



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I**
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

February 5, 2013

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

**SUBJECT: LIMERICK GENERATING STATION – NRC INTEGRATED INSPECTION
REPORT 05000352/2012005 AND 05000353/2012005**

Dear Mr. Pacilio:

On December 31, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Limerick Generating Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on January 11, 2013 with Mr. T. Dougherty, Site Vice President, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two findings of very low safety significance (Green). One of these findings was determined to involve a violation of NRC requirements. Additionally, two licensee-identified violations, which were determined to be of very low safety significance, are listed in this report. However, because of the very low safety significance, and because they are entered into your corrective action program, the NRC is treating these findings as non cited violations (NCVs), consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Limerick Generating Station. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Limerick Generating Station.

In accordance with 10 Code of Federal Regulations (CFR) 2.390 of the NRCs "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly

M. Pacilio

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Sincerely,

/RA/

Mel Gray, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos.: 50-352, 50-353
License Nos.: NPF-39, NPF-85

Enclosure: Inspection Report 05000352/2012005 and 05000353/2012005
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.: 50-352, 50-353

License Nos.: NPF-39, NPF-85

Report No.: 05000352/2012005 and 05000353/2012005

Licensee: Exelon Generation Company, LLC

Facility: Limerick Generating Station, Units 1 & 2

Location: Sanatoga, PA 19464

Dates: October 1, 2012 through December 31, 2012

Inspectors: E. DiPaolo, Senior Resident Inspector
J. Hawkins, Resident Inspector
A. Rosebrook, Senior Project Engineer
J. Caruso, Senior Operations Engineer
R. Nimitz, Senior Health Physicist
P. Kaufman, Senior Reactor Inspector
S. Barr, Senior Emergency Preparedness Specialist
C. Newport, Operations Engineer
J. DeMarshall, Senior Operations Engineer (In-Training)

Approved By: Mel Gray, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000352/2012005; 05000353/2012005; 10/01/2012 - 12/31/2012; Limerick Generating Station, Units 1 and 2; Licensed Operator Requalification and Post-Maintenance Testing.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. The inspectors identified two findings of very low safety significance, one of which was a non-cited violation (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects for the findings were determined using IMC 0310, "Components Within Cross-Cutting Areas." Findings for which the SDP does not apply may be Green, or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NRC Technical Report Designation (NUREG)-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green finding 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. Exelon staff entered this finding into their corrective action program (CAP) (IR 1437839), conducted a prompt investigation, assigned an action to complete the annual operating exam scenario set for the crew in question, and initiated an Apparent Cause Evaluation (ACE).

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. 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, the simulator scenario re-exam administered following a failed Annual Operating Test did not meet procedure requirements for number of scenarios. [H.4(b)]. (Section 1R11.3)

- Green. 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 emergency diesel generator (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. Exelon entered the issue into their CAP as IR 1453737, conducted a human performance review board, drained and flushed the tank to restore fuel oil quality, and initiated an ACE.

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 Exelon staff. The finding was determined to be of very low safety significance (Green) in accordance with Section A of Exhibit 2 of 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 as directed by the work order 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)

Other Findings

Two violations of very low safety significance that were identified by Exelon personnel were reviewed by the inspectors. Corrective actions taken or planned by Exelon have been entered into Exelon's CAP. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On October 29, during a period of high winds due to Storm Sandy, operators reduced power to approximately 49 percent in response to lowering main condenser vacuum and high grid voltage. Operators returned the unit to 100 percent power on October 30. Power was reduced to approximately 87 percent on October 31 to facilitate a follow-up control rod pattern adjustment. Power was returned to 100 percent on November 1. An additional power reduction to 93 percent and follow-up control rod pattern adjustment was performed on November 3. Operators returned power to 100 percent on November 4. On November 12, power automatically reduced to approximately 70 percent when single loop operation was entered following the trip of the 'A' reactor recirculation pump. The cause of the trip was the loss of the pump's adjustable speed drive (ASD) due to solid state controller failures. Operators further reduced power to approximately 36 percent per procedural requirements. Following troubleshooting and repair of the adjustable speed drive, operators restarted the 'A' reactor recirculation pump on November 15 and restored power to 100 percent later that day. A power reduction to approximately 80 percent was performed on November 16 to facilitate a follow-up control rod pattern adjustment and power was returned to 100 percent later that day. On December 7, operators reduced power to approximately 20 percent to remove the main turbine from service (Maintenance Outage 1M53) to facilitate repairs to stop a steam leak on the '1A2' moisture separator manway cover, repairs to the main generator hydrogen seal system and repairs to a low pressure turbine bleeder trip valve. Following the repairs, the main turbine was returned to service and the generator was synchronized to the grid on December 9. Unit 1 was returned to 100 percent power on December 10. Unit 1 remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. On October 5, operators reduced power to approximately 65 percent to facilitate planned main condenser circulating water box cleaning, control rod scram time testing, and a control rod pattern adjustment. Operators returned power to 100 percent on October 6. Power was reduced to approximately 90 percent on October 12 to facilitate a follow-up control rod pattern adjustment. Power was returned to 100 percent later that day. On October 29, during a period of high winds due to Storm Sandy, operators reduced power to approximately 21 percent in response to lowering main condenser vacuum and high grid voltage. Operators returned the unit to 100 percent power on October 31. An additional power reduction to approximately 80 percent and follow-up control rod pattern adjustment was performed on November 1. Power was returned to 100 percent later that day. Operators reduced power to approximately 90 percent on November 16 to facilitate a control rod pattern adjustment. Operators restored power to 100 percent later that day. On December 16, operators reduced power to approximately 81 percent facilitate main turbine valve testing, control rod fuel channel distortion testing, and to perform a control rod exercise. Unit 2 was returned to 100 percent on December 17. Unit 2 remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

Site Imminent Weather Conditions

a. Inspection Scope

During the approach of Storm Sandy to Montgomery County area, the inspectors attended storm preparation status meetings, reviewed site preparations for adverse weather, and reviewed preparations for plant damage assessment. The inspectors toured risk-significant and susceptible plant areas to verify the implementation of adverse weather preparation procedures and compensatory measures before the onset of adverse weather conditions. From October 29 until October 30, the inspectors observed plant response to the adverse weather and monitored Exelon's damage assessment, review of emergency response capabilities, and corrective actions as a result of the storm. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04Q – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- EDG D14 following return-to-service for a two year overhaul
- 'B' control room emergency fresh air system when 'A' control room emergency fresh air system was out-of-service for testing on December 11, 2012
- Unit 1 scram discharge volume level transmitters with LT-047-1N012C found out-of-calibration (Issue Report (IR) 1447377)
- Unit 1 seismic monitoring accelerometers with channel 1 failed (IR 1449120)

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the Updated Final Safety Analysis Report (UFSAR), technical specifications (TS), work orders, IRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Exelon staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

The inspectors performed a complete system walkdown of accessible portions of the Unit 2 fuel pool cooling system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hangar and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related IRs and work orders to ensure Exelon appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 4 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Exelon controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Fire Area 32, Unit 1 'A' and 'C' Residual Heat Removal (RHR) Heat Exchanger and Pump Rooms 102 and 103 (Elevation 177' and 201') [F-R-102 Unit 1]
- Fire Area 35, Unit 1 Core Spray Pump Room 'A' (Elevation 177') [F-R-110 Unit 1]
- Fire Area 96, Unit 1 Battery Room (Elevation 239') [F-T-443 Unit 1]
- Fire Area 109, Unit 2 Battery Room (Elevation 239') [F-T-460 Unit 2]

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed a fire brigade drill scenario conducted on October 10, 2012, that involved a simulated fire in the Unit 2 Cable Spreading Room. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that Exelon personnel identified deficiencies, openly discussed them in a self-critical manner at the debrief, and took appropriate corrective actions as required. The inspectors evaluated specific attributes as follows:

- Proper wearing of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate fire-fighting techniques
- Sufficient fire-fighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas
- Smoke removal operations
- Utilization of pre-planned strategies
- Adherence to the pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with Exelon's fire-fighting strategies.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the Unit 1 fuel pool cooling system heat removal capability test to determine the system's readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the components and verified Exelon's commitments to NRC Generic Letter 89-13. The inspectors reviewed the results of previous tests and issues with the system's performance. The inspectors discussed the results of the most recent inspection with engineering staff. The inspectors verified that Exelon staff initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program

.1 Resident Inspector Quarterly Review of Regualification Activities on the Simulator (71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed licensed operator simulator training scenarios conducted on November 20, 2012. The scenarios focused on operational decision making during four abnormal operating scenarios. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room (71111.11Q - 1 sample)

a. Inspection Scope

The inspectors observed licensed operator performance in the main control room during the reduction of main condenser vacuum, the reduction of service water flow, and abnormal high electrical grid voltage on Units 1 and 2 as a result of high winds from Storm Sandy on October 29-30, 2012. The inspectors observed operator actions to lower power on both units as a result of these conditions. The inspectors verified operator compliance and use of plant procedures, performance of procedure step in the proper sequence, and proper TS usage. Prejob briefs, the use of human error prevention techniques, communications between crew members, and supervision of activities were observed to verify that they were performed consistent with established plant practice.

b. Findings

No findings were identified.

.3 Licensed Operator Requalification (71111.11B – 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program."

Examination Results

On November 9, 2012, the results of the annual operating tests for 2012 were reviewed to determine if pass/fail rates were consistent with the guidance of NUREG-1021, Revision 9, Supplement 1, Operator Licensing Examination Standards for Power

Reactors and NRC Manual Chapter 0609, Appendix I, Operator Requalification Human Performance SDP was also performed. The review verified the following:

- Individual pass rate on the dynamic simulator test was greater than 80 percent. (Pass rate was 90.5 percent.)
- Individual pass rate on the job performance measures (JPMs) of the operating exam was greater than 80 percent. (Pass rate was 100 percent.)
- Individual pass rate on the written examination was greater than 80 percent. (N/A - Biennial written examination was not administered this year.)
- More than 80 percent of the individuals passed all portions of the exam. (90.5 percent of the individuals passed all portions of the operating examination.)
- Crew pass rate was greater than 80 percent. (Pass rate was 90 percent.)

Written Examination Quality

The inspectors reviewed two reactor operator and two senior reactor operator biennial written examinations both administered during 2011 examination cycle (i.e., since biennial written examinations were not being administered in the 2012 exam cycle) for qualitative and quantitative attributes as specified on Appendix B of Attachment 71111.11, Licensed Operator Requalification.

Operating Test Quality

Twelve JPMs and eight scenarios were reviewed for qualitative and quantitative attributes as specified in Appendix C of Attachment 71111.11, Licensed Operator Requalification.

Licensee Administration of Operating Tests

Observations were made of the dynamic simulator exams and JPMs administered during the week of November 5, 2012. These observations included facility evaluations of crew and individual performance during the dynamic simulator exams and individual performance of five JPMs.

Examination Security

The inspectors assessed whether Exelon staff properly safeguarded exam material. JPMs, scenarios, and written examinations were checked for excessive overlap of test items.

Remedial Training and Re-examination

The remediation plans for one operating crew that failed their annual operating test (week two) of the current exam cycle, five individual failures on the 2011 biennial written exam and one failure of the 2012 (off year) comprehensive written during this requalification cycle were reviewed to assess the effectiveness of the remedial training.

For those who had failed the biennial written examination, the inspectors confirmed that the remediation examinations did not duplicate questions from the failed examinations and that areas of weakness were appropriately retested.

Conformance with License Conditions

Medical records for six individuals were reviewed for compliance with NRC regulations. Eight quarters of proficiency watch records were reviewed to ensure that licensed operators were standing the appropriate type and number of watches for maintaining proficiency credit. In addition, five license reactivation records were reviewed for completeness.

Simulator Performance

Simulator performance and fidelity were reviewed for conformance to the reference plant control room including: five simulator work requests (SWRs) closed in the past two years; two SWRs still open; two transient tests; three steady state tests; two scenario based tests; and one core performance test.

Problem Identification and Resolution

Recent operating history found in inspection reports and the licensee's CAP was reviewed by the inspectors. The inspectors also reviewed specific events from the licensee's CAP which indicated possible training deficiencies to verify that they had been appropriately addressed. The resident inspectors were also consulted for insights regarding licensed operators' performance. The Plant Issues Matrix and the latest problem identification and resolution report were also reviewed to identify operator performance issues and potential training deficiencies.

b. Findings

Introduction. The inspectors identified a Green finding 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 LORT Annual Operating Test.

Description. The NRC-required dynamic simulator portion of the LORT Annual Operating Test is designed to ensure that licensed operators maintain safe standards of knowledge and ability in order to take appropriate safety-related actions in response to actual abnormal or emergency conditions. As part of the biennial LORT Program inspection, the inspectors evaluated the remediation package for the crew that failed the scenario examination portion of their Annual Operating Test during week two of the 2012 exam cycle. Only one scenario was used to reevaluate the crew. Exelon procedure TQ-AA-150, "Operator Training Programs," step 4.9.2.2 states, "The Annual Operating Test consists of at least five (5) JPMs and two (2) dynamic simulator scenarios." TQ-AA-155, "Conduct of Simulator Training and Evaluation," step 4.3.2.6 states, "If a crew receives a FAIL grade, then all associated crewmembers shall be evaluated using a scenario set for Annual Operating Tests, before being returned to licensed duties." The crew was remediated, a Performance Review Committee meeting held, and a single

scenario used to reevaluate the crew and restore qualifications prior to standing watch. This is contrary to the aforementioned Exelon procedures as well as both NRC inspection and established industry guidance since the actions taken did not satisfy successful completion of the annual operating exam (i.e., the re-exam was not equivalent in scope to the original exam failed and comprised of at least two scenarios). Adhering to established guidelines for administering a simulator scenario re-exam is important because it establishes an objective standard used throughout the nuclear industry to ensure that NRC-required requalification examinations adequately assess the ability of licensed operators to perform at acceptable levels, thereby minimizing plant risk associated with poor operator performance. Effective remediation and quality re-examinations are associated with Element 5 (Evaluation) of the Systematic Approach to Training. Exelon entered this finding into their CAP (IR 1437839), conducted a prompt investigation, assigned an action to complete the annual operating exam scenario set for the crew in question, and initiated an Apparent Cause Evaluation.

Analysis. The inspectors determined that Exelon staff not ensuring that NRC-required requalification examinations met the established standards for NRC simulator scenario examinations (i.e., a scenario set) was a performance deficiency that was reasonably within Exelon's ability to foresee and correct, and should have been prevented. The inspectors determined that 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). Specifically, the finding affected the administration of simulator scenario requalification examinations, which potentially impacted Exelon's ability to appropriately evaluate licensed operators.

The risk importance of this issue was evaluated using IMC 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)." IMC 0609, Appendix I, Block 12, "Related to Licensee Remedial Training and Re-exams?" was determined to be directly applicable. Block 12 directs using NRC IP 71111.11, "Licensed Operator Requalification," Appendix F, "Remedial Training and Re-Examination Checklist." Block 1 of IP 71111.11 Appendix F states, in part, "Re-examinations administered by the facility licensee are commensurate with the original failures. To be considered commensurate, determine the nature of the original failure (written, JPM, or scenario examination) and apply the criteria contained in Appendix C of this IP for JPM and simulator scenario re-examinations (i.e., a minimum of 5 JPMs, at least 40% of JPMs are alternate path, each licensed operator evaluated using at least two simulator scenarios, each simulator scenario contains at least the minimum number of events). Based on this screening criteria, the finding was characterized as having very low safety significance (Green). 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, the simulator scenario re-exam administered following a failed Annual Operating Test did not meet procedure requirements for number of scenarios.

Enforcement. 10 CFR 55.59, "Requalification," Section 4, "Evaluation," requires, in part, that the requalification program must include annual operating tests which determine areas in which retraining is needed to upgrade licensed operator and senior operator knowledge. However, the regulation does not specify a requirement for the number of scenarios required for simulator re-examination following crew failure of the dynamic

simulator portion of the exam. Therefore, no violation of regulatory requirements occurred. Enforcement action does not apply because the performance deficiency did not involve a violation of a regulatory requirement. Exelon entered this issue into the CAP as IR 1437839. Because this finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as a FIN (**FIN 05000352, 353/2012005-01, Failure to Administer an NRC Annual Operating Test Simulator Scenario Re-examination that Met Procedural Requirements**).

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, or component (SSC) performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance work orders, and maintenance rule basis documents to ensure that Exelon staff were identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by Exelon staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- IR 1406879, Maintenance rule (a)(1) determination for system 035, 66 kilo-volt substation third offsite power source
- IR 1421931, 101 safeguard transformer not tapping/preventive maintenance (PM) deferral

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the emergent work activities listed below to verify that Exelon staff performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Exelon personnel performed risk assessments as required by 10 CFR 60.65(a)(4) and that the assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- IR 1425575, Additional testing required for several replaced 4 kilo-volt circuit breakers (emergent)
- IRs 143616 and 1436208, Testing of EDGs D14 and D23 due to discovery of engine turbochargers being replaced without ASME section XI pressure testing being performed (emergent)
- IR 1433262, High grid voltage condition and reduced main condenser vacuum as a result of Storm Sandy requiring emergent downpowers on Units 1 and 2 (emergent)
- IR 1438772, Unit 1 'A' ASD failure due to loss of solid-state controllers causing the 'A' reactor recirculation pump to trip on November 12, 2012 (emergent)
- IR 1439669, Overspeed trip of EDG of D24 during surveillance testing (emergent)

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 3 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions:

- IR 1421099, Unit 1 'A' RHR pump operability determination with scaffold ladder in contact with pump motor
- IR 1423511, Unit 1 reactor water cleanup pump room temperatures low out of required band (plant leak detection system and reactor water cleanup operability determination)
- IRs 1439669 and 1440148, Extent-of-condition operability reviews following overspeed trip of EDG D24 during testing

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to Exelon's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon personnel. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 3 samples)

Permanent Modifications

a. Inspection Scope

The inspectors reviewed the permanent modifications listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the permanent modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- Engineering Change Request (ECR) 12-00387, Motor-Operated Containment Isolation Valve Modification to Resolve Potential to Not Fully Close following Electrical Load Shed
- ECR 12-00463, Defeat of Invalid Diagnostic Signal Circuit on 1 'A' ASD Redundant Controller Dual Power Supply Assemblies
- ECR 11-00219, EDG Speed Switch Replacement due to Obsolescence

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure was consistent with the information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- ST-6-051-231-1 'A' RHR Pump, Valve and Flow Test as post maintenance test for Unit 1 'A' RHR pump electrical PM
- IR 1236028, EDG D22 potential transformer and excitation equipment replacement
- IR 1412607, Unit 1 main steam line (MSL) high flow failed time response testing
- IR 1423970, Perform inverter component replacement PM
- IR 1441842, EDG D24 over speed linkage adjustment
- IR 1445893, Delayed response in EDG D22 K1 relay discovered following replacement (C0244579)
- R1241103, EDG D13 fuel oil day tank PM

b. Findings

Introduction. A self-revealing Green NCV of Technical Specification 6.8.1, "Administrative Controls-Procedures," was identified because Exelon personnel 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.

Description. During an EDG D13 break-in run while in a system outage window on December 14, 2012, operators secured the engine following the receipt of fuel oil strainer high differential pressure alarm. This was the third alarm received during the run. During initial startup of the EDG, a high differential pressure alarm was received on the fuel oil strainer associated with the direct current (DC) fuel oil pump. The second alarm was for the in-service fuel oil strainer associated with the engine-driven fuel oil pump. Operators responded by swapping from the in-service strainer to a clean, standby strainer.

Exelon performed troubleshooting of EDG D13 and determined that the cause of the high differential pressures was due to the presence of sludge that originated from the EDG's fuel oil day tank. Exelon performed flushes and filtering of the fuel oil in the day tank to restore the fuel oil particulate levels to within specifications. This resulted in approximately 40 hours of additional unplanned unavailability for EDG D13. Extent of condition sampling of the other site EDGs was performed with satisfactory results.

The inspectors reviewed the maintenance that was performed during the EDG D13 system outage window. Work Order R1241103 performed a draining, cleaning and inspection of the fuel oil day tank. This recurring Work Order was updated in 2011 during a performance centered maintenance template change to add the tank cleaning requirement. As written, the work instructions required the tank to be cleaned and then visually inspected. Work order completion remarks documented that the tank was drained, inspected with a borescope and that no cleaning was required, based on the inspection results. Exelon determined the cause of the fuel oil strainer high differential pressures was caused by sludge in the day tank, built up over the years of operation, being stirred up and mixing with fuel oil during the initial refilling of the day tank. The inspectors questioned why the work instructions were not changed to reflect the change in work scope. Also, the inspectors questioned the effectiveness of the tank inspection with a borescope because the inspection had not detected the sludge at the bottom of the tank.

Exelon conducted a Human Performance Review Board to review the event. The PM on the EDG day tanks was added in 2011. The purpose of the new PM was to periodically drain, clean, and inspect the fuel oil day tanks to satisfy license renewal commitments for the Fuel Oil Chemistry Aging Management Program. During preparation of the first day tank cleaning on EDG D22 in November 2011, discussions involving how to clean the tank occurred between the maintenance supervisor, maintenance technicians, and system engineering due to limited access to the tank internals. The use of a chemical wash was discussed but it was determined that this method was not feasible due to lack of a manway. The maintenance supervisor determined that the need for tank cleaning would be based on the results of the tank borescope inspection. If the inspection results were unsatisfactory, then a method would have to be devised to insert a vacuum into a lower tank plug to clean any observed material. The plan was covered during pre-job briefings and implemented on EDG D22 in November 2011, on EDG D14 in October 2012, and on EDG D13 in December 2012. Contrary to station procedural requirements the work order instructions were not revised to reflect the new plan. In addition no IR

was generated to document the issue. The inspectors concluded that the work order revision and IR generation were missed opportunities to identify that deferral of the day tank cleaning based on inspection results was inappropriate and did not meet the intent of the new PM requirements. If the PM had been performed as intended, the unplanned unavailability of EDG D13 could have been avoided.

Analysis. The failure of station workers to revise work instructions when they determined that the work order instructions for cleaning EDGs D13, D14, and D22 fuel oil day tanks could not be performed as written was a performance deficiency that was reasonably within Exelon's ability to foresee and correct and could have been prevented. The performance deficiency was also contrary to Exelon's procedure use and adherence requirements, as this procedure is applicable to work order instructions. 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 Section A of Exhibit 2 in Appendix A of IMC 0609, "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 the 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. This resulted in EDG D13 accruing approximately 40 hours of unplanned unavailability between December 14 and 16, 2012.

Enforcement. Technical Specification 6.8.1, "Administrative Controls-Procedures," states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures as recommended in NRC Regulatory Guide (RG) 1.33, Appendix A, Revision 2, February 1978. NRC RG 1.33, Appendix A, Section 1, requires administrative procedures for procedure adherence. Exelon procedure HU-AA-104-101, "Procedure Use and Adherence," Revision 4, provides direction on how approved procedures, including work instructions within a work package, are to be used and adhered to by company and contractor personnel while conducting activities at Exelon Nuclear facilities. HU-AA-104-101, step 3.2.1, requires that if a procedure cannot be performed as written, then initiate a Procedure Change Request or other appropriate action and revise the procedure prior to continuing. Contrary to HU-AA-104, in November 2011 maintenance workers including their supervisor determined that cleaning the EDG D22 fuel oil day tank could not be performed as written in Work Order R1206296 and a Procedure Change Request or other appropriate action was not initiated and the procedure was not revised prior to continuing with the work order. Similar improper actions were also taken in October 2012 and in December 2012 for identical work being performed on EDG D14 and EDG D13, respectively. As a result, EDG D13's fuel oil day tank was not cleaned when required and this resulted in unplanned unavailability. Because the finding is of very low

safety significance and has been entered into Exelon's CAP as IR 1453737, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy. **(NCV 05000352, 353/2012005-02, Failure to Revise EDG Tank Cleaning Work Instructions)**

1R22 Surveillance Testing (71111.22 – 1 Routine, 1 In-Service Test, 1 Reactor Coolant System (RCS) Leak)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied technical specifications, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- ST-4-049-951-2, In-Service Inspection Pressure Test of Reactor Core Isolation Pump and Turbine Supply performed on Unit 2
- ST-6-092-366-0, Inoperable Unit 2 Safeguard Power Supply Actions for Both Units performed following EDG D24 being rendered inoperable on November 14, 2012
- ST-6-107-590-1, Daily Surveillance Log/OPCONS 1, 2, 3 performed on Unit 1 the week of November 25, 2012 (including reactor coolant system leakage measurement)

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation

a. Inspection Scope (71114.02 - 1 sample)

An onsite review was conducted to assess the maintenance and testing of the Alert and Notification System (ANS). During this inspection, the inspectors conducted a review of the ANS testing and maintenance programs. The inspectors reviewed the associated ANS procedures and the Federal Emergency Management Agency approved ANS Design Report to ensure compliance with design report commitments for system maintenance and testing. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 2. 10 CFR 50.47(b)(5) and the related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System

a. Inspection Scope (71114.03 - 1 sample)

The inspectors conducted a review of the Limerick Emergency Response Organization (ERO) augmentation staffing requirements and the process for notifying and augmenting the ERO. The review was performed to verify the readiness of key licensee staff to respond to an emergency event and to verify Exelon's ability to activate their emergency response facilities (ERFs) in a timely manner. The inspectors reviewed the Exelon Nuclear Standardized Emergency Plan and the Limerick Emergency Plan Annex for ERF activation and ERO staffing requirements, the ERO duty roster, applicable station procedures, augmentation test reports, the most recent drive-in drill report, and IRs related to this inspection area. The inspectors also reviewed a ample of ERO responder training records to verify training and qualifications were up to date. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 3. Title 10 CFR 50.47(b)(2) and related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP5 Maintaining Emergency Preparedness

a. Inspection Scope (71114.05 - 1 sample)

The inspectors reviewed a number of activities to evaluate the efficacy of Exelon's efforts to maintain the Limerick emergency preparedness (EP) program. The inspectors reviewed: Letters of Agreement and/or Memorandums of Understanding with offsite agencies; the 10 CFR 50.54(q) Emergency Plan change process and practice; licensee maintenance of equipment important to EP; records of evacuation time estimate population evaluation; and provisions for, and implementation of, primary, backup, and alternate ERF maintenance. The inspectors also verified Exelon's compliance at Limerick with new NRC EP regulations regarding: emergency action levels for hostile action events; protective actions for on-site personnel during events; emergency declaration timeliness; ERO augmentation and alternate facility capability; evacuation time estimate updates; on-shift ERO staffing analysis; and ANS back-up means.

The inspectors further evaluated Exelon's ability to maintain their EP program through their identification and correction of EP weaknesses, by reviewing a sample of drill reports, actual event reports, self-assessments, 10 CFR 50.54(t) audits and EP-related IRs. The inspectors reviewed a sample of EP-related condition reports initiated at Limerick from November 2010 through December 2012. The inspection was conducted in accordance with NRC Inspection Procedure 71114.05. Title 10 CFR 50.47(b) and the related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 1 sample)Emergency Preparedness Drill Observationa. Inspection Scope

The inspectors evaluated the conduct of a table top simulated emergency preparedness drill performed in the technical support center and operations support center on November 29, 2012 to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the technical support center, and operations support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspectors' observations with those identified by Exelon staff in order to evaluate Exelon's critique and to verify whether the Exelon staff was properly identifying weaknesses and entering them into the CAP.

b. Findings

No findings were identified.

2. **RADIATION SAFETY****Cornerstone: Public Radiation Safety and Occupational Radiation Safety**2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 1 sample)a. Inspection Scope

This area was inspected to: (1) review and assess Exelon's performance in assessing the radiological hazards in the workplace associated with licensed activities and the implementation of appropriate radiation monitoring and exposure control measures for both individual and collective exposures, (2) verify Exelon staff are properly identifying and reporting Occupational Radiation Safety Cornerstone performance indicators, and (3) identify those performance deficiencies that were reportable as a performance indicator and which may have represented a substantial potential for overexposure of the worker.

During the week of November 12, 2012, the inspectors interviewed the radiation protection manager, radiation protection (RP) supervisors, radiation protection technicians, and radiation workers. The inspectors performed walkdowns of various portions of the station, performed independent radiation dose rate measurements, observed work activities in Radiological Control Areas and reviewed Exelon documents. The inspectors used the requirements in 10 CFR 20 and guidance in RG 8.38, "Control of Access to High and Very High Radiation Areas for Nuclear Plants"; the TS; and Exelon's procedures required by TS, as criteria for determining compliance.

Inspection Planning

The inspectors reviewed 2011 and 2012 Exelon performance indicators for the occupational exposure cornerstone for the Limerick Generating Station. The inspectors reviewed the results of available RP program audits and assessments. The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors determined if there had been changes to plant operations since the last inspection that may have resulted in a significant new radiological hazard for onsite workers or members of the public. The inspectors evaluated whether the Exelon assessed the potential impact of these changes and had implemented periodic monitoring, as appropriate, to detect and quantify the radiological hazard.

The inspectors reviewed various radiological surveys from radiological work locations within the facility. The inspectors also reviewed surveys from the most recent refueling outage. The inspectors evaluated whether the thoroughness and frequency of the surveys were appropriate for the given new radiological hazard.

The inspectors conducted walkdowns and independent radiation measurements in the facility to evaluate material and radiological conditions.

The inspectors selectively reviewed radiologically risk-significant work activities.

Instructions to Workers

The inspectors selectively evaluated whether containers holding radioactive materials were labeled and controlled in accordance with 10 CFR Part 20 requirements.

The inspectors reviewed instances where worker's electronic personal dosimeter (EPD) noticeably malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal condition. The inspectors assessed whether the issue was included in the CAP and whether compensatory dose evaluations were conducted, as appropriate.

Contamination and Radioactive Material Control

The inspectors observed locations where the Exelon staff monitors potentially contaminated material leaving the radiological controlled area and inspected the methods used for control, survey, and release of these materials from these areas. The inspectors observed the performance of personnel surveying and releasing material for unrestricted use and evaluated whether the work was performed in accordance with plant procedures.

The inspectors selected sealed sources from Exelon's inventory records to verify the sources were accounted for and verified to be intact.

The inspectors selectively reviewed transactions, as available, involving nationally tracked sources to ensure reporting in accordance with 10 CFR 20.2207.

Radiological Hazards Control and Work Coverage

The inspectors evaluated ambient radiological conditions and performed independent radiation measurements during the walkdowns of the facility. The inspectors assessed whether the conditions were consistent with applicable posted surveys, radiation work permits (RWPs), and associated worker briefings.

The inspectors evaluated the adequacy of radiological controls, such as required surveys, radiation protection job coverage and contamination controls. The inspectors evaluated Exelon's use of EPDs in high noise areas that were also high radiation areas (HRAs).

The inspectors assessed whether radiation monitoring devices were placed on the individual's body consistent with Exelon procedures. The inspectors assessed whether the dosimeter was placed in the location of highest expected dose or that Exelon staff properly implemented an NRC-approved method of determining effective dose equivalent.

The inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel in high radiation work areas with significant dose rate gradients.

The inspectors reviewed RWPs for work within potential airborne radioactivity areas (e.g., fuel transfer canal) with the potential for individual worker internal exposures.

The inspectors examined the posting and physical controls for selected HRAs and very high radiation areas (VHRA) to verify conformance with the occupational performance indicator.

Risk-Significant HRA and VHRA Controls

The inspectors discussed with the radiation protection manager and radiation protection supervisors and technicians the controls and procedures for high risk HRAs and VHRA. The inspectors assessed whether any changes to Exelon procedures substantially reduced the effectiveness and level of worker protection.

Radiation Worker

The inspectors observed the performance of radiation workers with respect to stated RP work requirements. The inspectors assessed whether workers were aware of the radiological conditions in their workplace and the RWP controls/limits in place, and whether their behavior reflected the level of radiological hazards present.

The inspectors reviewed available radiological problem reports since the last inspection. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by Exelon staff to resolve the reported problems.

RP Technician Proficiency

The inspectors observed the performance of the RP technicians with respect to controlling radiation work.

The inspectors reviewed available radiological problem reports since the last inspection. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by Exelon staff to resolve the reported problems.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were being identified by Exelon staff at an appropriate threshold and were properly addressed for resolution in Exelon's CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by Exelon staff that involve radiation monitoring and exposure controls. The inspectors assessed Exelon's process for applying operating experience to their plant.

b. Findings

No findings were identified.

2RS2 Occupational ALARA Planning and Controls (71124.02)

a. Inspection Scope

This area was inspected during the week of November 12, 2012, to assess performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements in 10 CFR Part 20; RG 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Plants will be As Low As Reasonably Achievable"; RG 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposure As Low as Reasonably Achievable"; TSs; and Exelon's procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed pertinent information regarding Limerick Generating Station collective dose history, current exposure trends, and ongoing or planned activities in order to assess current performance and exposure challenges. The inspectors reviewed the plant's three year rolling average collective exposure.

The inspectors compared the site-specific trends in collective exposures against the industry average values and those values from similar vintage reactors. In addition, the inspectors reviewed any changes in the radioactive source term. The inspectors reviewed site-specific procedures associated with maintaining occupational exposures ALARA, which included a review of processes used to estimate and track exposures from specific work activities.

Radiological Work Planning

The inspectors selected various work activities that had the expected highest exposure significance and reviewed Exelon's planning and preparation for the work activities as well as ongoing work.

The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure reduction requirements. The inspectors determined whether Exelon staff reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

The inspectors compared the results achieved (dose rate reductions, person-rem used), with the intended dose established in Exelon's ALARA planning for these work activities. The inspectors compared the person-hour estimates provided by maintenance planning and other groups to the RP group actual person-hours for the work activity time requirements, and evaluated the accuracy of these time estimates. The inspectors assessed the reasons for any inconsistencies between intended and actual work activity doses.

The inspectors determined whether work in-progress reviews were conducted to identify lessons learned. If problems were identified, the inspectors verified that worker suggestions for improving dose/contamination reduction techniques were entered into Exelon's CAP. The inspectors selectively reviewed radiological work post-job reviews.

Verification of Dose Estimates and Exposure Tracking Systems

The inspectors evaluated whether Exelon had established measures to track, trend, and if necessary, to reduce occupational doses for ongoing work activities. The inspectors assessed whether dose threshold criteria were established to prompt additional reviews and/or additional ALARA planning and controls.

The inspectors evaluated Exelon's method of adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work were encountered. The inspectors assessed whether adjustments to exposure estimates were based on sound RP and ALARA principles or if they were just adjusted to account for failures to plan/control the work.

Source Term Reduction and Control

The inspectors discussed with Exelon staff and used Exelon records to determine the historical trends and current status of plant source term known to contribute to elevated facility collective exposure. The inspectors assessed whether Exelon had made allowances or developed contingency plans for expected changes in the source term as the result of changes in plant fuel performance issues or changes in plant primary chemistry. The inspectors reviewed chemistry data for evaluating source term clean-up. The inspectors made independent radiation measurements to evaluate source term clean-up efforts.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with ALARA planning and controls were being identified by Exelon staff at an appropriate threshold and were properly addressed for resolution in Exelon's CAP.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

a. Inspection Scope

This area was inspected during the week of November 12, 2012, to verify in-plant airborne concentrations were being controlled consistent with ALARA principles and the use of respiratory protection devices on-site did not pose an undue risk to the wearer. The inspectors used the requirement in 10 CFR Part 20; the guidance in RG 8.15, "Acceptable Programs for Respiratory Protection"; RG 8.25, "Air Sampling in the Workplace"; NUREG-0041, "Manual of Respiratory Protection Against Airborne Radioactive Material"; TSs; and Exelon's procedures required by TSs as criteria for determining compliance.

The inspectors reviewed reported performance indicators to identify any related to unintended dose resulting from intakes of radioactive material.

Engineering Controls

The inspectors reviewed Exelon's use of permanent and temporary ventilation to determine whether Exelon staff used ventilation systems as part of its engineering controls to control and limit airborne radioactivity. The inspectors reviewed procedural guidance for use of installed plant systems to reduce dose and assessed whether the systems are used, to the extent practicable, during high-risk activities.

The inspectors assessed whether Exelon staff had established threshold criteria for evaluating levels of airborne beta-emitting and alpha-emitting radionuclides.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with the control and mitigation of in-plant airborne radioactivity were being identified by Exelon staff at an appropriate threshold and were properly addressed for resolution in Exelon's CAP. The inspectors assessed whether the corrective actions were appropriate for a selected sample of problems involving airborne radioactivity and were appropriately documented by Exelon staff.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

a. Inspection Scope

This area was inspected during the week of November 12, 2012, to ensure occupational dose was appropriately monitored and assessed. The inspectors used the requirements in 10 CFR Part 20; the guidance in RG 8.13, "Instructions Concerning Prenatal Radiation Exposures"; RG 8.36, "Radiation Dose to Embryo Fetus"; RG 8.40, "Methods for Measuring Effective Dose Equivalent from External Exposure"; TSs; and Exelon's procedures required by TSs, as criteria for determining compliance.

Inspection Planning

The inspectors selectively reviewed the results of available RP program audits and self-assessments related to internal and external dosimetry. The inspectors reviewed the most recent National Voluntary Laboratory Accreditation Program (NVLAP) accreditation report on the Exelon vendor's most recent results to determine the status of the accreditation.

The inspectors selectively reviewed Exelon procedures associated with dosimetry operations, including issuance/use of external dosimetry, assessment of internal dose, and evaluation of and dose assessment for radiological incidents.

The inspectors evaluated whether Exelon had established procedural requirements for determining when external dosimetry and internal dose assessments were required.

External Dosimetry

The inspectors evaluated whether Exelon's dosimetry vendor was NVLAP accredited and if the approved irradiation test categories for each type of personnel dosimeter used are consistent with the types and energies of the radiation present and the way the dosimeter is being used.

The inspectors assessed the use of EPDs to determine if Exelon uses a "correction factor" to address the response of the EPD as compared to the dosimeter of legal record for situations when the EPD is used to assign dose and whether the correction factor is based on sound technical principles.

The inspectors reviewed various dosimeter occurrence reports or CAP documents for adverse trends related to EPDs. The inspectors assessed whether Exelon staff had identified any adverse trends and implemented appropriate corrective actions.

Internal Dosimetry

Routine Bioassay (In Vivo)

The inspectors reviewed procedures used to assess the dose from internally deposited radionuclides using whole body counting (WBC) equipment.

Internal Dose Assessment – WBC Analyses

The inspectors discussed dose assessments performed by Exelon using the results of WBC analyses. The inspectors determined whether affected personnel were properly monitored with calibrated equipment and that internal exposures were assessed consistent with Exelon's procedures.

Special Dosimetric Situations

Dosimeter Placement and Assessment of Effective Dose Equivalent for External Exposures

The inspectors reviewed Exelon's methodology for monitoring external dose in non-uniform radiation fields or where large dose gradients exist. The inspectors evaluated

Exelon's criteria for determining when alternate monitoring, such as use of multi-badges was to be implemented. The inspectors selectively reviewed the results of Exelon implementation of effective Dose Equivalent monitoring practices for various recent refueling outage related work.

Shallow Dose Equivalent

The inspectors reviewed available dose assessments for shallow dose equivalent for adequacy. The inspectors evaluated Exelon's method (e.g., VARSKIN or similar code) for calculating shallow dose equivalent from distributed skin contamination or discrete radioactive particles.

Neutron Dose Assessment

The inspectors selectively evaluated Exelon's neutron dosimetry program, including dosimeter types and/or radiation survey instrumentation.

Problem Identification and Resolution

The inspectors assessed whether problems associated with occupational dose assessment were being identified by Exelon staff at an appropriate threshold and properly addressed for resolution in Exelon CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by Exelon involving occupational dose assessment.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05)

a. Inspection Scope

This area was inspected during the week of November 12, 2012, to verify Exelon staff was assuring the accuracy and operability of radiation monitoring instruments that are used to protect occupational workers and to protect the public from nuclear power plant operations. The inspectors used the requirements in 10 CFR Part 20; TSs; applicable industry standards; and Exelon's procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed available Exelon and third-party evaluation reports of the radiation monitoring program since the last inspection including evaluations of offsite calibration facilities or services, if applicable.

Walkdowns and Observations

The inspectors selected various portable survey instruments in use or available for issuance and assessed calibration and source check stickers for currency, as well as, instrument material condition and operability.

The inspectors discussed source checks for various different types of portable survey instruments. The inspectors selected various personnel contamination monitors, portal monitors, and small article monitors and evaluated whether the periodic source checks were performed in accordance with the manufacturer's recommendations and Exelon procedures.

Portal Monitors, Personnel Contamination Monitors, and Small Article Monitors

The inspectors selected various types of these instruments and verified that the alarm set-point values were reasonable under the circumstances to ensure that licensed material was not released from the site.

Calibration and Check Sources

The inspectors reviewed Exelon's source term or waste stream characterization per 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," to assess whether calibration sources used were representative of the types and energies of radiation encountered in the plant.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring instrumentation were being identified by Exelon at an appropriate threshold and were properly addressed for resolution in Exelon's CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by Exelon staff that involved radiation monitoring instrumentation.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

a. Inspection Scope

This area was inspected during the week of November 12, 2012, to evaluate the adequacy of effluent release and public dose calculations resulting from radioactive effluent discharges.

The inspectors used the requirements in 10 CFR Part 20; 10 CFR 50.35(a) TSs; 10 CFR 50, Appendix I, Numerical Guides for Design Objectives and Limiting Conditions for Operations to Meet the Criterion "As Low as is Reasonably Achievable (ALARA) for Radioactive Material in Light-Water – Cooled Nuclear Power Reactor Effluents; as well as, applicable Industry standards, and Exelon procedures required by TSs/offsite dose calculation manual (ODCM) as criteria for determining compliance.

Event Report and Effluent Report Reviews

The inspectors reviewed the Limerick Radiological Effluent Release Report for 2012 to determine if the report was submitted as required by the ODCM/TSs. The inspectors reviewed anomalous results, unexpected trends, or abnormal releases identified by

Exelon. The inspectors determined if these effluent results were evaluated, were entered in the CAP, and were adequately resolved.

Dose Calculations

The inspectors reviewed significant changes in reported dose values compared to the previous radioactive effluent release report to evaluate the factors which may have resulted in the change.

The inspectors reviewed changes in Exelon's methodology for offsite dose calculations since the last inspection to verify the changes are consistent with the ODCM and RG 1.109. The inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to ensure appropriate dispersion/deposition factors are being used for public dose calculations.

The inspectors reviewed the latest Land Use Census to verify that changes in the local land use have been factored into the dose calculations and environmental sampling/analysis program.

The inspectors evaluated whether the calculated doses were within the 10 CFR Part 50, Appendix I and TS dose criteria.

Problem Identification and Resolution

Inspectors assessed whether problems associated with the effluent monitoring and control program were being identified by Exelon staff at an appropriate threshold and properly addressed for resolution in the Exelon CAP. In addition, they evaluated the appropriateness of the corrective actions for a selected sample of problems documented by the Exelon involving radiation monitoring and exposure controls.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151)

.1 Occupational Exposure Control Effectiveness (1 sample)

a. Inspection Scope

During the week of November 12, 2012, the inspectors sampled Exelon's submittals for the occupational radiological occurrences PI (OR01) for the past four quarters. The inspectors used PI definitions and guidance contained in the Nuclear Energy Institute Document 99-02, Revision 6, "Regulatory Assessment Performance Indicator Guideline," to determine the accuracy of the PI data reported during those periods. The inspectors reviewed Exelon's assessment of the PI for occupational radiation safety to determine if the related data was adequately assessed and reported.

To assess the adequacy of Exelon's PI data collection and analyses, the inspectors discussed with RP staff, the scope and breadth of its data review and the results of

those reviews. The inspectors independently reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized PI occurrences. The inspectors also conducted walkdowns of various locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas.

b. Findings

No findings were identified.

.2 Radiological Effluent TS/ODCM Radiological Effluent Occurrences (1 sample)

a. Inspection Scope

During the week of November 12, 2012, the inspectors sampled Exelon's submittals for the radiological effluent TS/ODCM radiological effluent occurrences PI (PR01) for the past four calendar quarters. The inspectors used PI definitions and guidance contained in the Nuclear Energy Institute Document 99-02, Revision 6, "Regulatory Assessment Performance Indicator Guideline," to determine if the PI data was reported properly during this period. The inspectors reviewed the public dose assessments for the PI for public radiation safety to determine if related data was accurately calculated and reported.

The inspectors reviewed Exelon's issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous and liquid effluent summary data and the results of associated offsite dose calculations for the past four quarters to determine if indicator results were accurately reported.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index (2 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittal of the Mitigating Systems Performance Index for the following systems for the period of October 1, 2011 through September 30, 2012:

- Unit 1 Cooling Water (MS10)
- Unit 2 Cooling Water (MS10)

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed Exelon's operator narrative logs, condition reports, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.4 Reactor Coolant System (RCS) Specific Activity and RCS Leak Rate (4 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittal for the RCS Specific Activity (B101) and RCS Leak Rate (B102) performance indicators for both Unit 1 and Unit 2 for the period of October 1, 2011 through September 30, 2012. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed RCS sample analysis and control room logs of daily measurements for RCS leakage, and compared that information to the data reported by the performance indicator.

b. Findings

No findings were identified.

.5 Emergency Preparedness PI Verification (3 Samples)

a. Inspection Scope

The inspectors reviewed data for the three EP PIs, which are: (1) Drill and Exercise Performance (EP01); (2) ERO Drill Participation (EP02); and, (3) ANS Reliability (EP03). The last NRC EP inspection at Limerick was conducted in the fourth calendar quarter of 2011. Therefore, the inspectors reviewed supporting documentation from EP drills and equipment tests from the fourth calendar quarter of 2011 through the third calendar quarter of 2012 to verify the accuracy of the reported PI data. The review of the PIs was conducted in accordance with NRC Inspection Procedure 71151. The acceptance criteria documented in NEI 99-02, "Regulatory Assessment Performance Indicator Guidelines," Revision 6, was used as reference criteria.

b. Findings

No findings were identified.

40A2 Problem Identification and Resolution (71152 – 3 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Exelon staff entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and

addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended condition report screening meetings.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by Exelon staff outside of the CAP, such as trend reports, performance indicators, major equipment problem lists, maintenance rule assessments, and maintenance or CAP backlogs. The inspectors also reviewed Limerick's CAP database for the third and fourth quarters of 2012 to assess IRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRCs daily IR review (Section 4OA2.1).

b. Findings and Observations

No findings were identified. The inspectors assessed that Exelon personnel were identifying issues at a low threshold and entering issues into the CAP for resolution.

NRC Inspection Report 05000352, 353/2012003, dated August 1, 2012, discussed a negative trend with plant issues related to PM of plant equipment over several quarters. The inspectors noted five findings and an additional event related to PMs. Since the discussion of the trend, two additional Green findings have been identified. NRC IR 2012004, dated November 1, 2012, identified a self-revealing Green NCV associated with failure to establish and perform adequate PM activities to routinely inspect the 480VAC load center power transformers. This resulted in a transformer fault that led to a Unit 1 manual scram on July 18, 2012 that could have been prevented. Section 1R19 of this report documents a self-revealing Green NCV of Technical Specification 6.8.1, "Administrative Controls-Procedures". The finding was associated with the failure of station workers to revise work instructions when they determined that the procedure for cleaning the EDG D13, D14, and D22 fuel oil day tanks could not be performed as written. The finding was related to the failure to properly implement PM work instructions to clean the fuel oil day tank which was a license renewal commitment. The inspectors concluded that the negative trend in the implementation of PMs continued to challenge Limerick and has resulted in plant events and safety system unavailability.

.3 Annual Sample: ESW System

a. Inspection Scope (1sample)

A problem identification and resolution sample inspection was conducted during the period of November 27-30, 2012. The issue identified for evaluation was an adverse trend in reduced emergency service water (ESW) flow rates to safety-related and non-safety-related equipment identified in UFSAR Table 9.2.3.

The inspectors assessed Exelon's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of Exelon's corrective actions to determine whether Exelon staff were appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Exelon's CAP and 10 CFR Part 50, Appendix B. In addition, the inspectors performed documentation reviews and interviewed engineering personnel to assess the effectiveness of the implemented, planned and scheduled corrective actions.

To verify the adequacy of ESW system flow rates to safety-related equipment during design basis events the inspectors reviewed the documents noted in the Attachment to this report that identified reduced ESW system flow rates to safety-related equipment. Specifically, the inspectors reviewed ESW and residual heat removal service water (RHRSW) system health reports, operability determination evaluations, ESW system flow verification tests, work orders, and issue reports.

The inspectors selected a sample of these documents to perform a documentation review of those activities for compliance with Technical Specification requirements and the guidance contained in Regulatory Information Summary 2005-20, Revision 1, Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Determination & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety." The inspectors performed this review to determine that nonconforming indications were appropriately identified, characterized, documented and entered into the Exelon's CAP.

b. Findings and Observations

No findings were identified.

Sample results of the deposits from the ESW system piping indicate that the fouling of ESW system piping and equipment was caused by general iron corrosion degradation of ESW system carbon steel piping.

The operability evaluations of the adverse trend in reduced ESW flow rates to safety-related equipment were appropriately performed in accordance with the guidance contained in Regulatory Information Summary 2005-20, Revision 1.

The inspectors determined that this issue is receiving appropriate management attention as indicated by the comprehensive cleaning of the spray pond piping network, increased monitoring of ESW system piping flow rates, and the developed action plans to replace additional portions of ESW carbon steel piping with stainless steel piping and ESW pump replacements.

The inspectors also determined that the corrective actions taken to date including the comprehensive cleaning of the ESW system spray pond distribution piping network,

replacement of the 'D' ESW pump in 2012, replacement of portions of ESW system piping with stainless steel piping to various safety-related equipment over the past several years, and the planned corrective actions to replace the 'A', 'B', and 'C' ESW pumps should resolve the adverse trend in ESW system flow rates to safety-related equipment. These longer term actions are being tracked in the Exelon's CAP. In order to resolve the general corrosion issue of the ESW system piping, the planned corrective actions to replace additional portions of the carbon steel piping with stainless steel piping should be implemented in accordance with the current plans commensurate with the safety significance of the issue.

.4 Annual Sample: Limerick Seismic Monitoring System

a. Inspection Scope (1 sample)

The inspectors reviewed recent equipment deficiencies associated with the Limerick Unit 1 Seismic Monitoring system, specifically the XE-VA-105 seismic accelerometer channel number 1 failure to respond during the performance of ST-2-036-600-0, "Seismic Monitor Functional Test." The inspectors performed an in-depth review of the recent history associated with the seismic monitoring system including Exelon's evaluation of the issue and CAP history due to the potential impact on emergency preparedness and the ability to enter the appropriate Emergency Action Level during an event.

To determine whether Exelon staff were appropriately identifying, characterizing, and correcting deficiencies associated with the seismic monitoring system the inspectors also assessed Exelon's problem identification threshold, extent of condition reviews, and prioritization, timeliness and adequacy of corrective actions. The inspectors reviewed Exelon's response to concerns related to a greater than design basis earthquake that results in a loss of off-site power and a reactor scram.

b. Findings

No findings were identified. The inspectors determined that although there have been a few equipment deficiencies related to the seismic monitoring system since the seismic event at the North Anna Power Station in August 2011, Exelon has appropriately addressed all of the known deficiencies. Exelon is appropriately planning to upgrade site seismic monitoring equipment based on industry recommendations.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 5 samples)

.1 Plant Events (1 sample)

a. Inspection Scope

Following Unit 1 entry into single recirculation loop operation following the trip of the 'A' recirculation pump due to loss of the 'A' adjustable speed drive on November 12, 2012, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR Parts 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the events to assure that

Exelon staff implemented appropriate corrective actions (IR 1438773) commensurate with their safety significance.

b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report (LER) 05000352, 353/2012007-00: Condition Prohibited by Technical Specifications due to Inoperable Primary Containment Isolation Valves

During a self-assessment in preparations for an NRC Component Design Basis Inspection, Exelon personnel identified a design deficiency affecting the operability of 15 primary containment isolation valves (PCIVs) on Unit 1 and 15 PCIVs on Unit 2. The deficiency resulted in the potential failure of the valves to fully close during a loss of coolant accident with offsite power available. The Limerick loss of coolant accident design results in electrical load shedding in response to reactor vessel level reaching Low Level 1. The design issue involved was that PCIVs which receive isolation signals prior to level reaching Low Level 1 were vulnerable to losing the closure seal-in signal when power was lost if the valve stops in a zone where the valve indicates closed but is not fully seated. Exelon declared the PCIVs inoperable and implemented design changes to remove the vulnerability on all valves on Unit 1 and on 12 valves on Unit 2. Exelon plans to implement modification on the three remaining valves on Unit 2. Those valves remain inoperable and are normally closed. The inspectors concluded that Exelon has satisfied the TS Required Actions for these inoperable PCIVs.

The enforcement aspects of this issue are discussed in Section 40A7. The inspectors did not identify any other issues during the review of the LER. This LER is closed.

.3 (Closed) LER 05000353/2012001-00/01: Condition Prohibited by Technical Specifications due to Redundant Reactivity Control System Setpoint Drift

On May 10, 2012, the engineering system manager, performing system monitoring, identified unacceptable instrument drift on a reactor pressure vessel pressure instrument associated with the Unit 2 redundant reactivity control system. The acceptance criteria for the channel check of the redundant reactivity control system reactor pressure instruments was not restrictive enough to detect that the unacceptable instrument drift of the channel resulted in the Anticipated Transient Without Scram Recirculation Pump Trip System Instrumentation being inoperable. An investigation determined that the channel was inoperable for a time longer than allowed by TS 3.3.4, "Anticipated Transient Without Scram Recirculation Pump Trip System Instrumentation". The unacceptable instrument drift was caused by premature failure of the instrument's analog trip module card. Revision 1 to the LER updated the cause of the event based on laboratory failure analysis. Exelon staff replaced the degraded analog trip module and restored the system to an operable status. The channel check acceptance criteria for the pressure instrument was revised to ensure that unacceptable channel signal drift, contained in ST-6- ST-5-107-590-2, "Daily Surveillance Log/OPCONS 1, 2, 3," will be identified and evaluated as required.

The enforcement aspects of this issue are discussed in Section 40A7. The inspectors did not identify any other issues during the review of the LER. This LER is closed.

.4 (Closed) LER 05000352/2012-008-00: Condition Prohibited by Technical Specifications Due to Inoperable Isolation Instrumentation

On September 13, 2012, Limerick Unit 1 staff completed planned surveillance testing of MSL high flow isolation instrumentation channel response times. Exelon staff reviewed the results and identified the TS maximum limit of less than or equal to 0.5 seconds had been exceeded. Limerick staff determined that the response time test failures were caused by a failure to proceduralize the method of replacement relay selection to ensure the fastest contact release times. This caused the overall as-left logic response time to lose margin to the TS limit. Exelon has revised the relay selection and testing procedure to ensure the fastest relays are selected. Exelon also plans to submit a TS change to increase the response time and margin to the TS limit.

The inspectors reviewed the issue and determined that although the TS required response times for three of four isolation channels exceeded 0.5 seconds, inaccuracies in replacement relay selection and overly restrictive surveillance test administrative limits led to the failed response times. This issue is similar to example 2.a in IMC 0612, Appendix E, Examples of Minor Issues, in that, although the TS limit was exceeded, the inboard main steam isolation valve (MSIV) closing times were not degraded due to this condition and MSL response testing history remained low enough to meet the TS required response times. This issue is determined to be of minor consequence. The inspectors did not identify any new issues during the review of the LER. This LER is closed.

.5 (Closed) LER 05000352/2012-001-00: Three Main Steam Isolation Valves Failed Hot Closing Stroke Time Surveillance Test

On February 20, 2012, Limerick Unit 1 staff completed MSIV cold shutdown valve testing during a planned shutdown to enter refueling outage 1R14. Exelon staff reviewed the results and identified that three of the eight MSIV valves' as-found hot stroke times exceeded the TS required closing time of less than or equal to 5 seconds. TS 3.4.7, MSIVs, requires that two MSIVs per MSL shall be operable with closing times greater than or equal to 3 and less than or equal to 5 seconds. Exelon staff determined that the cause of the test failure was related to valve stroke times not being optimized following previous test failures, inherent accuracies in valve stroke timing practices and deficiency in the MSIV pneumatic manifold causing an extended delay time prior to valve motion. Exelon staff determined that the closing times of the 3 MSIVs that stroked greater than 5 seconds were bounded by the containment analysis for a steam line break. The cold shutdown test has been revised to ensure the as-left closing times provide adequate margin to TS limits. The MSIV cold shutdown valve test was performed successfully prior to restart. Exelon staff also scheduled the replacement of the MSIV pneumatic manifold and is benchmarking MSIV stroke timing method improvements across the Exelon fleet.

The inspectors reviewed the issue and determined that although the TS required closing times for three of the MSIVs exceeded 5 seconds, inaccuracies in timing methods and inadequate administrative surveillance test 'as-left' limits contributed to the MSIVs exceeding the limit. This issue is similar to example 2.a in IMC 0612, Appendix E, Examples of Minor Issues, in that, although the TS limit was exceeded, the actual closing times of the MSIVs with corrected timing methods and increased surveillance

test margins were within the TS limits. This issue is determined to be of minor consequence. The inspectors did not identify any new issues during the review of the LER. This LER is closed.

4OA5 Other Activities

.1 Institute of Nuclear Power Operations (INPO) Report Review

a. Inspection Scope

The inspectors reviewed the final report for the INPO plant assessment of Limerick Generating Station conducted in February 2012. The inspectors reviewed the report to ensure that any issues identified were consistent with NRC perspectives of Exelon's performance and to determine if INPO identified any significant safety issues that required further NRC follow-up.

b. Findings

No findings were identified.

- .2 (Opened/Closed) NCV 05000352, 353/2012005-03: 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 electronic 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.**

.3 (Closed) Temporary Instruction (TI) 2515/187 – Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns

Inspectors verified that Exelon's walkdown packages in Exelon Mid-Atlantic Sites Near-Term Task Force Recommendation 23 Flood Walkdown Phase I Preparation Report contained the elements as specified in NEI 12-07 Walkdown Guidance document.

The inspectors accompanied Exelon personnel on their walkdown of Control Enclosure, Elevation 200', Rooms 258 and 263 (control enclosure chiller and recombiner access areas) and verified that Exelon confirmed the following flood protection features:

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed.
- Reasonable simulation, if applicable to the site
- Critical SSC dimensions were measured
- Available physical margin, where applicable, was determined
- Flood protection feature functionality was determined using either visual observation or by review of other documents

The inspectors independently performed a walkdown of Turbine Building, elevation 217', Area 335 (turbine building laydown area) and verified that flood protection features including electrical penetration seals, wall boundaries, high energy doors, fire doors, and flood doors were in place and appeared functional.

The inspectors verified that non-compliances with current licensing requirements, and issues identified in accordance with the 10 CFR 50.54(f) letter, Item 2.g of Enclosure 4, were entered into Exelon's CAP. In addition, issues identified in response to Item 2.g that could challenge risk significant equipment and Exelon's ability to mitigate the consequences will be subject to additional NRC evaluation.

No NRC-identified or self-revealing findings were identified.

4 (Closed) TI 2515/188 – Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns

The inspectors accompanied Exelon personnel on their seismic walkdowns of the D11 Emergency Diesel Generator Building, Elevation 217', Room 311 on July 31, 2012, the Reactor Building and Control Enclosure motor control centers (MCCs) on August 1, 2012, and the Spray Pond Pump House, Elevation 268', Room 1000 on August 2, 2012. The inspectors verified that Exelon personnel confirmed that the following seismic features associated with the D114-D-G Diesel Generator Area Safeguard 480V MCC, the Diesel Generator Room ventilation fan, the 'B' RHR service water pump, the Spray Pond 440V AC power MCC, and the 'A' ESW pump were free of potential adverse seismic conditions:

- Anchorage was free of bent, broken, missing or loose hardware
- Anchorage was free of corrosion that is more than mild surface oxidation
- Anchorage was free of visible cracks in the concrete near the anchors
- Anchorage configuration was consistent with plant documentation.
- SSCs will not be damaged from impact by nearby equipment or structures.
- Overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls are secure and not likely to collapse onto the equipment.
- Attached lines have adequate flexibility to avoid damage.
- The area appears to be free of potentially adverse seismic interactions that could cause flooding or spray in the area.
- The area appears to be free of potentially adverse seismic interactions that could cause a fire in the area.
- The area appears to be free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding).

The inspectors independently performed their walkdown of the Unit 1 'B' RHR heat exchanger, the 'A' RHR pump, the RCIC pump and turbine, the D12 Diesel Generator Day tank and the Control Panel Spray Pond Pump Structure Air Supply Fan on August 2 – 3, 2012, and verified the following for each SCC:

- All anchorage was intact and the configuration was consistent with plant documentation.

- Each SSCs would not be damaged from impact by nearby equipment or structures.
- All overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls were secure and not likely to collapse onto the equipment.
- Any attached lines had adequate flexibility to avoid damage.
- Each area appeared to be free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding).

Observations made during the walkdown that could not be determined to be acceptable were entered into Exelon's corrective action program for evaluation.

Additionally, inspectors verified that items that could allow the spent fuel pool to drain down rapidly were added to the seismic walkdown equipment list and these items were walked down by Exelon personnel.

No NRC-identified or self-revealing findings were identified.

40A6 Meetings, Including Exit

On January 11, 2013, the inspectors presented the inspection results to Mr. T. Dougherty, Site Vice President, and other members of the Limerick staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

40A7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by Exelon staff and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

- Technical Specification 6.8.1 states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures as recommended in NRC Regulatory Guide 1.33, Appendix A, Revision 2, February 1978. NRC Regulatory Guide 1.33, Appendix A, Section 8.b requires procedures for surveillance tests. Limerick Unit 2 ST-6-107-590-2, "Daily Surveillance Log/OPCONS 1, 2, 3," Table 2, Revision 128, contained the redundant reactivity control system TS surveillance channel checks for the reactor pressure vessel pressure instruments associated with the Anticipated Transient Without Scram Recirculation Pump Trip System Instrumentation. Contrary to TS 6.8.1, ST-6-107-590-2 acceptance criteria for channel checks associated with these instruments were not adequately established. This resulted in the Unit 2, Division II Anticipated Transient Without Scram Recirculation Pump Trip System Instrumentation being inoperable due to instrument drift from September 8, 2011 until May 10, 2012 which is longer than allowed by TS.

Exelon entered this issue into the CAP as IR 1365093. The inspectors determined that the finding was of very low safety significance (Green) in accordance with Section C of Exhibit 2 of NRC IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," because the finding did not affect

both a single reactor protection system trip signal to initiate a reactor scram and the function of other redundant trips or diverse methods of reactor shutdown.

- 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis for those structures, systems, and components to which the appendix applies are correctly translated into specifications. Contrary to Criterion III, Exelon failed to correctly translate the design basis for 15 PCIVs on Unit 1 and 15 PCIVs on Unit 2 into specification for the motor operators for the valves. This resulted in the valves not being able to perform their intended safety function under certain conditions following a loss of coolant accident with offsite power remaining available.

Exelon entered this issue into the CAP as IR 1402693 and 1416070. The inspectors determined that the finding was of very low safety significance (Green) in accordance with Section B of Exhibit 3 of NRC IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," because it did not represent an actual open pathway in the physical integrity of reactor containment. In addition, all of the effected penetrations, with the exception of two, had another primary containment isolation valve that was not impacted by the design issue. Conservatively processing the two penetrations that did not contain a non-effected valve through NRC IMC 0609, Appendix H, "Containment Integrity Significance Determination Process," determined that they were not risk significant from a large early release frequency standpoint. One penetration (suppression pool clean-up suction line) did not connect with the drywell atmosphere or reactor coolant system. The other penetration (reactor water cleanup suction line) is a closed system and the design error would not have affected the ability of the system's primary containment isolation valves to isolate following their design basis event (intersystem loss of coolant accident outside of containment).

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION**KEY POINTS OF CONTACT**Licensee Personnel

T. Dougherty, Site Vice President
 D. Lewis, Plant Manager
 R. Kreider, Director of Operations
 D. Doran, Director of Engineering
 F. Sturniolo, Director of Maintenance
 J. Hunter, Director of Work Management
 K. Kemper, Security Manager
 R. Dickinson, Manager, Regulatory Assurance
 J. Karkoska, Manager, Nuclear Oversight
 M. Gillin, Shift Operations Superintendent. Manager, Engineering Systems
 M. DiRado, Manager, Engineering Programs
 M. Bonifanti, Manager, ECCS Systems
 L. Harding, Regulatory Assurance Engineer
 M. Crim, Emergency Preparedness Manager
 D. Molteni, Licensed Operator Requalification Training Supervisor
 A. Wasong, Training Director
 R. Ruffe, Operations Training Manager
 M. DiRado, Manager, Engineering Programs
 D. Merchant, Radiation Protection Manager
 C. Gerdes, Chemistry Manager
 A. Varghese, System Manager, Radiation Instruments
 M. Bonanno, Electrical Plant Engineering Manager
 R. Nealis, Radiochemist
 T. Kan, License Coordinator
 T. Byers, Operations Training
 V. Hydro, Simulator Lead
 L. Stanford, Exam Developer
 A. Kopistansy, System Manager, Emergency Service Water
 J. Risteter, Radiological Technical Manager
 L. Birkmire, Manager, Environmental

Others

M. Murphy, Commonwealth of Pennsylvania, Department of Environmental Protection

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATEDOpened/Closed

05000352,353/2012005-01	FIN	Failure to Administer an NRC Annual Operating Test Simulator Scenario Re-examination That Met Procedural Requirements (Section 1R11.3)
05000352,353/2012005-02	NCV	Failure to Revise EDG Tank Cleaning Work Instructions (Section 1R19)

05000352,353/2012005-03 <u>Closed</u>	NCV	Failure to Follow Radiation Protection Procedures for Personnel Monitoring (Section 4OA5.2)
05000352,353/2012-007-00	LER	Condition Prohibited by Technical Specifications due to Inoperable Primary Containment Isolation Valves (Section 4OA3.2)
05000353/2012-001-00/01	LER	Condition Prohibited by Technical Specifications due to Redundant Reactivity Control System Setpoint Drift (Section 4OA3.3)
05000352/2012-008-00	LER	Condition Prohibited by Technical Specifications Due to Inoperable Isolation Instrumentation (Section 4OA3.4)
05000352/2012-001-00	LER	Three Main Steam Isolation Valves Failed Hot Closing Stroke Time Surveillance Test (Section 4OA3.5)
2515/188	TI	Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (Section 4OA5.3)
2515/188	TI	Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns (Section 4OA5.4)

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Issue Reports

1449120 1447377 1448846

Procedures

S92.9.N, Routine Inspection of the Diesel Generators, Revision 61

S92.1.N, Diesel Generator Set Up for Automatic Operation Following Maintenance, Revision 39

S78.1.B, Aligning the Control Room HVAC Isolation and Emergency Fresh Air Supply System for Automatic Operation, Revision 8

ST-2-036-413-0, Seismic Monitoring – Triaxial Time – History Accelerometer/Recorders Calibration/Functional Test, Revision 16

ST-2-036-600-0, Seismic Monitoring – Triaxial Time – History Accelerometers/Recorders, Revision 17

ST-2-047-409-1, RPS – Scram Discharge Volume Water Level – High, Revision 16

Miscellaneous

ARC-MCR-00C693 A1, System Recording Activated, Revision 1

ARC-MCR-00C693 B1, OBE Exceeded, Revision 001

L-S-46, Meteorological and Seismic Monitoring Systems, Revision 2
 SE-5, Earthquake, Revision 35
 Elementary Diagrams, M-1-C71-1020-E-1, 4, 9, 10, 11, 12, 17, 18; Reactor Protection System
 M-47, P&ID - Control Rod Drive Hydraulics - Part B

Section 1R04S: Complete Risk Important System Walkdowns

Issue Reports

1192253 1191762 1229423 1329244 1255511

Procedures

RT-1-053-850-2, Design Basis Heat Transfer Capability Verification for Fuel Pool Cooling System, Revision 5
 RT-6-053-490-2, Determination of Fuel Pool Tell-Tale Liner Drain Leakage, Revision 0
 S53.9.A, Routine Inspection of Fuel Pool Cooling System, Revision 14
 2S53.1.A, Equipment Alignment for Startup of the Fuel Pool Cooling System, Revision 11

Miscellaneous

UFSAR Section 9.1.3, Fuel Pool Cooling and Cleanup, Revision 16
 Fuel Pool Cooling System Health Report
 Action Request A1460041
 Action Request A1746022
 Action Request A1812975
 ECR 10-00084
 Work Order C0245359

Section 1R05: Fire Protection

Procedures

F-R-110 (Fire Area 35), LGS Pre-Fire Plan for Unit 1, Core Spray Pump Room A (EL 177), Revision 8
 F-R-102 (Fire Area 32), LGS Pre-Fire Plan for Unit 1, A and C RHR Heat Exchanger and Pump Room, Rooms 102 and 203 (EL 177 and 201), Revision 7
 F-T-443 (Fire Area 96), LGS Pre-Fire Plan for Unit 1, Battery Room (EL 239), Revision 5
 F-T-460 (Fire Area 109), LGS Pre-Fire Plan for Unit 2, Battery Room (EL 239), Revision 6
 SE-8, Fire, Revision 45
 ST-6-022-551-0, Fire Drill, Revision 10
 OP-AA-201-003, Fire Drill Performance, Revision 12

Miscellaneous

F-A-450, Fire Drill Scenario – Unit 2 Cable Spreading Room, Elev. 254', Fire Area 23
 LGS Emergency Plan Annex, Table 3-1

Section 1R07: Heat Sink Performance

Issue Reports

1329244 1192253

Procedures

RT-1-053-850-1, Design Basis Heat Transfer Capability Verification for Fuel Pool Cooling System, Revision 5

Miscellaneous

UFSAR, Section 9.1.3, Fuel Pool Cooling and Cleanup System, Revision 16
Unit 1 Fuel Pool Cooling Health Report

Section 1R11: Licensed Operator Regualification ProgramIssue Reports

01254845	01282885	01306613	01327746	01341136	01353700
01373765	01437839				

Procedures

TQ-AA-150, Operator Training Programs, Revision 7
TQ-AA-155, Conduct of Simulator Training and Evaluation, Revision 0
ANSI/ANS -3.5-1985, Nuclear Power Plant Simulators for Use in Operator Training
ANSI/ANS -3.5-2009, Nuclear Power Plant Simulators for Use in Operator Training
HR-AA-07-101, NRC Licensed Operator Medical Examination
OP-AA-105-102, Attachment 2, Reactivation of License Log, Revision 9
RT-6-000-994-0, Verification of Operator Qualifications, Revision 17
TQ-AA-150-F28, Licensed Operator Regualification Training Attendance Sheet, Revision 0
TQ-AA-306, Simulator Management, Revision 4
TQ-AA-306-F-19, Simulator Core Performance Testing Summary for Certified Reactivity Manipulations, Revision 1
TQ-AA-306-F-20, Simulator Scenario Based Testing Checklist, Revision 1
TQ-JA-155-09, Simulator Evaluation – Crew Competency Standards, Revision 1

Miscellaneous

LGS Licensed Operator Regualification Simulator Exercise Guide, LLOREG-9050, Revision 0

Other

TQ-AA-224-F100, Remedial Training Notification and Action on Failure, Revision 3 [reviewed the completed form that documented the week two crew failure]
TQ-AA-155-F05, Simulator Evaluation Form – Crew, Revision 1 [reviewed the completed form that documented the week two crew failure]
TQ-AA-155-F04, Simulator Evaluation Form – Individual, Revision 1 [reviewed the completed forms that documented the week two individual failures]

Simulator Work Requests

SWR 2009132/12015, Change Circ Water Pump Low Suction Pressure Alarm Stepout
SWR 2010106/12846, Unit 1 & 2 SRM Recorder Replacements
SWR 2011046/13270, DXX D-G Trouble Does Not Actuate When a Diesel Generator is Started
SWR 2011084/13500, Mass Is Lost in Primary Containment Whenever Drywell Spray is in Service
SWR 2011089/13586, Simulator to Reference Plant Review for Loss of Steam Sealing

Transient Tests

Transient Test 7.01 2011 Manual Scram

Transient Test 7.08 2011 Maximum Size Reactor Coolant System Rupture Combined With Loss of Off-Site Power

Annual/ Normal Evolution Tests

- 1.12 Simulator to Reference Plant Critical Parameter Comparison (Low Power), 6/6/2011
- 1.12 Simulator to Reference Plant Critical Parameter Comparison (Intermediate Power), 6/6/2011
- 1.12 Simulator to Reference Plant Critical Parameter Comparison (High Power), 6/8/2011

Post-Event Simulator Testing

- Test Number: PTR120310, Plant Event Review – Trip of 2A Reactor Recirc Pump, 5/22/2011
- Test Number: PTR0503011, Plant Event Review – Loss of Turbine Steam Seals During Startup, 9/23/12

2011 Biennial Written Examinations

- 1106-4 (RO and SRO versions)
- 1106-5 (RO and SRO versions)

Job Performance Measures

0086 0125 0126 0129 0204 0207 0211 0212 0515 0516 0529 0756

Simulator Evaluation Scenarios

2006 2014 3000 3003 5003 7009 7013 7014

Section 1R12: Maintenance Effectiveness

Issue Reports

1421931 1398134 1422469

Miscellaneous

- R1116105
- R1118614
- R1123411

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Issue Reports

1391791 1450951 1450952 1450954 1450950 1439669
 1435048 1327630 1356788 1440148 1288634 1442791
 1438773 1423618 1397744 1359953 1423512

Procedures

- E-5, Grid Emergency, Revision 20
- OP-AA-108-107-1001, Station Response to Grid Capacity Conditions, Revision 4
- M-020-002, Fairbanks Morse Opposed Piston Diesel Engine Examination and General Maintenance, Revision 6
- RT-6-092-321-1, D11 Diesel Generator Overspeed Trip Test
- ST-4-092-914-2, 24 Diesel Generator 24-Month Inspection, Revision 7
- S43.1.F U/1, Responding to Alarms at ASD HMI, Revision 2

Miscellaneous

C0245602

C0244225

Fairbanks Morse Engine SIL for O. P. Fuel Control Linkage, October 25, 2012

1A ASD Trip Start-Up PORC Write-up

Section 1R15: Operability EvaluationsIssue Reports

1450951	1450952	1450954	1450950	1439669	1435048
1327630	1356788	1440148	1288634	1442791	1423511
1423733	1424172	860165	895483	598392	921398
1421099	1399078	1395494	1368069		

Procedures

M-020-002, Fairbanks Morse Opposed Piston Diesel Engine Examination and General Maintenance, Revision 006

RT-6-092-321-1, D11 Diesel Generator Overspeed Trip Test, Revision 25

ST-4-092-914-2, 24 Diesel Generator 24-Month Inspection, Revision 7

ST-6-107-590-1(2), Daily Surveillances Log/OpCons 1, 2, and 3, Revision 162(129)

ST-2-025-407-1, NSSSS – NUMAC Steam Leak Detection Calibration/Functional Test, Revision 10

MA-AA-796-024, Scaffold Installation, Inspection, and Removal, Revision 8

MA-AA-796-024-1001, Scaffolding Criteria for the Mid-Atlantic Stations, Revision 8

Miscellaneous

C0245602

Fairbanks Morse Engine SIL for O. P. Fuel Control Linkage, October 25, 2012

Calc-1001

Calculation MISC-22, Leak Detection System Setpoint Bases, Revision 6

Section 1R18: Plant ModificationsIssue Reports

1234417	1423618	1438773
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Procedures

SM-AA-300, Procurement Engineering Support Activities, Revision 6

SA-AA-300-1001, Procurement Engineering Process and Responsibilities, Revision 13

ST-2-020-402-1, Electrical Power Systems 1 CG501 Diesel Generator

Critical and Non-Critical Instruments Calibration/Functional Test, Revision 29

Miscellaneous

Work Order R1181327, Replace Diesel Generator Speed Switch

C0244225

C0245347

TRT 12-193 and ECR 12-00463, Defeat of Invalid Diagnostic Signal Circuit on 1A ASD Redundant Controller Dual Power Supply Assemblies, Revision 0

Section 1R19: Post-Maintenance Testing

Issue Reports

1413587	1452156	1452196	1452159	1453737	1147676
1450951	1450952	1450954	1450950	1439669	1435048
1327630	1356788	1440148	1288634	1442791	1445893
1313897	793897	1432616			

Procedures

- IC-11-02002, Emergency Diesel Generator Voltage Regulators, Revision 15
- ST-6-092-932-2, D22 Diesel Generator Governor and Voltage Regulator Post Maintenance Testing, Revision 8
- M-020-002, Fairbanks Morse Opposed Piston Diesel Engine Examination and General Maintenance, Revision 6
- RT-6-092-321-1, D11 Diesel Generator Overspeed Trip Test
- ST-4-092-914-2, 24 Diesel Generator 24-Month Inspection, Revision 7
- ST-6-051-231-1, A RHR Pump, Valve and Flow Test, Revision 78
- S51.1.A, Set Up of RHR System for Automatic Operation in LPCI Mode, Revision 051

Miscellaneous

- RG 1.137, Fuel Oil Systems for Standby Diesel Generators, Revision 1, October 1979
- PM R1241103
- PM R1232185
- PM R1206296
- WO C0245815
- C0245602
- Fairbanks Morse Engine SIL for O. P. Fuel Control Linkage, October 25, 2012
- TC 12-0455-1
- C0244579
- C0241307
- ECR 11-00280, 114-80811 K-1 Contactor ARI for Diesel Generator IEE (Relay Replacement)
- C0228794
- A1882020

Section 1R22: Surveillance Testing

Issue Reports

1354348	1424239	1424506	1424300	1424523	1003769
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Procedures

- ER-AB-331-1006, BWR Reactor Coolant System Leakage Monitoring and Action Plan, Revision 2
- ER-LG-330-1001, ISI Program Plan, Revision 5
- ER-AA-330-001, Section XI Pressure Testing, Revision 10
- ST-4-049-951-2, ISI Pressure Test of RCIC Pump and Turbine Supply, Revision 4
- ST-6-049-230-2, RCIC Pump, Valve and Flow Test, Revision 71

Miscellaneous

- M-49, Sheet 2 P&ID, Reactor Core Isolation Cooling (RCIC)
- M-50, Sheet 2 P&ID, RCIC Pump/Turbine
- S49.9.A, Routine Inspection of RCIC System, Revision 28

S49.1.D, RCIC System Full Flow Functional Test and Turbine Oil Priming, Revision 42
 EPRI Terry Turbine Maintenance Guide
 M-050-007, RCIC Turbine Minor Inspection, Revision 1

Section 1EP2: Alert and Notification System Evaluation

Design Report Limerick Generating Station Public ANS, Revision 1
 EP-MA-121-1002, Exelon East ANS Program, Revision 6
 EP-MA-121-1004, Exelon East ANS Corrective Maintenance, Revision 4
 EP-MA-121-1005, Exelon East ANS Preventive Maintenance Program, Revision 4
 EP-MA-121-1006, Exelon East Siren Monitoring, Troubleshooting, and Testing, Revision 6
 Limerick Generating Station ANS test and maintenance records for 2012

Section 1EP3: Emergency Response Organization Staffing and Augmentation System

EP-AA-1000, Exelon Nuclear Standard Radiological Emergency Plan, Revision 22
 EP-AA-1008, Exelon Nuclear Radiological Emergency Plan Annex for Limerick Generating Station, Revision 25
 EP-AA-122-1001, Drill & Exercise Scheduling, Development and Conduct, Revision 15
 EP-AA-122-1002-F-01, Drill & Exercise Objective/Demonstration Criteria Evaluation Summary, Revision H
 EP-AA-122-F-01, Drill & Exercise Evaluation Criteria, Revision I
 ERO B-1 Table
 EOF-JIC-ENC Qualification Roster, Revision 238
 February 2, 2012 – ERO Call-in Augmentation Drill Results
 Limerick Team Roster, 12/03/2012
 TQ-AA-113, ERO Training and Qualification, Revision 20

Section 1EP5: Correction of Emergency Preparedness Weaknesses

LS-AA-125, Corrective Action Program, Revision 15
 LS-AA-120, Issue Identification and Screening Process, Revision 17
 EP-AA-120-1001, 50.54(q) Program Evaluation and Effectiveness Review, Revision 7
 EP-AA-122, Drills and Exercises, Revision 10
 EP-AA-121, Emergency Response Facilities and Equipment Readiness, Revision 11
 Limerick Generating Station, 8/23/11, Notice of Unusual Event Report, September 22, 2011
 Limerick Generating Station, 9/29/11, Notice of Unusual Event Report, October 27, 2011
 Limerick Generating Station, 7/18/12, Notice of Unusual Event Report
 NOSA-LIM-12-03, Emergency Preparedness Audit Report Limerick Generating Station, dated 4/18/12
 NOSA-LIM-11-03, Emergency Preparedness Audit Report Limerick Generating Station, dated 5/4/11
 10 CFR 50 Appendix E Evacuation Time Estimate Analysis for Limerick Generating Station, dated 12/12/2012
 EP-AA-1008, Addendum 1, Limerick Generating Station On-Shift Staffing Technical Basis, Revision 0

Condition Reports

1195988	1196000	1202618	1209280	1209284	1309555
1318328	1367024	1367028	1367097	1370646	1370647
1392190	1427025	1445463	1449235		

Section 1EP6: Drill Evaluation

Issue Reports
1445676

Miscellaneous
Exelon Nuclear Emergency Preparedness Event Timeline, LGS Exercise Drill, 4th Quarter Table
Top 2012

Section 2RS01: Access Control to Radiologically Significant Areas

Procedures
ST-0-107-493-0, Periodic By-Product Material Leakage Test and Inventory, Revision 13
RP-LG-460-105, Drywell Entries at Power, Revision 7
ST-7-084-925-0, Fire Door Closing Mechanism Inspection, Revision 6

Documents
Radiological Survey data (various)
Dosimeter - NVLAP certification data
Contamination Control – Personnel Contamination Data
Personnel Exposure Investigations (IR 1349376)
2012 Annual Source Inventory Reconciliation
Sealed Source Inventory
Radiation Work permit Dose Limits for Greater than 100 mR exposures
Corrective Action Documents (See Section 4OA1)

Section 2RS02: Occupational ALARA Planning and Controls

Procedures
RP-AA-401, Operational ALARA Planning and Control, Revision 15

Documents
2R11 Radiation Protection Outage Report
1 R14, Radiation protection Outage Report
Unit 1 BRAC Data
Station and Departmental Goals
Station ALARA Committee meeting Minutes
Post-Job ALARA Reviews- 12-08, 12-49, 12-47, 12-5, 12-29, 12-48
Corrective Action Documents (See Section 4OA1)

Section 2RS03: In-plant Airborne Radioactivity Control and Mitigation

Documents
Occupational Dose Summary
Radiological Source Term Data
Airborne Radioactivity Intake Assessments
Corrective Action Documents (See Section 4OA1)

Section 2RS04: Occupational Dose Assessment

Procedures

RP-AA-211, Personnel Dosimetry Performance Verification, Revision 9

Documents

NVLAP Scope of Accreditation
Exposure Control and Dose Records
General Source Term Data
Personnel Contamination Event Logs
Personnel Intake Investigations
EPD Alarm Evaluations
Effective Dose Equivalent Evaluation Sheets
Drywell Power Entry Authorization Sheets
Neutron Dose Tracking Log
Neutron Estimation Sheets
Corrective Action Documents (See Section 4OA1)

Section 2RS05: Radiation Monitoring Instrumentation

Documents

General Source Term Data
EPD Alarm Evaluations
Effective Dose Equivalent Evaluation Sheets
Drywell Power Entry Authorization Sheets
Neutron Dose Tracking Log
Neutron Estimation Sheets
Corrective Action Documents (See Section 4OA1)

Section 2RS06: Radioactive Gaseous and Liquid Effluent Treatment

Documents

2011 and 2012 Annual Effluents and Environmental Reports
Offsite Dose Calculation Manual, Revision 26

Section 4OA1: Performance Indicator Verification

Procedures

LS-AA-2200, Mitigating System Performance Index Data Acquisition and Reporting, Revision 5
LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Revision 014
ST-6-107-596-1/2, Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log/OPCON
1,2,3, Revisions 24/27
EP-AA-125-1001, EP Performance Indicator Guidance, Revision 6

Issue Reports

1329324	1329743	1335098	1335445	1332512	1332725
1331112	1337239	1439859	1375536	1316478	1435302
1386575					

Documents

Check-in Assessment – 1271526, ALARA Planning and Control

Self-Assessments:

- 1271526, ALARA, Planning and Control
- 1319877, Radioactive Sources and Devices
- 1319906, Radiation Protection Department Procedure Use and Adherence
- 1319940, Locked High radiation Controls
- 1373664, Common Cause, Personnel Contamination
- 1351013, Common Cause, Radiation Worker Practices

Emergency Preparedness Performance Indicator Data – 4th quarter 2011 to 3rd quarter 2012

Section 40A2: Problem Identification and ResolutionIssue Reports

1140214	1139996	1271061	1286439	1292570	1346780
11348524	1349522	1349681	1378775	1449120	1166225
1167651	1174809	1209444	1235338	1254561	1254835
1254845	1254902	1254915	1254956	1262599	1265463
1266440	1295849	1309555	1319036	1412417	1421326
1412141	1412130				

Licensing and Design Basis Documentation

LGS Unit 1 Technical Requirements Manual, Revision 35

LGS Unit 2 Technical Requirements Manual, Revision 37

Limerick Generating Station Updated Final Safety Report, Revision 15

L-S-02, Emergency Service Water, Revision 14

L-S-04, Residual Heat Removal Service Water System, Revision 11

L-S-46, Meteorological and Seismic Monitoring Systems, Revision 2

Drawings

8031-M-0012, Sheet 1, Emergency Service Water / RHR Service Water Overview, Revision 9

8031-M-11, Sheets 1 and 2, Emergency Service Water, (Unit 1, Unit 2 and Common), Revision 72 and 87

8031-M-390, Piping and Mechanical Spray Pond House Plan and Sects, Revision 14

8031-M-12, Sheet 1, Residual Heat Removal Service Water (Common), Revision 71

Engineering Change Requests (ECR)

ECR LG 11-00539, SPARTA Version 4.10 DTSQA Documentation, Revision 0

ECR LG 10-00291, Replacement of Unit 2 ESW Piping to Core Spray Coolers, Revision 3

Completed Surveillance Testing

RT-2-011-251-0, ESW Loop 'A' Flow Balance, performed May 14, 2012

RT-2-011-251-0, ESW Loop 'A' Flow Balance, performed September 16, 2011

RT-2-011-252-0, ESW Loop 'B' Flow Balance, performed May 12, 2012

RT-2-011-252-0, ESW LOOP 'B' Flow Balance, performed June 18, 2012

ST-6-011-231-0, 'A' Loop ESW Pump Valve and Flow Test, performed June 22, 2012

ST-6-011-233-0, 'A' Loop ESW Pump Comprehensive Test, performed May 28, 2011

ST-6-012-232-0, 'B' Loop RHRSW Pump, Valve & Flow Test, performed August 17, 2012

ST-6-012-232-0, 'B' Loop RHRSW Pump, Valve and Flow Test, performed May 12, 2012

ST-6-012-234-0, 'B' Loop RHRSW Pump Comprehensive Test, performed February 10, 2011

ST-2-036-413-0, Seismic Monitoring – Triaxial Time – History Accelerometer/Recorders Calibration/Functional Test, Revision 16

ST-2-036-600-0, Seismic Monitoring – Triaxial Time – History Accelerometers/Recorders, Revision 17

Work Orders

C0242678, OB-P548 Replace ESW Pump, Planned

Miscellaneous

SE-5, Earthquake, Revision 035

EP-AA-121, Emergency Response Facilities and Equipment Readiness, Revision 11

OPEX Evaluation, ATI 1325374-04-06, Greater Than Design Basis Earthquake Results in a Loss of Off-Site Power and Reactor Scram

ARC-MCR-00C693 A1, System Recording Activated, Revision 1

ARC-MCR-00C693 B1, OBE Exceeded, Revision 1

OPE-11-007, Reduced 'B' Loop RHRSW Cooling Water Flow, Revision 5

OPE-11-009, Reduced 'A' Loop ESW/RHRSW Cooling Water Flow, Revision 3

EABC-M-81-2, Balance Test Report for Limerick Generating Station, Spray Pond Pump Structure, Revision 3

ESW System Health Reports, 3rd Quarter 2011 and 3rd Quarter 2012

RHRSW System Health Reports, 3rd Quarter 2011 and 3rd Quarter 2012

ASME Boiler and Pressure Vessel Code Case N-513-2, Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1

Regulatory Information Summary 2005-20, Revision 1, Revision to NRC Inspection Manual Part 9900 Technical Guidance, Operability Determination & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse To Quality Or Safety

Section 4OA3: Followup of Events and Notices of Enforcement Discretion

Issue Reports

1423970	1402900	219148	1416763	1412675	1402816
1413900					

Procedures

OT-112, Recirculation Pump Trip, Revision 50

OT-104, Unexpected/Unexplained Positive or Negative Reactivity Insertion, Revision 48

S94.9.A, Routine Inspection of A(B) RPS UPS Static Inverter, Revision 15

S94.9.I, Routine Inspection of Technical Support Center UPS System, Revision 14

S94.2.A, Bypassing and Removing the A RPS UPS Inverter from Service, Revision 16

Miscellaneous

ARC-MCR-120 A5, 1A RPS UPS Static Inverter Trouble, Revision 0

ARC-MCR-120 G1, 1 Unit Division 1 Safeguard Battery Charger Trouble, Revision 3

PM 215068

PM380198

A1613678

Section 4OA5: Other Activities

Issue Reports

1387851 – Apparent Cause Report – Tech Spec (TS) LCO 3.3.1 Actions Not Taken in a Timely Fashion in Response to a Main Control Room (MCR) Alarm

1445240 – Unqualified Instructor Initiated Exam Administration

Miscellaneous

Operations Standing Order, 12-08 ARC Usage Requirements, Revision 0

LIST OF ACRONYMS

ADAMS	Agency wide Documents Access and Management System
ALARA	As Low As Is Reasonably Achievable
ANS	Alert and Notification System
ASD	Adjustable Speed Drive
CAP	Corrective Action Program
CFR	Code of Federal Regulations
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
EPD	Electronic Personal Dosimeter
ERF	Emergency Response Facility
ERO	Emergency Response Organization
ESW	Emergency Service Water
HRA	High Radiation Area
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
IR	Issue Report
JPM	Job Performance Measures
LER	Licensee Event Report
LORT	Licensed Operator Requalification Training
MCC	Motor Control Center
MSIV	Main Steam Isolation Valve
MSL	Main Steam Line
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NUREG	NRC Technical Report Designation
NVLAP	National Laboratory Accreditation Program
ODCM	Offsite Dose Calculation Manual
PI	Performance Indicator
PM	Preventive Maintenance
RG	Regulatory Guide
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RP	Radiation Protection
RWP	Radiation Work Permit
SDP	Significance Determination Process
SSC	Structure, System, or Component
SWR	Simulator Work Requests
TI	Temporary Instruction
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
VHRA	Very High Radiation Area
WBC	Whole Body Counter