold procedure deviations. In addition, Exelon's housekeeping and material condition program did not identify and resolve these conditions through the corrective action process during a time of increased activities in the plant. Exelon restrained the carts and other rolling equipment, removed the weld blankets, and removed, reworked, and evaluated scaffolding.

This finding is more than minor because it adversely affected the protection against external factors (flood and seismic hazards) attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the loose unattended welding blankets would have blocked the pipe tunnel floor drains during an analyzed internal flooding event which would result in structural failures if not identified and corrected by operations personnel; the unrestrained carts would translate and rotate during a seismic event which could potentially impact safety related equipment and challenge the function or barrier; and the scaffold clearance and attachment issues could potentially cause impact with ductwork, cable trays, hangers, and structural supports during a seismic event. In addition, the performance deficiency is similar to the more-than-minor example described in IMC 0612, Appendix E, example 4.A, in that Exelon routinely failed to perform engineering evaluations on similar issues. Using IMC 0609, Appendix A, Exhibit 2, the inspectors determined that this finding was of very low safety significance (Green). Specifically, the finding is a deficiency affecting the design or qualification of mitigating structures, systems, and components, and the actual functions of the structures, systems, and components were maintained. The inspectors determined that this finding has a cross-cutting aspect in the area of Human Performance, Training, because the organization did not provide sufficient training to maintain a knowledgeable workforce with respect to proper material handling and storage, awareness of flood hazards and floor drains, and scaffolding requirements. [H.9]

Inspection Report# : 2016001 *(pdf)*

Significance: G Sep 30, 2015
Identified By: NRC
Item Type: NCV Non-Cited Violation
Inadequate Preventive Maintenance of the HPCI System Motor Control Center
A self-revealing Green NCV of Technical Specification (TS) 6.8.1.a, "Procedures and Programs," was identified because Exelon failed to adequately implement a preventive maintenance (PM) task for the 2DB-1-14 High Pressure Coolant Injection (HPCI) Direct Current (DC) Motor Control Center (MCC) cubicle. The root cause from a fire in the HPCI DC MCC on April 5, 2015 was determined to be that the administrative guidance to change the PM task in 1995 did not ensure all the work that was previously performed was now performed on the revised PM task. This led to the PM "M-095-002, 250 VDC Westinghouse MCU Maintenance, Revision 6" not being performed on the auxiliary compartment of the 2DB-1-14 cubicle. The cause of the fire, the 1A Timetactor, was located in the auxiliary compartment and would have been inspected and cleaned as a part of this PM.

This issue is more than minor because it was associated with the procedures quality attribute of the Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, maintenance procedure M-095-002, 250 VDC Westinghouse MCU Maintenance, Revision 6, was not performed on both compartments of the 2DB-1-14 cubicle that led to the fire in the HPCI DC MCC which had the potential to affect HPCI system operation. Using IMC 0609, "Significance Determination Process, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined that this finding was of very low safety significance (Green) because the finding was not a deficiency affecting the design or qualification of the HPCI system and the system maintained operability and functionality. Specifically, the affected portions of the HPCI system were a part of the HPCI vacuum tank condensate pump which is not required to ensure operability or functionality. The inspectors determined that the finding did not have a cross-cutting aspect because the PM task change did not occur within the last three years, and the inspectors did not conclude that the causal factors represented present Exelon performance. (Section 4OA3)

Inspection Report# : 2015003 *(pdf)*

Significance: G Jul 30, 2015
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Verify Adequacy of EDG Voltage to Start Safety Related Motors
The team identified a finding of very low safety significance involving a non-cited violation (NCV) of the 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that Exelon did not verify and assure in design basis calculations, that adequate voltage would be available for starting Class 1E accident mitigating motors when the safeguards buses are powered by the emergency diesel generators (EDG). Specifically, in the calculation performed to evaluate voltage available to individual motors when they are powered by the EDGs, Exelon assumed that the generator output voltage would be 4285 Volts, alternating current (Vac), rather than the minimum voltage allowed by station technical specifications (4160 Vac). Additionally, the electrical ratings of loads powered by the EDG were not adjusted for the maximum frequency allowed by station technical specifications (61.2 hertz (Hz)). As a result, the starting voltage for some of the safety-related motors would not have been acceptable under EDG generator voltage and frequency limiting conditions. In response, Exelon entered the issue into their corrective action program and performed evaluation that determined that EDG actual test results demonstrated the EDGs to be operable. The team review of the evaluation determined it to be reasonable. This finding was more than minor because it was similar to Example 3.j of NRC IMC 0612, Appendix E, and 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 because it was a design deficiency confirmed not to result in a loss of safety-related motor operability or functionality. The team determined this finding had a cross-cutting aspect in the area of Problem Identification and Resolution (Identification, Aspect P.1), because during a calculation revision in 2014, Exelon did not recognize that the limits of voltage and frequency allowed by the station technical specifications affected the calculation results and, therefore, did not completely and accurately identify the issue and revise the calculation in accordance with the station's corrective action program requirements.
Inspection Report# : 2015007 *(pdf)*

Significance: G Jul 30, 2015
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Verify Adequate Voltage Available for DC Equipment
The team identified a finding of very low safety significance involving a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that Exelon's design control measures did not verify the adequacy of the design regarding adequate direct current voltage (Vdc). Specifically, Exelon did not ensure that adequate voltage existed to emergency diesel generator (EDG) relays and output breaker spring charging motors. Additionally, the team determined that the overall impact to voltage drop calculations was not adequately assessed when the temporary battery cart is used. Following identification of the issue, Exelon entered it into their corrective action program and evaluated the operability of the batteries, concluding that the affected DC components would function at the current battery capacities. The team's review of the evaluation determined it to be reasonable. The finding was more than minor because it was similar to Example 3.j of NRC IMC 0612, Appendix E, and was associated with the Design Control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure 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 because it was a design deficiency affecting the safety-related batteries that did not result in the loss of operability or functionality. The team determined this finding had a cross-cutting aspect in the area of Human Performance, (Documentation, Aspect H.7) because the battery sizing calculation was revised on March 15, 2014, which provided an opportunity to identify the inaccuracies

of the battery calculations.
Inspection Report# : 2015007 *(pdf)*

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Significance: G Mar 31, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
Entry Into A High Radiation Area Without Radiological Briefing and Complying With The RWP
A self-revealing Green NCV of LGS Unit 1 technical specification 6.12.1 was identified involving improper entry of two workers into the Unit 1 reactor drywell on
March 22, 2016. Specifically, the workers entered the drywell, an area controlled as a Locked High Radiation Area, without obtaining the required access radiological conditions briefing. Further, one of the two workers entered under the control of an RWP that did not authorize access into High Radiation Areas. Exelon initiated IR 2644005, restricted the workers from further radiological controlled area access, re-configured the access area, conducted an extent of condition and human performance review, issued a site communication, and performed a staff stand down.

This finding is more than minor because it is associated with the programs and process attribute of the Occupational Radiation Safety cornerstone and adversely affected the cornerstone objective to ensure adequate protection of workers from radiation exposure.

In addition, this example is similar to example 6.h of IMC 0612, Appendix E. Specifically, the workers did not receive a brief and did not review surveys prior to entering a work area with radiation levels that exceeded 100 mrem/hr at 30 cm. Using IMC 0609, Appendix C, “Occupational Radiation Safety Significance Determination Process,” the inspectors determined the finding was of very low safety significance (Green) because: 1) it was not an as low as is reasonably achievable (ALARA) finding, 2) there was no overexposure, 3) there was no substantial potential for an overexposure, and 4) the ability to assess dose was not compromised. The inspectors determined that this finding has a cross-cutting aspect in the area of Human Performance, Procedure Adherence, because the individuals failed to follow verbal work instructions. [H.8] (Section 2RS1)

Inspection Report# : 2016001 *(pdf)*

Significance: G Sep 30, 2015
Identified By: NRC
Item Type: NCV Non-Cited Violation
Inadequate Procedure for RWCU Backwashing Operations

A self-revealing Green NCV of Technical Specification (TS) 6.8.1.a, “Procedures and Programs,” occurred because Exelon failed to establish, implement, and maintain an adequate procedure for the control of radioactivity and limiting personnel exposure during operation of a solid radioactive waste system. Specifically, the procedure for the conduct of reactor water cleanup (RWCU) filter media backwashing and collection was inadequate to ensure a sufficient receiving tank volume prior to transferring waste media. On June 28, 2015, this resulted in the overflow of a Unit 2 RWCU collection tank and back up of the reactor building floor drain system, causing high levels of radioactive contamination in accessible portions of the Unit 2 reactor building, and resulting in radioactive contamination of personnel. Exelon controlled access, decontaminated affected areas and personnel, conducted bounding dose assessments, performed extent of condition reviews, and revised affected procedures to address the issue. Exelon placed this issue into the corrective action program as issue report (IR) 2520732.

This issue is more-than-minor because if left uncorrected, it had the potential to lead to a more significant safety concern. Specifically, the failure to effectively control and manage radioactive material could result in significant unplanned, unintended occupational radiation exposure of workers. Using IMC 0609, Appendix C, “Occupational Radiation Safety Significance Determination Process,” the inspectors determined that this finding was of very low safety significance (Green) because the finding did not involve an as low as is reasonable achievable (ALARA) issue, was not an overexposure, did not result in a substantial potential for an overexposure, and did not compromise the ability to assess dose. The inspectors determined this finding has a cross-cutting aspect in the area of Human Performance, Avoiding Complacency, because Exelon did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes, and therefore did not implement appropriate error reduction tools. Specifically, Exelon operated the backwash receiving tank (BWRT) to routinely accept high level alarms with associated potential for system overflow. Consequently, although this mode of operation of the system was longstanding, the issue reflects present performance [H.12]. (Section 2RS1)
Inspection Report# : 2015003 *(pdf)*

Public Radiation Safety

Significance: G Mar 31, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Implement Procedures for Control of Potentially Contaminated Clean Systems
The inspectors identified a Green NCV of technical specification 6.8.1 because Exelon failed to implement procedure CY-AA-170-210, “Potentially Contaminated System Control Program,” for the evaluation and control of potentially cross-contaminated systems. Specifically, Exelon did not implement CY-AA-170-210 for the evaluation and control of a potentially cross-contaminated system when samples collected from the Unit 2 service air system, a non-contaminated system, indicated the potential presence of contamination on June 16, 2015. Exelon entered this issue into the corrective action program (IR 2556568), restricted use of the service air system, conducted a 10 CFR 50.59 screening and radiological evaluation of the system, conducted bounding radiation dose analyses for both occupational workers and members of the public, conducted an extent of condition review, decontaminated the system, and subsequently modified operation of the service air system to preclude re-contamination.

This finding is more-than-minor because it is associated with the program and process attributes of the occupational and public radiation safety cornerstones and adversely affected both cornerstone objectives to ensure adequate protection of worker and public health and safety from exposure to radioactive material. Specifically, during the time the service air system was contaminated but not recognized as such and not restricted in use, the potential existed to inadvertently contaminate workers and release radioactive material to the environment. Using IMC 0609, Appendix C, “Occupational Radiation Safety Significance Determination Process,” the inspectors determined that this finding

was of
very low safety significance (Green) because the finding did not involve an as low as is reasonably achievable (ALARA) issue, was not an overexposure, did not result in a substantial potential for an overexposure, and did not compromise the ability to assess dose. In addition, using IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," the inspectors determined that the issue did not involve a substantial failure to implement the effluent release program and did not result in public doses exceeding 10 CFR 50, Appendix I or 10 CFR 20.1301 (e) and thus was of very low safety significance (Green). The inspectors determined this finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Exelon
did not take effective corrective actions when service air system issues were identified. [P.3] (Section 4OA3)

Inspection Report# : 2016001 *(pdf)*

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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