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

November 1, 2012

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 05000352/2012004 AND 05000353/2012004 AND NOTICE OF VIOLATION

Dear Mr. Pacilio:

On September 30, 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 October 12, 2012, 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.

One violation is cited in the enclosed Notice of Violation and the circumstances surrounding it are described in detail in the subject inspection report. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The violation involved the failure to follow an alarm response procedure following the receipt of a main control room alarm on Unit 1 on July 11, 2012. Although determined to be of very low safety significance (Green), the violation is being cited in the Notice because not all of the criteria specified in Section 2.3.2.a of the NRC Enforcement Policy for a non-cited violation were satisfied. Specifically, Exelon Generating Company, LLC, failed to restore compliance within a reasonable amount of time after the violation was identified by the NRC to Exelon Management in a meeting on August 22, 2012. You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

This report also documents one NRC-identified and two self-revealing findings of very low safety significance (Green). These findings were determined to involve violations 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 violations 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 Available Records (PARS) component of the NRC's Agencywide Documents Access Management System (ADAMS). ADAMS is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Paul G. Krohn, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure:
1. Notice of Violation
2. Inspection Report 05000352/2012004 and 05000353/2012004 w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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NOTICE OF VIOLATION – Limerick Unit 1

Exelon Generating Company, LLC. Docket No: 50-352
Limerick Generating Station Unit 1 License No: NPF-39

During an NRC inspection conducted June 1 through September 30, 2012, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

> Limerick Generating Station Unit 1 Technical Specification 6.8, "Procedures and Programs," states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978.
>
> Regulatory Guide 1.33, Appendix A, Revision 2, February 1978, Section 5, "Procedures for Abnormal, Offnormal or Alarm Response," states, in part, "Each safety-related annunciator should have its own written procedure, which should normally contain the immediate operation actions."
>
> Alarm response procedure, ARC-MCR-107-A2, Revision 3, contained written instructions to be implemented when Main Control Room Annunciator Panel 107, Window A2 alarm 'Turbine Control Valve / Stop Valve Scram Bypassed' was received. The procedure required, in part, that power be immediately reduced upon receipt of the alarm.
>
> Contrary to the above, on July 11, 2012, Limerick operators did not adequately implement an alarm response procedure when responding to a main control room alarm. Specifically, the operators failed to immediately reduce power per alarm response procedure, ARC-MCR-107-A2, 'Turbine Control Valve / Stop Valve Scram Bypassed,' after the main control room received the alarm condition. Instead, the operators delayed the immediate reduction in reactor power to validate the control room alarm indication, and did not commence power reduction until one hour and forty-nine minutes later.

This violation is associated with a Green Significance Determination Finding.

Pursuant to the provisions of 10 CFR 2.201, Exelon Generating Company, LLC, is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region I, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 1st day of November, 2012

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.:	50-352, 50-353
License Nos.:	NPF-39, NPF-85
Report No.:	05000352/2012004 and 05000353/2012004
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 & 2
Location:	Sanatoga, PA 19464
Dates:	July 1, 2012 through September 30, 2012
Inspectors:	E. DiPaolo, Senior Resident Inspector J. Hawkins, Resident Inspector E. Burket, Reactor Inspector R. Nimitz, Senior Health Physicist J. Laughlin, Emergency Preparedness Specialist
Approved By:	Paul G. Krohn, Chief Reactor Projects Branch 4 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000352/2012004, 05000353/2012004; 07/01/2012 - 09/30/2012; Limerick Generating Station Units 1 and 2; Operability Determinations and Functionality Assessments, Problem Identification and Resolution, and Follow-Up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors, announced inspections performed by two regional inspectors, and an in-office review by an emergency preparedness specialist from Headquarters. Inspectors identified four findings of very low safety significance (Green). Three of these findings were determined to be non-cited violations (NCVs) and one was determined to be a cited violation. 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 Nuclear Regulatory Commission (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: Initiating Events

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

  The finding was determined to be more than minor because it was associated with the Initiating Events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was determined to be of very low safety significance because the finding caused a reactor trip but not the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. This finding was determined to have a cross-cutting aspect because, although the performance deficiency occurred more than three years ago, the performance characteristic associated with ineffective PM implementation continues to exist within Limerick's PM program and is indicative of present performance. The cross-cutting aspect associated with this performance deficiency is in the Resources component of the Human Performance area because the licensee did not ensure that personnel, equipment, procedures and other resources were adequate to assure long term plant safety through maintenance and the minimization of long-standing equipment issues [H.2 (a)]. (Section 4OA3.7)

Cornerstone: Mitigating Systems

- Green. A self-revealing NCV of TS 6.8, “Procedures and Programs,” was identified because Exelon did not maintain adequate maintenance procedures associated with work performed on the Unit 2 ‘B’ residual heat removal (RHR) pump motor circuit breaker. Specifically, Exelon did not perform appropriate post maintenance testing following the replacement of the Unit 2 ‘B’ RHR pump breaker on November 30, 2011. Despite the circuit breaker replacement affecting necessary pump support equipment operation due to circuit breaker dimensional differences, the procedure did not require a check to assure the support equipment was not adversely affected following the installation. As a result, the Unit 2 ‘B’ RHR pump was inoperable for the low pressure coolant injection function when the pump was operating in the suppression pool cooling mode because the pump’s minimum flow valve would not have opened automatically following the receipt of a loss of coolant accident signal. This condition existed from November 30, 2011 until the condition was corrected on June 27, 2012. This issue was entered into the Exelon CAP as IR 1381792.

  This self-revealing finding was determined to be more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was determined to be of very low safety significance (Green) because it did not represent a loss of system function and did not represent an actual loss of function for two separate safety systems out-of-service for greater than its TS Allowed Outage Time. The finding had a cross-cutting aspect in the area of Human Performance, Resources, because Exelon did not provide work packages with sufficient detailed instructions to assure nuclear safety [H.2(c)]. (Section 4OA2.2)

- Green. The inspectors identified a NCV of very low safety significance (Green) of TS 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," because Limerick operators did not enter the required TS action in a timely manner in response to an RPS instrumentation line failure. Specifically, following the main control room (MCR) receipt of the Unit 1 ‘Turbine Control Valve / Stop Valve Scram Bypassed’ alarm and equipment operator verification that the ‘C’ and ‘D’ channels of RPS circuitry were potentially bypassed indicating a possible loss of RPS function, action by the MCR operators to enter the applicable TS action statement was delayed by over an hour while RPS electrical prints were reviewed to verify inputs to the RPS circuitry. This issue was entered into Exelon’s CAP as IR 1387851 and an apparent cause evaluation was conducted.

  The finding was determined to be more than minor because it is associated with the human performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, operators did not reduce thermal power within 15 minutes as required for reactor protection. The inspectors determined this finding did affect a single RPS trip signal but did not affect the function of other redundant trips or diverse methods of reactor shutdown, did not involve control manipulations that unintentionally added positive reactivity, and did not result in a mismanagement of reactivity by operators. Therefore, the inspectors determined the finding to be of very low safety significance (Green). This finding had a cross-cutting aspect in the

area of Human Performance, Decision-Making, because operators did not use conservative assumptions in decision making and promptly apply readily available information contained in the ARC, TS Bases, and equipment operator reports to determine TS applicability for the alarm condition [H.1(b)]. (Section 1R15.1)

- Green. The inspectors identified a cited violation of very low safety significance (Green) of TS 6.8, "Procedures and Programs," because Limerick operators did not adequately follow an alarm response procedure when responding to a MCR alarm on July 11, 2012. Specifically, the operators failed to immediately reduce power per the alarm response card (ARC) procedure, ARC-MCR-107-A2, 'Turbine Control Valve / Stop Valve Scram Bypassed,' after the MCR received the alarm condition. The operators decided to delay the immediate reduction in reactor power to validate the control room alarm indication. Overall, it took operators one hour and forty-nine minutes to commence reducing reactor power per procedure. This finding is being cited because not all of the criteria specified in Section 2.3.2.a of the NRC Enforcement Policy for a non-cited violation were satisfied in that Exelon failed to restore compliance within a reasonable amount of time after the violation was identified. Specifically, the violation was communicated to Exelon Management by the inspectors on August 22, 2012. However, this violation was not entered into the Exelon CAP, as IR 1429761, until October 22, 2012 and no interim corrective actions were identified until Standing Order 12-08 was issued on October 22, 2012 to provide operator guidance, 103 days after the initial event.

  The finding was determined to be more than minor because it affected the human performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, it resulted in operators not reducing reactor power immediately as required for reactor protection. The inspectors determined this finding did affect a single RPS trip signal but did not affect the function of other redundant trips or diverse methods of reactor shutdown, did not involve control manipulations that unintentionally added positive reactivity, and did not result in a mismanagement of reactivity by operators. Therefore, the inspectors determined the finding to be of very low safety significance (Green). This finding had a cross-cutting aspect in the area of Human Performance, Work Practices, because operators did not follow procedures [H.4(b)]. (Section 1R15.2)

Other Findings

Two violations of very low safety significance that were identified by Exelon were reviewed by the inspectors. Corrective actions taken or planned by Exelon have been entered into Exelon's corrective action program. 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. During the inspection period, power was periodically lowered during periods of high condensate temperature due to environmental conditions (i.e., high outside temperatures). On July 12, operators reduced power to approximately 22 percent to remove the main turbine from service in response to the failure of one of the main turbine first stage pressure sensing lines. Following the turbine outage (1F50) to facilitate repairs and to perform an extent of condition inspection, the main turbine was synchronized to the grid on July 14. Unit 1 was returned to 100 percent power later that day. On July 18, operators inserted an unplanned manual scram per procedural requirements following a main turbine runback and the loss of the reactor recirculation pumps due to the loss of main generator stator cooling water. The loss of stator cooling was caused by an electrical transient caused by a fault on a balance of plant transformer (Load Center 124A Transformer). An Unusual Event was declared due to evidence that a flashover event, confined to the load center transformer cabinet occurred. Based on observed damage, an Unusual Event was declared for an explosion within the Protected Area affecting the Control Enclosure Building. The Unusual Event was exited later that day. Following repairs to the transformer, a reactor startup was commenced on July 22. The unit was returned to 100 percent power on July 24. On August 31, operators commenced a shutdown to commence a planned maintenance outage (1M52) to inspect the main low pressure 'A' turbine for turbine blade cracks and to replace degraded seals on the 'A' and 'B' recirculation pump seals. Operators commenced a reactor startup on September 5 and returned power to 100 percent on September 7. A follow-up power reduction to approximately 80 percent was performed on September 9 to facilitate a control rod pattern adjustment. Power was returned to 100 percent on September 9. 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. During the inspection period, power was periodically lowered during periods of high condensate temperature due to environmental conditions (i.e., high outside temperatures). On July 27, operators commenced an unplanned shutdown for forced outage 2F48 to replace the 'G' safety/relief valve which exhibited increased pilot valve leakage and to repair a main generator hydrogen leak. Following repairs, operators commenced a reactor startup on July 29 and returned Unit 2 to 100 percent on July 31. Operators reduced power on September 2 to approximately 92 percent to facilitate fuel channel distortion testing, a control rod pattern adjustment, and to perform main steam isolation valve testing. The unit was returned to 100 percent power on September 2. 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 – 3 samples)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of Exelon's readiness for the onset of seasonal high temperatures. The review focused on the offsite and onsite power systems. The

inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), TS, control room logs, and the corrective action program to determine what temperatures or other seasonal weather could challenge these systems, and to ensure Exelon's personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including Exelon's seasonal weather preparation procedure and applicable operating procedures. The inspectors also reviewed LG-MODE-003, "Limerick Unit 1 Technical Specification 3.0.4.b Risk Assessment," to verify Exelon's assumptions and extreme weather input into their risk assessment. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during hot weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified

.2 Site Imminent Weather Conditions

a. Inspection Scope

On September 18, 2012, the inspectors reviewed Exelon's preparations in advance of and during a Severe Thunderstorm Warning issued by the National Weather Service for Montgomery County. The inspectors performed walkdowns of areas that could be potentially impacted by the weather conditions, such as the diesel structure and transformers, and verified that station personnel secured loose materials staged for outside work prior to the forecasted weather. The inspectors verified that Exelon monitored the approach of the storm according to applicable procedures and took appropriate actions as required.

b. Findings

No findings were identified.

.3 External Flooding

a. Inspection Scope

During the week of August 6, 2012, the inspectors performed an inspection of the external flood protection measures for the Limerick Generating Station. The inspectors reviewed the UFSAR, Chapter 3.4, which described the design flood levels and protection areas containing safety-related equipment to identify areas that may be affected by external flooding. The inspectors conducted a general site walkdown of all external areas of the plant, including the turbine building, control building, and emergency diesel generator building to ensure that Exelon maintained credited flood protection equipment in accordance with design specifications. The inspectors also reviewed operating procedures for mitigating external flooding during severe weather to determine if Exelon planned or established adequate measures to protect against external flooding events.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdowns (71111.04Q – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 20 station auxiliary transformer with the 10 station auxiliary transformer out of service for corrective maintenance due to a load tap changer (LTC) failure (IR 1391737)
- Emergency diesel generator (EDG) D11 during EDG D14 monthly surveillance and Temporary Instruction (TI) 2515/188 seismic site component walkdowns
- Unit 2 core spray (CS) system during the Unit 2 'A' CS emergency service water pipe replacement
- Unit 2 reactor core isolation cooling (RCIC) system when high pressure coolant injection (HPCI) was out-of-service due to testing.

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 UFSAR, TS, work orders, condition reports, 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 corrective action program for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 6 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 22, Unit 1 Cable Spreading Room, F-A-449, Revision 12
- Fire Area 23, Unit 2 Cable Spreading Room, F-A-450, Revision 10
- Fire Area 54, Unit 2 'A' and 'C' RHR Heat Exchanger and Pump Rooms 173 and 280 (elevations 177 and 201), F-R-173, Revision 7
- Fire Area 80, Unit 1 D13 EDG Room and Fuel Oil and Lube Oil Tank Room, Rooms 311C and 312C (elevation 217), F-D-311-C, Revision 7
- Fire Area 122, Pre-Fire Plan Strategy for Spray Pond Pump Structure, Western Half F-S-001, Revision 12
- Fire Area 123, Pre-Fire Plan Strategy for Spray Pond Pump Structure, Eastern Half F-S-002, Revision 10.

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Internal Flooding Review (71111.06 – 1 sample)

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed the corrective action program (CAP) to determine if Exelon identified and corrected flooding problems and whether operator actions for coping with flooding were adequate. The inspectors performed a walkdown on the Unit 2 HPCI and RCIC rooms and adjacent passageways to verify the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program

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

a. Inspection Scope

The inspectors observed licensed operator evaluated simulator scenarios for operating crew 'A' on July 31, 2012, which included instrumentation failures, control rod inoperability, failures of secondary equipment, and containment isolation failures. 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 - 2 samples)

a. Inspection Scope

The inspectors observed licensed operator performance in the main control room during the Unit 1 control rod pull to criticality performed on July 22, 2012 and Unit 2 reactor startup activities performed on July 29, 2012. The inspectors verified operator compliance and use of plant procedures, performance of procedure steps in the proper sequence, and proper TS usage. Pre-job briefs, the use of human error prevent techniques, communications between crew members, and supervision of activities were observed to verify that they were performed consistent with established plant practices.

b. Findings

No findings were identified.

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, corrective action program documents, maintenance work orders, and maintenance rule basis documents to ensure that Exelon was 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 *Code of Federal Regulations* (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 1384549, D234 load center potential transformer replacement PM
- IR 1412841, Failed main steam line flow nuclear steam supply shutoff system isolation logic relays (ST-2-041-908-1, Response Time Testing).

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 maintenance and emergent work activities listed below to verify that Exelon 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 technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- On-line risk profile on July 17 and July 18 when PJM Interconnection issued Maximum Emergency Generation Actions
- On-line risk profile on July 23 with the 10 auxiliary transformer unavailable due to failure of the transformer LTC
- On-line risk profile on July 24 with the TS 3.0.4.b risk assessment in place for an inoperable offsite source and an Operational Condition (OPCON) change from Startup to Power Operation
- On-line risk profile for August 20 – 21 with HPCI out-of-service to implement multiple spurious operations modifications and EDG D21 out-of-service for a relay replacement
- On-line risk profile for September 5 – 7 with EDG D23 out-of-service for relay/rectifier replacement and RCIC out-of-service for multiple spurious operations modification work.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 7 samples)

a. Inspection Scope

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

- IR 1376415, EDG D23 failed to start during monthly testing
- IR 1387481, Periodic steam plume between Unit 1 high pressure and low pressure turbines (LPTs)
- IR 1384878, Unit 1 'A' reactor recirculation pump seal #2 pressure approaching trend region
- IR 1390431, Unit 1 drywell unit cooler leak
- IR 1391534, Unanalyzed condition for loss of main generator stator cooling water runback
- IR 1408528, Potential crack in reactor pressure vessel instrument line weld
- IR 1408977, Unit 1 'A' adjustable speed drive started up in test mode requiring single-loop operation to reset solid-state (NXG) controller.

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. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

.1 Timeliness of Operability Determination

Introduction. The inspectors identified a NCV of very low safety significance (Green) of TS 3.3.1.1, "RPS Instrumentation," because Limerick operators did not enter the required TS action in a timely manner in response to an RPS instrumentation line failure. Specifically, following the main control room (MCR) receipt of the Unit 1 'Turbine Control Valve / Stop Valve Scram Bypassed' alarm and an equipment operator verification that the 'C' and 'D' channels of RPS circuitry were potentially bypassed indicating a possible loss of RPS function, action by the operators to enter the applicable TS action statement was delayed by over an hour while RPS electrical prints were reviewed to verify inputs to the RPS circuitry.

Description. At 11:44 p.m. on July 11, 2012, the MCR received alarm Panel 107, Window A2 'Turbine Control Valve / Stop Valve Scram Bypassed.' Operators began investigation of the cause of the alarm using the alarm response card (ARC) procedure, ARC-MCR-107-A2, "Turbine Control Valve (TCV) / Stop Valve (TSV) Scram Bypassed," and reviewed the applicable TS 3.3.1, "RPS Instrumentation," to determine what actions were required. At 11:46 p.m., the lead equipment operator reported to the MCR that there was a steam leak near the LPT and then at 12:03 a.m. on July 12, 2012, reported that trip lights for the local pressure sensing instrumentation for the 'C' and 'D' RPS channels were off. MCR operators did not immediately enter TS 3.3.1 at this time because, in part, operators wanted to verify the inputs and felt they had 'time to discover' the cause of the alarm prior to declaring RPS inoperable. At 1:21 a.m. on July 12, 2012, one hour and thirty-seven minutes after the alarm condition, MCR operators determined

that the turbine stop valve (TSV) closure trip channels A2 and B2 were inoperable causing Unit 1 to enter TS 3.3.1.d Action 6 requiring thermal power reduction within 15 min and thermal power below 29.5 percent thermal power within 2 hours. Thermal power reduction commenced at 1:33 a.m. and was below the RPS function bypassed limit of 29.5 percent by 3:04 a.m.

The RPS is made up of two independent trip systems. There are usually four channels to monitor each parameter with two channels in each trip system. The outputs of the channels in a trip system are combined in a logic so that either channel will trip that trip system. The ARC for MCR alarm 107-A2 indicates that the cause of the alarm is that at least one of the four RPS TSV or TCV fast closure trips are bypassed due to turbine first stage pressure being less than the value which corresponds to 29.5% reactor power. The Limerick Unit 1 UFSAR states, "TSV closure and TCV fast closure trip bypass is affected by four pressure sensors associated with the turbine first stage pressure. Two physically separate and redundant pressure taps are located in the turbine steam supply lines upstream of the high pressure turbine first stage are piped to two non-redundant pressure sensors that sense first stage pressure. Any one channel in a bypass state produces a control room annunciation." Limerick Unit 1 TS 3.3.1 requires four minimum operable channels per trip system for the turbine stop valve closure RPS function and two for the turbine control valve fast closure RPS function per Table 3.3.1-1. If these minimum operable channels per trip system cannot be met, depending on situation, the trip channel or trip system is tripped (TS 3.3.1.a through c) or thermal power is reduced within 15 minutes to reduce turbine first stage pressure until the RPS function is bypassed within two hours (TS 3.3.1.d - Action 6).

The inspectors determined that the alarm was unexpected for the existing plant conditions and should have prompted the operators to question the immediate operability of the TCV and TSV RPS functions. Exelon procedure OP-AA-103-102, "Watch Standing Practices," Section 4.5, "Annunciator Response," states, "Alarms and indications shall be accepted as correct until demonstrated otherwise," thus the operators should have accepted the alarm condition as correct until demonstrated otherwise. Furthermore, TSs require that a SSC be operable given the plant operational condition. Operability should be determined immediately upon discovery that an SSC subject to TS is in a degraded or nonconforming condition. While this determination may be based on limited information, the information should be sufficient to conclude that there is a reasonable expectation that the SSC is operable. If the operators are not able to conclude this, then the SSC should be declared inoperable. Based upon the information received from the equipment operators at 11:46 pm and 12:03 am, there was reasonable information available to the operators which put RPS operability in question and should have resulted in them declaring the associated equipment inoperable and entering the TS Action Statement at that time.

During the interviews conducted by the inspectors, the operators were asked about the reasonable expectation of operability for the RPS TSV and TCV functions at the time the alarm was received. All of the operators that were interviewed replied that not enough information was available and that more information was required due to the complexity of the RPS circuitry before the correct TS could be entered. The operators used the term 'time of discovery' to justify the time used during the alarm condition verification before entering the TS.

The inspectors concluded that, since the TS bases and the ARC described the plant condition associated with the alarm, there had been adequate information readily available for the MCR operators to determine that a reasonable expectation of operability for the RPS TSV and TCV had been lost, and that TS 3.3.1.a should have been entered at 12:03 am when reasonable information was available to the MCR operators. The inspectors discussed their conclusions with Limerick management and the issue was entered into the CAP as IR 1387851 for further evaluation.

Analysis. The inspectors determined that MCR operators not promptly entering TS 3.3.1.a in response to alarm 107-A2 'Turbine Control Valve / Stop Valve Scram Bypassed' was a performance deficiency. The finding was more than minor because it affected the human performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, operators did not enter the appropriate action statement and reduce thermal power as required by TS 3.3.1. The inspectors evaluated the finding using the IMC 0609, Attachment 4, "Initial Characterization of Findings" and the Phase I screening questions in IMC 0609, Appendix A, "The Significance Determination Process for Findings At Power." The inspectors determined this finding did affect a single RPS trip signal but did not affect the function of other redundant trips or diverse methods of reactor shutdown, did not involve control manipulations that unintentionally added positive reactivity, and did not result in a mismanagement of reactivity by operators. Therefore, the inspectors determined the finding to be of very low safety significance (Green). This finding had a cross-cutting aspect in the area of Human Performance, Decision-Making, because operators did not use conservative assumptions in decision making and promptly apply readily available information contained in the ARC and TS Bases to evaluate operability and determine TS applicability for the alarm condition. [H.1(b)]

Enforcement. TS 3.3.1, "RPS Instrumentation," requires as a minimum, the RPS instrumentation channels in Table 3.3.1-1 be operable. If within the one hour time allocated by TS 3.3.1 actions (a), it is not desired to place the inoperable channel or trip system in trip, then thermal power reduction is to be initiated in 15 minutes to reduce power below the turbine first stage pressure where RPS is automatically bypassed within 2 hours (nominally $<$29.5% power) per TS 3.3.1.d. Contrary to the above, on July 11-12, 2012, Limerick operators did not enter the required TS action in a timely manner in response to an RPS instrument line failure. Specifically, following the MCR receipt of the Unit 1 'Turbine Control Valve / Stop Valve Scram Bypassed' alarm and equipment operator verification that the 'C' and 'D' channels of RPS circuitry were potentially bypassed indicating a possible loss of RPS function, action by the operators to enter the TS 3.3.1.d action statement were delayed. As a result, thermal power reduction was not initiated until one hour and 59 minutes following the initial alarm indication and power was not reduced to the point at which the RPS function was automatically bypassed until 3 hours and 20 minutes following the alarm. Because this issue is of very low safety significance (Green) and Limerick entered this issue into their CAP as AR 1387851, this finding is being treated as an NCV consistent with the NRC Enforcement Policy. **(NCV 05000352/2012004-01, Failure to Enter Technical Specifications in a Timely Manner)**

.2 Procedure Use and Adherence

Introduction. The inspectors identified a cited violation of very low safety significance (Green) of TS 6.8, "Procedures and Programs," because Limerick operators did not adequately follow an alarm response card procedure when responding to a MCR alarm. Specifically, the operators failed to immediately reduce power per the ARC procedure, ARC-MCR-107-A2 "Turbine Control Valve / Stop Valve Scram Bypassed," after the MCR received the alarm condition.

Description. At 11:44 p.m. on July 11, 2012, the Unit 1 MCR operators responded to the receipt of alarm Panel 107, Window A2 "Turbine Control Valve / Stop Valve Scram Bypassed" and a report from an equipment operator of a steam leak around the Unit 1 main turbine. After validating the alarm condition, Limerick commenced reducing power on Unit 1 at 1:33 a.m. on July 12 to satisfy TS requirements. The Unit 1 main turbine steam leak and alarm were later determined to be caused by a failure of a common first stage pressure sensing line for reactor protection system instruments.

The inspectors reviewed the MCR logs and interviewed the operators to understand the timeline for the event and the decisions made in response to the alarm. The inspectors determined that upon receipt of the MCR alarm, the alarm was acknowledged and the ARC procedure, ARC-MCR-107-A2 "Turbine Control Valve / Stop Valve Scram Bypassed" was entered. The ARC procedure starts with an operator action section and a note prior to step one. The 'Note' states that the 'scram can be verified to be bypassed if all four trip lights on PIS-001-1N652A, B, C, D are not lit.' Operators stated that they discussed the applicability of the 'Note' but that it did not delay their actions. Step one of the ARC procedure directs operators that, 'If core thermal power is greater than or equal to 29.5%, then immediately reduce reactor power to less than 1036 MWth (29.5%)' and then step two states, 'If desired to verify scram bypassed, then dispatch an operator to Aux Equipment room to verify trip lights.' Despite direction in the ARC, operators came to a collective decision that the alarm condition was not valid for the plant conditions that existed and made the decision not to perform step one. Operators continued with step 2 of the ARC while concurrently verifying TS applicability.

From the interviews with the operators, the inspectors determined that the ARC procedures are treated as Level 1 procedures and that per HU-AA-104-101, 'Procedure Use and Adherence', Revision 4, operators are to follow the procedure exactly as written. Exelon procedure OP-AA-103-102, "Watch-Standing Practices," Revision 11, Section 4.5 - Annunciator Response, directs operators to review and perform the ARC procedure for all unexpected alarms. The receipt of this alarm at 100% steam flow was unexpected and indicated that the associated RPS trip was inappropriately bypassed and was unable to perform its safety function in a condition where it is required. Following the ARC procedure would have ensured compliance with the associated TS 3.3.1, "RPS Instrumentation" Action Statement.

The inspectors concluded that contrary to Exelon procedures, the operators failed to immediately reduce power per the ARC procedure, ARC-MCR-107-A2 "Turbine Control Valve / Stop Valve Scram Bypassed," after the MCR received the alarm condition. Although the operators exhibited a 'good questioning attitude' in response to the unexpected alarm condition and the applicability of the Note in the ARC procedure, the conservative action to immediately reduce power per the ARC should have been

completed in a timely manner. The inspectors discussed their conclusions with Limerick management.

The July 11 event was entered into Exelon's CAP as IR 1387851 and an apparent cause evaluation (ACE) was conducted. The inspectors performed an initial review of Exelon's Management Review Committee-approved ACE when it was completed in August. The ACE identified a latent organizational weakness in that there was no corporate or station procedure which governs the use of alarm response procedures for Operations personnel. However, the ACE did not contain a thorough investigation into the human performance aspects of the issue. The inspectors considered the failure to follow a level 1 procedure as a separate performance deficiency and determined it was a violation of TS 6.8, "Procedures and Programs." On August 22, 2012, the inspectors discussed their concerns with the Limerick Plant Manager and other Exelon management and communicated that the performance deficiency was a violation of NRC requirements. However, Exelon failed to enter this concern into their CAP and evaluate this potential violation in a timely manner. On October 12, 2012, during the inspection exit, the concern was again formally raised to Exelon management. Although the performance deficiency and potential violation were acknowledged, the concern was not entered into the Exelon CAP until October 22, 2012 as IR 1429761. Limerick then issued a Standing Order 12-08, "ARC Usage Requirements" on October 22, 2012 to provide operator guidance.

Analysis. The inspectors determined that MCR operators failing to immediately reduce power per the ARC procedure, ARC-MCR-107-A2 'Turbine Control Valve / Stop Valve Scram Bypassed,' after receiving the alarm condition was a performance deficiency that was reasonably within their ability to foresee and correct, and should have been prevented. The finding was more than minor because it is associated with the human performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, operators did not reduce reactor power immediately as required for reactor protection. The inspectors evaluated the finding using the Phase 1, "Initial Screening and Characterization of Findings," worksheet in Attachment 4 to IMC 0609, "Significance Determination Process." The inspectors determined this finding did affect a single RPS trip signal but did not affect the function of other redundant trips or diverse methods of reactor shutdown, did not involve control manipulations that unintentionally added positive reactivity, and did not result in a mismanagement of reactivity by operators. Therefore, the inspectors determined the finding to be of very low safety significance (Green). This finding had a cross-cutting aspect in the area of Human Performance, work practices, because operators did not follow procedures. [H.4(b)]

Enforcement. TS 6.8, "Procedures and Programs" states, in part, "that written procedures shall be established, implemented and maintained covering … the applicable procedures recommended in Regulatory Guide (RG) 1.33, Appendix A, Revision 2, February 1978." RG 1.33, Appendix A, Revision 2, February 1978, Section 5, "Procedures for Abnormal, Offnormal or Alarm Response," states, in part, "Each safety-related annunciator should have its own written procedure, which should normally contain the immediate operation actions." Contrary to the above, on July 11, 2012, Limerick operators did not adequately implement an alarm response procedure when responding to a main control room alarm. Specifically, the operators failed to immediately reduce power per alarm response procedure, ARC-MCR-107-A2, 'Turbine

Control Valve / Stop Valve Scram Bypassed,' after the main control room received the alarm condition. Instead, the operators delayed the immediate reduction in reactor power to validate the control room alarm indication, and did not commence power reduction until one hour and forty-nine minutes later.

This finding is being cited because not all of the criteria specified in Section 2.3.2.a of the NRC Enforcement Policy for a non-cited violation were satisfied. Specifically, Exelon failed to restore compliance within a reasonable amount of time after the violation was identified. The event was entered into Exelon's CAP as IR 1387851 and an ACE was conducted. The inspectors performed an initial review of Exelon's Management Review Committee-approved ACE. The ACE identified a latent organizational weakness in that there was no corporate or station procedure which governs the use of alarm response procedures for Operations personnel. However, the inspectors identified that the ACE did not perform a thorough investigation into the human performance aspects of the issue. Failing to immediately reduce power per the ARC procedure was determined to be violation of NRC requirements and this was communicated the Exelon Management by the inspectors on August 22, 2012. This violation was not entered into the Exelon CAP, as IR 1429761, until October 22, 2012 and no interim corrective actions were identified until Standing Order 12-08 was issued on October 22, 2012 to provide operator guidance, 103 days after the initial event. Furthermore, the corrective actions identified to address the latent organizational weakness in the ACE also appeared to be untimely as these corrective actions were not scheduled for completion until October 31, 2012 and December 31, 2012. As a result, the NRC concluded that compliance with this violation had not been restored within a reasonable amount of time and the violation could not be dispositioned as an NCV. **(VIO 05000352/2012004-02, Failure to Immediately Reduce Reactor Power per the Alarm Response Card Procedure)**

1R19 Post-Maintenance Testing (71111.19 – 5 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.

- IR 1387481, Periodic steam plume between Unit 1 high pressure and low pressure turbines (LPTs)
- IR 1390033, 124A load center transformer failure troubleshooting and post maintenance testing
- IR 1411994, Gross failure on Unit 1 RCIC flow switch FS-049-1N659 during lineup of RCIC for pump, valve, and flow test
- ST-6-052-231-2, 'A' core spray (CS) Pump, Valve and Flow Test following emergency service water piping replacement on the Unit 2 'A' CS system
- AR 1386876, EDG D23 slow operation during engine air barring during testing.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 2 samples)

a. Inspection Scope

The inspectors reviewed the station's work schedules and outage risk plans for the following two outages:

- Unit 1 forced outage 1F51 conducted July 18 – July 24 to replace the 124A load center transformer and 'A' and 'B' recirculation pump seals
- Unit 1 planned maintenance outage 1M52 conducted September 1 – September 6 to perform inspections on LPT rotor blades.

The inspectors reviewed Exelon's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outages, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable technical specifications when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that technical specifications were met
- Monitoring of decay heat removal operations
- Impact of outage work on the ability of the operators to operate the spent fuel pool cooling system
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Maintenance of secondary containment as required by technical specifications
- Refueling activities, including fuel handling and fuel receipt inspections
- Fatigue management.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 routine, 2 In Service Test, 1 Isolation Valve Samples)

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-2-041-908-1, Nuclear Steam Supply Shutoff System – Main Steam Line Flow – High Division 1A, Channel 'A' Response Time Testing performed on Unit 1 (Isolation Valve)
- ST-6-047-471-1, Pre-control Rod Withdrawal Check and Control Rod Drive Exercise in OPCONS 3,4 with No Core Alterations
- ST-6-049-230-1, RCIC Pump, Valve and Flow Test performed on Unit 1 (IST)
- ST-6-049-230-2, RCIC Pump, Valve and Flow Test performed on Unit 2 (IST)
- ST-6-052-236-1, Safeguard Fill Pump Comprehensive Test performed on Unit 1
- ST-2-074-505-1, Low-Power Range Monitor Gain Calibration performed on Unit 1
- ST-6-092-113-1, EDG D13 24-Hour Endurance Test
- ST-2-092-321-2, 4 kilo-volt (kV) Emergency D21 Bus Undervoltage Channel Functional Test.

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 sample)

a. Inspection Scope

The Office of Nuclear Security and Incident Response headquarters staff performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures and the Emergency Plan located under ADAMS accession numbers ML12192A512 as listed in the Attachment.

The licensee determined that in accordance with 10 CFR 50.54(q), the changes made in the revisions resulted in no reduction in the effectiveness of the Plan, and that the revised Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The NRC review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 1 sample)

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine Exelon simulator-based emergency exercise on conducted on July 31, 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 simulator, technical support center, and emergency operations facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the critique to compare inspector 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 corrective action program.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety and Occupational Radiation Safety

2RS5 Radiation Monitoring Instrumentation (71124.05)

This area was inspected to verify that Exelon was assuring the accuracy and operability of process and effluent radiation monitoring instruments. The evaluation of licensee performance in this area was based on comparison to criteria contained in 10 CFR Part 20, 10 CFR Part 50, Appendix I, Numerical Guides for Design Objectives and Limiting Conditions for Operation to meet the Criterion "As Low as is Reasonably Achievable" (ALARA) for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents, and applicable requirements contained in TSs and the Offsite Dose Calculation Manual (ODCM).

.1 Inspection Planning

a. Inspection Scope

The inspector selectively reviewed the Limerick Station UFSAR to identify radiation instruments associated with monitoring process streams and effluents. The inspectors also selectively evaluated the meteorology measurement program. The inspectors reviewed the associated TS requirements for post-accident monitoring instrumentation.

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

The inspectors reviewed procedures that govern effluent instrument effluent source checks and calibrations. The inspectors reviewed the calibration and source check procedures for adequacy and implementation.

The inspectors reviewed selected effluent monitor alarm set-point bases and the calculation methods provided in the ODCM.

b. Findings

No findings were identified.

.2 Walkdowns and Observations

a. Inspection Scope

The inspectors walked down various effluent radiation monitoring systems (Unit 1 and Unit 2 North and South Stacks, Service Water Monitor). The inspectors evaluated flow measurement devices for point-of-discharge liquid and gaseous effluent monitors. The inspectors assessed whether the effluent/process monitor configurations align with what is described in the ODCM and the UFSAR.

The inspectors observed licensee staff performance as the staff demonstrated collection of weekly stack particulate and iodine effluent samples.

The inspectors compared monitor response (via local readout or remote control room indications) with actual area radiological conditions for consistency.

b. Findings

No findings were identified.

.3 Calibration and Testing Program

Process and Effluent Monitors

a. Inspection Scope

The inspectors selected various effluent monitoring instruments (North Stack, South Stack) and evaluated whether channel calibration and functional tests were performed consistent with station TSs/ODCM. The inspectors assessed whether; (a) the licensee calibrated its monitors with National Institute of Standards and Technology traceable sources; (b) the primary calibrations adequately represented the plant nuclide mix; (c) when secondary calibration sources were used, the sources were verified by comparison with the primary calibration source; and (d) the licensee's channel calibrations encompassed the instrument's alarm setpoints.

The inspectors assessed whether the effluent monitor alarm setpoints were established as provided in the ODCM and station procedures.

For changes to effluent monitor setpoints, the inspectors evaluated, as applicable, the basis for changes to ensure that an adequate justification existed.

b. Findings

No findings were identified.

Laboratory Instrumentation

a. Inspection Scope

The inspectors assessed laboratory analytical instruments used for radiological analyses to determine whether daily performance checks and calibration data indicate that the frequency of the calibrations is adequate and there were no indications of degraded performance.

The inspectors assessed whether appropriate corrective actions were implemented in response to indications of degraded performance.

b. Findings

No findings were identified.

Post-Accident Monitoring Instrumentation

a. Inspection Scope

The inspectors reviewed the licensee's capability to collect high-range, post-accident effluent samples.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

This area was inspected to review Exelon's treatment, monitoring and control of effluent releases including adequacy of public dose calculations and projections. The evaluation of licensee performance in this area was based on comparison to criteria contained in 10 CFR Part 20; 10 CFR Part 50, Appendix A - Criterion 60 Control of Release of Radioactivity to the Environment and Criterion 64 Monitoring Radioactive Releases; 10 CFR 50, Appendix I, Numerical Guides for Design Objectives and Limiting Conditions for Operations to Meet the Criterion ALARA for Radioactive Material in Light-Water – Cooled Nuclear Power Reactor Effluents; and applicable industry standards, licensee procedures, and TSs.

.1 Inspection Planning and Program Reviews

Event Report and Effluent Report Reviews

a. Inspection Scope

The inspectors reviewed the Limerick Station Radiological Effluent and Environmental Release Reports for 2010 and 2011 to determine if the reports were submitted as required by the ODCM/TSs. The inspectors reviewed anomalous results, unexpected

trends, or abnormal releases identified by the licensee. The inspectors determined if these effluent results were evaluated, were entered in the corrective action program, and were adequately resolved.

The inspectors identified radioactive effluent monitor operability issues reported by the licensee as provided in the Annual Radioactive Effluent Release Reports, and reviewed these issues to determine if the issues were entered into the corrective action program and were adequately resolved.

b. Findings

No findings were identified.

ODCM and UFSAR Report Review

a. Inspection Scope

The inspectors reviewed Limerick Station UFSAR descriptions of the radioactive effluent monitoring systems, treatment systems, and effluent flow paths to identify system design features and required functions.

The inspectors reviewed changes to the ODCM made by the licensee since the last inspection. When differences were identified, the inspectors reviewed the technical basis or evaluations of the change to determine whether the changes were technically justified and maintained effluent releases ALARA.

The inspectors reviewed licensee documentation to determine if the licensee had identified any non-radioactive systems that have become contaminated as disclosed either through an event report or the ODCM since the last inspection. The inspectors reviewed selected 10 CFR 50.59 evaluations and made a determination if any newly contaminated systems had an unmonitored effluent discharge path to the environment. The inspectors also reviewed whether any revisions to the ODCM were required to incorporate these new pathways and whether the associated effluents were reported in accordance with RG 1.21.

b. Findings

No findings were identified.

Groundwater Protection Initiative (GPI) Program

a. Inspection Scope

The inspectors reviewed reported groundwater monitoring results and changes to the licensee's written program for identifying and controlling contaminated spills/leaks to groundwater.

b. Findings

No findings were identified.

Procedures, Special Reports, and Other Documents

a. Inspection Scope

The inspectors reviewed Licensee Event Reports, and/or special reports related to the effluent program issued since the previous inspection to identify any additional focus areas for the inspection based on the scope/breadth of problems described in these reports.

The inspectors reviewed effluent program implementing procedures, including those associated with effluent sampling, effluent monitor setpoint determinations, and dose calculations.

The inspectors reviewed available copies of licensee and third party (independent) evaluation reports of the effluent monitoring program since the last inspection to gather insights into the effectiveness of the licensee's program.

b. Findings

No findings were identified.

.2 Walkdowns and Observations

a. Inspection Scope

The inspectors walked down selected components of the gaseous and liquid discharge systems to verify that equipment configuration and flow paths align with the descriptions in the UFSAR and to assess equipment material condition. Special attention was made to identify potential unmonitored release points, building alterations which could impact airborne, or liquid, effluent controls, and ventilation system leakage that communicate directly with the environment.

The inspectors reviewed the licensee's material condition surveillance records, as applicable, for equipment or areas associated with the systems selected for review that were not readily accessible due to radiological conditions.

The inspectors observed selected portions of the routine processing and discharge of radioactive gaseous effluent to verify that appropriate treatment equipment was used and the processing activities aligned with discharge permits.

The inspectors determined if the licensee had made any changes to effluent release paths and had properly evaluated and approved the changes. The inspectors verified that appropriate effluent treatment equipment is being used and that radioactive liquid waste was being processed and discharged in accordance with licensee procedures.

b. Findings

No findings were identified.

.3 Sampling and Analyses

a. Inspection Scope

The inspectors selected various effluent sampling activities, and assessed whether adequate controls have been implemented to ensure representative samples were obtained.

The inspectors evaluated if effluent discharges were made with inoperable effluent radiation monitors to verify that controls were in place to ensure compensatory sampling is performed consistent with the TSs/ODCM and that those controls are adequate to prevent the release of unmonitored liquid and gaseous effluents.
The inspectors determined whether the facility was routinely relying on the use of compensatory sampling in lieu of adequate system maintenance, based on the frequency of compensatory sampling since the last inspection.

The inspectors selectively reviewed the results of the inter-laboratory and intra-laboratory comparison program to verify the quality of the radioactive effluent sample analyses. The inspectors also assessed whether the intra and inter-laboratory comparison program includes hard-to-detect isotopes, as appropriate.

b. Findings

No findings were identified.

.4 Instrumentation and Equipment

Effluent Flow Measuring Instruments

a. Inspection Scope

The inspectors reviewed the methodology that the licensee uses to determine the effluent stack and vent flow rates to verify that the flow rates were consistent with TSs/ODCM and/or UFSAR values. The inspectors reviewed the differences between assumed and actual stack and vent flow rates, as appropriate, to ensure that they did not affect the calculated results of the public doses.

b. Findings

No findings were identified.

.5 Dose Calculations

a. Inspection Scope

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

The inspectors reviewed various radioactive liquid and gaseous waste discharge permits to verify that the projected public doses were accurate and based on representative samples of the discharge path.

Inspectors evaluated the methods used to determine the isotopes that were included in the source term to ensure all applicable radionuclides were included, within detectability standards. The review included the current waste stream analyses to ensure hard-to-detect radionuclides were included in the effluent releases.

The inspectors reviewed any significant changes in the 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 were being used for public dose calculations.

The inspectors reviewed the latest Land Use Census to verify that changes in the local land use had been factored into public dose projections and environmental sampling/analysis program, as applicable.

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

The inspectors reviewed various records of any abnormal gaseous or liquid discharges to ensure the abnormal discharge was properly evaluated and monitored, as applicable. Discharges made with inoperable effluent radiation monitors, or unmonitored leakages were reviewed to ensure that an evaluation was made of the discharge to account for the effluent release and were included in the calculated doses to the public.

b. Findings

No findings were identified.

.6 GPI Implementation

a. Inspection Scope

The inspectors reviewed monitoring results of the Nuclear Energy Institute (NEI) GPI to determine if the licensee had implemented its program as intended, and to identify any anomalous results. For anomalous results or missed samples, the inspectors assessed whether the licensee had identified and addressed deficiencies through the corrective action program.

The inspectors reviewed identified leakage or spill events and entries made into the licensee's decommissioning files. The inspectors reviewed evaluations of leaks or spills, and reviewed the effectiveness of applied remediation actions. The inspectors reviewed onsite contamination events involving contamination of groundwater and assessed whether the source of the leak or spill was identified and isolated/terminated.

For unmonitored spills, leaks, or unexpected liquid or gaseous discharges, the inspectors assessed whether an evaluation was performed to determine the type and amount of radioactive material that was discharged by assessing whether sufficient radiological surveys were performed to evaluate the extent of the contamination and assessing whether a survey/evaluation has been performed to include consideration of hard-to-detect radionuclides; and determining whether the licensee completed offsite notifications, as provided in its GPI implementing procedures.

The inspectors reviewed the evaluation of discharges from onsite surface water bodies, as applicable, that contain or potentially contain radioactivity, and the potential for groundwater leakage from these onsite surface water bodies. The inspectors assessed whether the licensee was properly accounting for discharges from these surface water bodies as part of their effluent release reports.

The inspectors assessed whether on-site groundwater sample results and a description of any significant on-site leaks/spills into groundwater for each calendar year were documented in reports to the NRC.

For any significant, new effluent discharge points, such as significant or continuing leakage to groundwater that continue to impact the environment, the inspectors evaluated whether the licensee's ODCM was updated to include the dose calculation method for the new release point and the associated dose calculation methodology.

b. Findings

No findings were identified.

.7 Problem Identification and Resolution

a. Inspection Scope

The inspectors selectively reviewed problem reports and audits and assessments to verify that problems associated with the effluent monitoring program were being identified by Exelon at an appropriate threshold and were being addressed for resolution in the corrective action program.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (71124.07)

This area was inspected to verify that the radiological environmental monitoring program (REMP) quantifies the impact of radioactive effluent releases to the environment and sufficiently validates the integrity of the radioactive gaseous and liquid effluent release program.

The evaluation of licensee performance in this area was based on comparison to criteria contained in 10 CFR Part 20; 10 CFR Part 50, Appendix A, Criterion 60 - Control of Release of Radioactivity to the Environment; 10 CFR 50, Appendix I, Numerical Guides for Design Objectives and Limiting Conditions for Operations to Meet the Criterion ALARA for Radioactive Material in Light-Water – Cooled Nuclear Power Reactor Effluents; and applicable guidance in licensee procedures, the ODCM and TSs.

.1 Inspection Planning

a. Inspection Scope

The inspectors reviewed the Annual Radiological Environmental Operating Reports for 2010 and 2011, and the results of any licensee assessments since the last inspection to verify that the REMP was implemented and reported in accordance with the TSs and ODCM. This review included changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, inter-laboratory comparison program, and presentation/analysis of data.

The inspectors reviewed the ODCM to identify locations of environmental monitoring stations. The inspectors reviewed the UFSAR for information regarding the environmental monitoring program and meteorological monitoring instrumentation. The inspectors reviewed the Annual Radioactive Effluent Release Reports for 2010 and 2011, and the most recent results from waste stream analysis, to determine if the licensee was sampling and analyzing for the predominant radionuclides likely to be released in effluents.

b. Findings

No findings were identified.

.2 Problem Identification and Resolution (Radiological Environmental Monitoring Program)

a. Inspection Scope

The inspectors assessed whether problems associated with the REMP are being identified by the licensee at an appropriate threshold and appropriate corrective actions are assigned for resolution in the licensee's corrective action program.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151- 6 samples)

.1 Unplanned Scrams per 7000 Critical Hours (IEO1) (2 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittals for the Unplanned Scrams per 7000 Critical Hours for both Unit 1 and Unit 2 for the period of July 1, 2011, through June 30, 2012. To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed Exelon's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, IRs, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Unplanned Scrams with Complications (IEO4) (2 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittals for the Unplanned Scrams with Complications for both Unit 1 and Unit 2 for the period of July 1, 2011, through June 30, 2012. To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed Exelon's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, IRs, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index (MS09) (2 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittal of the Mitigating Systems Performance Index for Unit 1 and Unit 2 RHR systems for the period of July 1, 2011, through June 30, 2012. To determine the accuracy of the PI data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed Exelon's operator narrative logs, IRs, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Inspection Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.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 entered issues into the corrective action program 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 corrective action program and periodically attended condition report screening meetings.

b. Findings

No findings were identified.

.2 Annual Sample: RHR Minimum Flow Valve Failure (1 sample)

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's apparent cause analysis and corrective actions associated with IR 1381792, Unit 2 'B' RHR minimum flow valve failed to open during surveillance testing. Specifically, a contact in the valve's open circuitry did not properly make up which resulted in the valve not opening automatically following the receipt of a loss of coolant accident signal with low RHR loop flow.

The inspectors assessed Exelon's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of corrective actions to determine whether Exelon was 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 corrective action program and 10 CFR 50, Appendix B. In addition, the inspectors performed field walkdowns and interviewed maintenance, engineering, and operations personnel to assess the effectiveness of the implemented corrective actions.

b. Findings and Observations

Introduction. A self-revealing Green NCV of Technical Specification 6.8.1, "Administrative Controls-Procedures," was identified because Exelon did not maintain adequate maintenance procedures associated with work performed on the Unit 2 'B' RHR pump motor circuit breaker. This resulted in the 'B' RHR pump minimum flow valve failing to open when required on June 25, 2012 during testing.

Description. On June 25, 2012, partial logic system functional testing was being performed on the Unit 2 Division II RHR system as a post maintenance test for a modification on the 'B' RHR heat exchanger bypass valve. During the test, the Unit 2 'B' RHR pump minimum flow valve (HV-051-2F007B) failed to open as required by the test. With the pump breaker racked to the Test position, the valve failed to open following a simulated loss of coolant accident (LOCA) initiation signal with RHR loop flow less than 1300 gpm. This test was later repeated with the same results. Exelon entered this issue into the CAP as IR 1381792 and commenced troubleshooting.

The instrument logic that would cause the RHR pump minimum flow valve to open following a LOCA signal with low RHR loop flow is initiated through a set of contacts in the Mechanism Operated Contact (MOC) switch located above the RHR pump supply breaker cubicle. The switch is operated by the pump breaker's MOC actuator which changes position with breaker state (i.e., open or closed) through a linkage rod. Troubleshooting determined that the malfunctioning MOC switch was caused by improper alignment between the circuit breaker MOC actuator and linkage rod. Although

all the other contacts providing signals for other functions (e.g., RHR room cooler start) on the MOC switch operated properly, troubleshooting efforts confirmed that the contact providing the open signal to the minimum flow valve did not make up. Dimensional checks of the MOC actuator on the installed circuit breaker showed a difference with spare circuit breakers in the maintenance shop. Exelon replaced the installed circuit breaker with a spare, performed satisfactory post maintenance testing, and returned the 'B' RHR pump to an operable status.

Exelon's apparent cause evaluation reviewed the history of the replaced circuit breaker. The breaker was overhauled in November of 2011 and installed in the Unit 2 'B' RHR breaker cubicle on November 30, 2011. Post maintenance testing at that time only included a pump operational check. Exelon determined that the post maintenance test was deficient and that proper testing should have included a test of the MOC cell switch contacts for proper operation because of the potential for differences in the dimensions of the circuit breakers' MOC actuator. Exelon concluded that the overhaul procedure was deficient in that it did not contain dimensional checks of the breaker MOC actuator. Corrective actions were planned to revise the overhaul procedure to include dimensional checks of the circuit breaker MOC actuator and to revise procedures to require a check of proper MOC switch operation when installing circuit breakers.

The inspectors concluded that the issue affected the operability of the Unit 2 'B' RHR pump for the LPCI function only when the RHR pump was aligned to the suppression pool cooling mode. This was because the minimum flow valve would not have opened automatically when the RHR system re-aligned to the LPCI mode following a LOCA signal. The inspectors reviewed operating data and determined that the 'B RHR pump was never lined up in the suppression pool cooling mode for longer than the allowed outage time for a single train of LPCI per TS 3.5.1, ECCS Operating (i.e., 30 days). During the normal standby lineup for the LPCI function, the minimum flow valve is normally open and would have automatically closed when there was sufficient flow through the system.

Analysis. The inspectors determined that Exelon's failure to perform appropriate post maintenance testing following the replacement of the Unit 2 'B' RHR pump breaker on November 30, 2011 and restoring the system to an operable status was a performance deficiency. This self-revealing finding was determined to be more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was determined to be of very low safety significance (Green) in accordance with Inspection Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," because it did not represent a loss of system function and did not represent an actual loss of function for two separate safety systems out-of-service for greater than its TS Allowed Outage Time.

The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, Resources, because Exelon did not provide work packages with sufficient detailed instructions to assure nuclear safety (H.2(c)). This resulted in the Unit 2 'B' RHR pump being returned to service without all of the required post maintenance testing being performed to demonstrate operability.

Enforcement. 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 (RG) 1.33, Appendix A, Revision 2, February 1978. NRC Regulatory Guide 1.33, Appendix A, Section 9, requires procedures for the performance of maintenance. Contrary to the above, on November 30, 2011, procedure Work Order R1205757 was performed on Unit 2 to replace the 'B' RHR pump motor circuit breaker and the procedure did not contain adequate instructions to perform post maintenance testing to assure pump operability. Specifically, although the circuit breaker replacement could have affected necessary pump support equipment operation due to circuit breaker MOC actuator dimensional differences, the procedure did not require a check of proper MOC switch operation following the installation of the new RHR pump motor circuit breaker. As a result, the Unit 2 'B' RHR pump was inoperable for the LPCI function when the pump was operating in the suppression pool cooling mode. This condition existed from November 30, 2011 until the condition was corrected on June 27, 2012. Because the finding is of very low safety significance and has been entered into Exelon's CAP as IR 1381792, this violation is being treated as a non-cited violation, consistent with the NRC Enforcement Policy. **(NCV 05000353/2012004-03, Inadequate Post Maintenance Testing Following Circuit Breaker Replacement)**

.3 Problem Identification and Resolution (Radiation Monitoring Instrumentation)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring instrumentation were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee corrective action program. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radiation monitoring instrumentation.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 7 Samples)

.1 Plant Events (2 samples)

a. Inspection Scope

For the plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. 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 implemented appropriate corrective actions commensurate with their safety significance.

- Unit 1 unplanned down power due to main turbine first stage pressure instrument line break on July 12, 2012
- Unit 1 manual scram due to loss of recirculation pumps caused by loss stator cooling water and Unusual Event due to a fault and damage on 124A load center transformer on July 18, 2012

b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report (LER) 05000352/2012-002-00 and -01: Valid Manual Actuation of the Reactor Protection System Due to Reactor Recirculation Pumps Tripping

On April 19, 2012, Limerick Unit 1 experienced a 144D load center transformer fault and subsequent low voltage condition that resulted in a loss of the main generator stator cooling water system which automatically tripped both of the reactor recirculation pumps requiring a valid manual actuation of the reactor protection system. Limerick determined that the 144D load center (LC) transformer fault was caused by a manufacturing defect in the polyester support board for the high voltage rod line. This LER was revised on September 18, 2012, to update the cause and corrective actions to align with the site's final investigation results. The inspectors did not identify any new issues during the review of the LER. This LER is closed.

.3 (Closed) LER 05000352/2012-004-00: Common-cause Inoperability of Independent Channels Due to Pipe Leak

On July 11, 2012, Limerick Unit 1 discovered that one of two main turbine first stage pressure instrument lines failed. This failure caused the 'Turbine Control Valve / Stop Valve Scram Bypassed' alarm in the main control room and initiated operator actions in accordance with the Alarm Response Card and Technical Specification 3.3.1, Reactor Protection System. Limerick determined that the event involved the common-cause inoperability of two independent channels in RPS but the RPS safety function was maintained. Limerick's failure analysis identified that the instrument pipe failed at the half-coupling connection to the main steam line. Circumferential fatigue cracks were observed along the weld toe due to reverse bending and indicated the line was subject to vibration.

The enforcement aspects of this issue are discussed in Section 1R15. The inspectors did not identified any new issues during the review of the LER. This LER is closed.

.4 (Closed) LER 05000352/2012-005-00: Valid Actuation of the Reactor Protection System with the Reactor Critical and Unusual Event Declared

On July 18, 2012, Limerick Unit 1 experienced a fault of the 124A load center transformer which, due to the plant electrical line-up, caused a loss of the main generator stator cooling water system which automatically tripped both of the reactor recirculation pumps requiring a valid manual actuation of the reactor protection system. An Unusual Event was declared due to flash-over damage on the failed transformer cabinet which was subsequently classified as an explosion within the protected area boundary. Limerick determined that the 124A LC transformer fault was caused by an

incorrectly installed high voltage clamp on the 13Kv cable which led to overheating and failure of the clamp.

The inspectors reviewed the LER and determined that a self-revealing NCV of TS 6.8.1 had occurred. This NCV is discussed further in Section 4OA3.7. No additional issues were noted. This LER is closed.

.5 (Closed) LER 05000352/2012-003-00: Valid Manual Actuation of the Primary Containment Isolation System due to Ventilation System Trip

On May 2, 2012, the Unit 1 reactor enclosure ventilation system tripped which resulted in a low delta pressure condition in reactor enclosure secondary containment. Operators entered Technical Specification Action 3.6.5.1.1, "Reactor Enclosure Secondary Containment Integrity," due to not maintaining reactor enclosure differential pressure greater than .25 inches of vacuum water gauge. Operators responded, in accordance with alarm response procedures, and initiated a manual Reactor Enclosure Secondary Containment isolation which restored differential pressure in accordance with TS. The cause of the spurious trip of the reactor enclosure ventilation system could not be determined. The inspectors reviewed the issue and determined that the issue was of minor risk significance because operators responded to the condition in accordance with plant procedures to restore secondary containment differential pressure into TS compliance and there was no adverse consequence as a result of their actions. Exelon planned revisions to the alarm response procedures to provide additional guidance to operators to reduce the likelihood of requiring manual secondary isolations following a trip of the reactor enclosure ventilation system. This LER is closed.

.6 (Closed) LER 05000352/2012-006-00: Valid Manual Actuation of the Reactor Protection System due to a Personnel Error and Surveillance Test Weakness

On July 19, 2012, with Unit 1 in Operational Condition 4 (Cold Shutdown) and all control rods inserted, a valid manual actuation of the reactor protection system was initiated when the reactor mode switch was repositioned back to the "Shutdown" position. This was performed as a result of discovering that the required nuclear instrumentation surveillance tests had not been performed within the required frequency. Earlier that day the reactor mode switch was placed in the "Refuel" position to support planned control rod exercising. Prior to any control rod withdrawal, a licensed operator reviewing the outage schedule identified that two prerequisite surveillance tests, which verify operability of the source range and intermediate range nuclear instruments, were outside of their required surveillance frequencies. After the reactor mode switch was placed back to the "Shutdown" position, the required surveillances were completed satisfactorily. The event was caused by a personnel error during the performance of a surveillance test (ST-6-047-471-1, "Pre-control Rod Withdrawal Check and CRD Exercise OPCONs 3 and 4 with No Core Alterations)," which verified that various surveillances were within their required frequency, prior to moving the reactor mode switch to the "Refuel" position. Exelon determined that a contributing cause was a test weakness that does not provide for a peer check of the verification of surveillance due dates. Exelon planned revisions to the verification surveillance test to add an additional peer review prior to completion.

The enforcement aspects of this issue are discussed in Section 4OA7. The inspectors did not identify any other issues during the review of the LER. This LER is closed.

.7 Findings

Introduction. A self-revealing Green non-cited violation of Limerick TS 6.8.1 was identified for failure to establish and perform adequate preventative maintenance (PM) activities to routinely inspect the 480 VAC load center power transformers. As a result, Limerick experienced a transformer related fault that could have been prevented by PM and which led to a manual reactor scram of Unit 1 on July 18, 2012.

Description. On July 18, 2012, Limerick Unit 1 inserted a manual scram due to an automatic trip of both reactor recirculation pumps following a loss of main generator stator cooling water. The loss of stator cooling water was caused by a failure of the 124A LC transformer. Limerick completed a root cause report (RCR) for the 124A failure and determined that the electrical fault in the transformer was caused by a degraded cable connection on one of the 13.2kV supply cables in the air terminal cabinet (ATC). During the site's extent of condition review, Limerick identified that of the 29 similar transformers on site, only fifteen had active PMs. The review showed that the other fourteen transformers were found to either not have a PM or the PM had been deactivated due to the site's implementation of a thermography monitoring program in 1998. This thermography monitoring program was credited at the time of implementation for replacing the existing transformer PM which consisted of a cleaning, inspections, and electrical testing. Limerick's assessment determined that the performance of the previously deactivated PM would not have detected the vulnerable connector that failed because the high voltage line connections in the ATC were not inspected by the PM.

Limerick's thermography monitoring program is governed by procedure MA-AA-716-230-1003, "Thermography Program Guide," Revision 4. This procedure required the Component Maintenance Optimization Group technology owner to identify and maintain a record of all equipment monitored by thermography. When the 124A LC PM was deactivated in 1994, thermography was credited as a condition based monitoring task to ensure the component's reliability. Thermography was initially performed on the 124A LC transformer by removing the enclosure panels to access the high voltage connections on the transformer. This method, which only included inspecting the transformer and not the high voltage line connections in the ATC, was discontinued in 1998 due to a safety concern caused by a flashover event on a similar transformer during a thermography inspection. As a result, thermography on these load centers was discontinued. In June 2004, it was determined that thermography windows on each transformer would need to be installed on the ATC as well as the transformer cabinet to allow safe implementation of the thermography program. In May 2006, an engineering change request, ECR 06-00123, was approved by the site to install thermography monitoring windows in these transformers but, to date, the windows have not been installed on many of the transformers, including the 124A LC transformer. Thermography windows were scheduled to be installed on the 124A LC transformer during 1R17 (A1678313) in 2018. Limerick's RCR stated that the proposed thermography window installation would have allowed viewing of the transformer cubicle as well as the ATC and would have detected the temperature differential that caused the failure of the cable connector.

The inspectors questioned whether Limerick had any previous opportunity to identify that there was no PM or thermography monitoring being performed on these transformers since the PM deactivation in 1998. The inspectors reviewed the RCR and conducted interviews with the applicable system engineers and site experts. The inspectors

determined that Exelon did not show adequate justification for the deactivation of the thermography monitoring program in 1998. Because of this deactivation, the credited process for ensuring the transformers' reliability was not in place since 1998. The inspectors noted that the transformer clean-and-inspect PM frequency was inconsistently applied to similar transformers and that the required clean-and-inspect PM frequency of once every 20 years was not being followed on all transformers due to the deactivation of the PM for the thermography monitoring program (IR 01355930).

Corrective actions implemented by Limerick as a result of this transformer failure included advancing the thermography window installation schedule to align with each transformers feeder breaker trip test calibration by 2014. Limerick also repaired and replaced the 124A LC transformer that failed. Limerick performed thermography inspections on the other load center transformers and have corrective actions (IRs 1355930; 1390033) in place to reinstitute the clean-and-inspect PM on all load center transformers at an increased frequency of 8 years vice 20 years.

Analysis. The inspectors determined that Limerick's failure to establish and perform adequate PMs to routinely inspect the 480 VAC load center power transformers was a performance deficiency. The finding was more than minor because it was associated with the Initiating Events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was determined to be of very low safety significance (Green) in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," because the finding caused a reactor trip but not the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

The NRC's integrated inspection report from the second quarter 2012, documented a negative trend with plant issues related to the PM of plant equipment over the past several quarters (ADAMS Accession No.: ML12214A454 - See Section 4OA2.2, Problem Identification and Resolution - Semi-Annual Trend Review). The inspectors identified a trend noting recent examples of PM inadequacy, improper PM implementation, and unjustified PM deferrals. This finding was determined to have a cross-cutting aspect because, although the performance deficiency occurred more than three years ago, the performance characteristic associated with ineffective PM implementation, continues to exist within Limerick's PM program and is indicative of current performance. The cross-cutting aspect associated with this performance deficiency is in the Resources component of the Human Performance area because the licensee did not ensure that personnel, equipment, procedures and other resources were adequate to assure long term plant safety through maintenance and the minimization of long-standing equipment issues [H.2 (a)].

Enforcement. Limerick Unit 1 TS 6.8.1, "Procedures and Programs" requires, in part, that procedures be established and implemented covering the applicable activities in Appendix A of Regulatory Guide 1.33, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A, Section 9b states, in part, that preventive maintenance schedules should be developed to specify inspections of equipment, replacement, and inspection or replacement of parts that have a specific lifetime. Contrary to this requirement, Exelon did not provide adequate procedural guidance for preventive maintenance activities to routinely inspect the 480 VAC load center power transformers. As a result, on July 18, 2012, Limerick experienced a fault on the 124A LC transformer that led to a

manual reactor scram that could have been prevented. However, because this finding was of very low safety significance and it was entered into the corrective action program as IRs 1355930 and 1390033, consistent with the Enforcement Policy, this violation is being treated as a non-cited violation. **(NCV 05000352, 353/2012004-04, Failure to Establish and Perform Adequate Preventive Maintenance on 480 VAC Load Center Power Transformers)**

4OA5 Other Activities

.1 Buried Piping, TI-2515/182, Phase 1 (1 sample)

a. Inspection Scope

The licensee's buried piping and underground piping and tanks program was inspected in accordance with paragraphs 03.01.a through 03.01.c of TI 2515/182 and was found to meet all applicable aspects of NEI document 09-14, Revision 1, as set forth in Table 1 of the TI 2515/182.

b. Findings

No findings were identified.

.2 Temporary Instruction 2515/187 – Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (1 sample)

a. Inspection Scope

On August 6, 2012, inspectors commenced activities to independently verify that Exelon conducted external flood protection walkdown activities using an NRC-endorsed walkdown methodology. These flooding walkdowns are being performed at all sites in response to Enclosure 4 of a letter from the NRC to licensees entitled, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). The results of this temporary instruction will be documented in a future inspection report.

b. Findings

No findings were identified.

.3 Temporary Instruction 2515/188 – Inspection of Near-Term Task Force Recommendation 2.3 – Seismic Walkdowns (1 sample)

a. Inspection Scope

On July 30, 2012, inspectors commenced activities to independently verify that Exelon conducted seismic walkdown activities using an NRC-endorsed seismic walkdown methodology. These seismic walkdowns are being performed at all sites in response to Enclosure 3 of a letter from the NRC to licensees entitled, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommen-

dations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). When complete, the results of this temporary instruction will be documented in a future inspection report.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On October, 12, 1012, 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.

4OA7 Licensee-Identified Violations

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

- Technical Specification 6.8, "Procedures and Programs" states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures as recommended in NRC RG 1.33, Appendix A, February 1978. NRC RG 1.33, Appendix A, Section 8, requires procedures for the performance of surveillance tests. Contrary to the above, on July 19, 2012, Surveillance Test ST-6-047-471, "Pre-control Rod Withdrawal Check and CRD Exercise OPCONs 3 and 4 with No Core Alterations," was not properly implemented. Specifically, surveillance steps which verified that the source range and intermediate range nuclear instruments were within their required test frequency were completed incorrectly. This resulted in the reactor mode switch being placed in the "Refuel" position without all the required TS surveillance tests being within their required frequency. Exelon entered this issue into the CAP as IR 1390866. The inspectors determined that the finding was of very low safety significance (Green) in accordance with NRC IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," because the finding did not represent a finding that required quantitative assessment.

- Limerick Unit 1 and Unit 2 TS 6.8.4.d. required that: 1) a Radioactive Effluent Controls Program be provided for the control of radioactive effluents, 2) the program be contained in the ODCM, and 3) that the program be implemented. Limerick Station ODCM, Revision 25, Section 4.2.2.3, requires that cumulative organ doses due to iodine, tritium, and particulates with half-lives greater than 8 days, be determined at least once per 31 days. Contrary to TS 6.8.4 and the ODCM, cumulative total dose to organs was not calculated during the period of approximately November 23, 2010 through October 2011, due to loss of dose factors from a software package. Exelon subsequently calculated bounding dose values after re-loading the factors and determined the projected doses to be well within applicable dose limits. Exelon also provided an update to its 2010 annual effluent release report. This finding was assessed for significance using IMC 0609,

Appendix D, “Public Radiation Safety Significance Determination Process,” and determined to be of very low safety significance because: there was no spill or release event; the issue was contrary to Technical Specifications and a radioactive effluent release program deficiency; secondary radioactive effluent monitoring and controls program elements provided for control of effluents releases; although organ doses were slightly underestimated, projected doses did not exceed applicable limits, including ALARA design specifications of 10 CFR 50, Appendix I; there was no effluent monitor calibration issue; and the licensee had data by which to assess dose to a member of the public. Because this issue was determined to be of very low risk significance (Green), and Exelon has entered this issue into the CAP as IR 1297197, this issue is being characterized as a licensee identified NCV.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Dougherty, Site Vice President
D. Lewis, Plant Manager
C. Rich, Director of Operations
D. Doran, Director of Engineering
R. Kreider, 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
D. Molteni, Licensed Operator Requalification Training Supervisor
A. Wasong, Training Director
R. Ruffe, Operations Training Manager
R. Wehrman, Engineer
P. Hansen, Enercon
L. Maclay, Enercon
M. DiRado, Manager, Engineering Programs
B. Tracy, Buried Pipe Program Owner
R. Harding, Regulatory Assurance
D. Merchant, Radiation Protection Manager
C. Gerdes, Chemistry Manager
D. Wahl, Radiochemist
A. Varghese, System Manager, Radiation Instruments
M. Bonanno, Electrical Plant Engineering Manager
M. Gift, Engineer, Response Team
R. Nealis, Radiochemist
J. Laughlin, Emergency Preparedness Inspector, NSIR

Other:

M. Murphy, Inspector, Commonwealth of Pennsylvania

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened

05000352/2012004-02	VIO	Failure to Immediately Reduce Reactor Power per Alarm Response Procedure (Section 1R15.2)

Opened/Closed

05000352/2012004-01	NCV	Failure to Enter Technical Specifications in a Timely Manner (Section 1R15.1)
05000353/2012004-03	NCV	Inadequate Post Maintenance Testing Following Circuit Breaker Replacement (Section 4OA2.2)
05000352, 353/2012004-04	NCV	Failure to Establish and Perform Adequate Preventive Maintenance on 480VAC Load Center Power Transformers (Section 40A3.7)

Closed

05000352/2012002-00,01	LER	Valid Manual Actuation of the Reactor Protection System due to Reactor Recirculation Pumps Tripping (Section 4OA3.2)
05000352/2012-004-00	LER	Common-cause Inoperability of Independent Channels due to Pipe Leak (Section 4OA3.3)
05000352/2012-005-00	LER	Valid Actuation of Reactor Protection System with the Reactor Critical and Unusual Event Declared (Section 4OA3.4)
05000352/2012003-00	LER	Valid Manual Actuation of the Primary Containment Isolation System Due to Ventilation System Trip (Section 4OA3.5)
05000352/2012-006-00	LER	Valid Manual Actuation of the Reactor Protection System due to a Personnel Error and Surveillance Test Weakness (Section 4OA3.6)
2515/182	TI	Buried Piping, Phase 1 (Section 4OA5.1)

Discussed

2515/187	TI	Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (Section 4OA5.2)
2515/188	TI	Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns (Section 4OA5.3)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Issue Reports
1391791

Procedures
Temporary Instruction 2515/187, Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns
Event Procedure E-5, Grid Emergency, Revision 20
WC-AA-104, Integrated Risk Management, Revision 18
WC-AA-101, On-line Work Control Process, Revision 19
GP-7.1, Summer Weather Preparation and Operation, Revision 28
SE-9, Preparation for Severe Weather, Revision 30

Section 1R04: Equipment Alignment

Issue Reports
839237 840421 A1213889

Procedures
S49.9.A, Routine Inspection of RCIC System, Revision 28
2S49.1.A (COL), Valve Alignment to Assure Availability of the RCIC System, Revision 13

Section 1R05: Fire Protection

Procedures
F-R-173, Unit 2 A and C RHR Heat Exchanger and Pump Rooms 173 and 280 (EL 177 and 201) Fire Area 54, Revision 7
F-D-311-C, Unit 1 D13 Diesel Generator Room and Fuel Oil and Lube Oil Tank Room, Rooms 311C and 312C (EL 217) Fire Area 80, Revision 7
F-A-450, Common, U2 Cable Spreading Room (EL 254), Revision 10
F-A-449, Common, U2 Cable Spreading Room (EL 254), Revision 12

Section 1R06: Flood Protection Measures

Procedures
SE-4-1, Reactor Enclosure Flooding, Revision 8

Miscellaneous
UFSAR, Chapter 3, Design of Structures, Components, Equipment, and Systems
L-T-09, Internal Hazards, Revision 5

Section 1R11: Licensed Operator Requalification Program

Issue Reports
1396158 1396165 1393199 1373765

Miscellaneous
LORSEG-3152E, Simulator Evaluation Guide, Revision 0

Section 1R12: Maintenance Effectiveness

Procedures
M-171, Specification for Environmental Service Condition, Revision 016
RT-6-041-490-2, Suppression Pool Gross Input Leak Rate Determination
SM-AA-404, Nuclear Material Procurement, Revision 10
SM-AC-400, Materials and Services Procurement Procedure, Revision 01
ST-2-041-911-1, NSSSS – Main Steam Line Flow – High Division IIB, Channel D Response Time Test (PDIS-41-1N686[687, 688, 689]D)
ST-2-041-908-1, NSSSS – Main Steam Line Flow – High Division IA, Channel A Response Time Test, Revision 12
ST-2-041-909-2, NSSSS - MAIN Steam Line Flow – High Division IB, Channel B Response Time Test, Revision 9
ST-2-041-659-1, NSSSS – Condenser Vacuum - Low, Main Steam Line Pressure - Low; Main Steam Line Flow - High, Channel C Functional Test, Revision 13

Issue Reports
1384549 1663806 851461 1412841 1412065 1091132
1421787 1414207

Miscellaneous
Inspection Report 0124950 (07/27/12)
MSRV Receipt Inspection Guideline, Revision 3

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
WC-AA-101, On-Line Work Control Process, Revision 19
E-5, Grid Emergency, Revision 20
MA-AA-716-210, PCM Process
MA-AA-716-210-1001
MA-AA-716-009, PM Deferral Process
OU-AA-103, Shutdown Safety Management Program, Revision 12
ER-AA-600-1042, On-Line Risk Management, Revision 7
S91.0.G, Responding to 10/20 Regulating Transformer Alarm, Revision 3
S35.0.K, No. 10 Transformer Tap Change Control (Local), Revision 12
IC-11-02064, Limerick 220kV Substation No. 10 Transformer AVC, Revision 6

Issue Reports
1391737 1287795 1225421

Miscellaneous
S210-40-9, Service Information – Power Transformers, November 1974
PM R0818016
PTI 224 M, Manual Control Addendum (LTC)
IQ Review - 10/20 Transformer LTC PM
Ops Logs 7/22-23/12

Section 1R15: Operability Evaluations

Procedures

NF-AB720-1000, Startup, Shutdown, and Target Rod Pattern Sequence Package Development, Revision 9
NF-LG-721-1005, Reactor Maneuvering Shutdown Instructions Preparation Guideline, Revision 3
ST-3-107-870-1, Shutdown Margin Determination (SDM), Revision 11
S43.3.A, Filling and Venting 'A' Recirculation Pump Loop and Seal, Revision 46
M-043-013, Reactor Recirculation Pump N-7500 Mechanical Seal Test, Revision 8
OT-112, Attachment 1, LGS Power Flow Operation Map, Revision 50
TCP 12-0486-0, GP-2 Normal Plant Startup – Add Direction for Entering Single Recirc Loop Operation
ARC-MCR-107-A2, Turbine Control Valve / Stop Valve Scram Bypassed
AD-AA-101-1002, Writer's Guide for Procedures and T&RM, Revision 16
OP-AA-103-102, Watch Standing Practices, Revision 11
OP-LG-103-102-1001, Alarms and Indications, Revision 6
HU-AA-104-101, Procedure Use and Adherence, Revision 4
Operations Standing Order 12-08, Revision 01

Issue Reports

1416080	1392061	1384878	1374944	1386343	1390153
693677	693675	1299616	1391534	1408977	1390033
1376415	1387831	1387481	1388282	138075	

Maintenance Orders/Work Orders

R1037500	R1162430	R0254626

Miscellaneous

LG1C15SD-04.0, Unit 1 Shutdown Sequence
NF-AB-720-F-2, Control Rod Move Sheet, Revision 0
ARC-MCR-111 A1, A Recirculation Pump Seal Stage HI/LO Flow, Revision 0
8031-M1-B32-C001, Technical Manual for Reactor Coolant Pump
Flowserve Field Service Report for Limerick Generating Station Unplanned Outage 7/18/12 A1467777
MA-MA-716-009, Att. 3, PM Deferral Justification Checklist, Revision 7
PM325547
1408977 PORC – Operational Decision Making (ODM) for 1A adjustable speed drive Repair Plan
8031-M-1-C71-1020E

Section 1R19: Post-Maintenance Testing

Issue Reports

1381792	1386876	1376415	1378119	1277313	1378119
1345006	1391980				

Procedures

M-200-002, 2.3kV and 4kV Power Circuit Breaker Overhaul, Revision 7
S92.2.N, Shutdown of the Diesel Generators, Revision 033

ST-6-092-313-2, D23 Diesel Generator Slow Start Operability Test Run, Revision 072
S91.1.H, Energizing/De-energizing a 13.2 KV/480V Load Center Transformer, Revision 011

Maintenance Orders/Work Orders
R1022440
R1022441
PM252422
C0243147
C0243702

Miscellaneous
Drawing 8031-M-49, Reactor Core Isolation Cooling
Startup PORC for 1F51

Section 1R20: Refueling and Other Outage Activities

Procedures
S28.9.A, Routine Inspection of Hydrogen and Seal Oil System, Revision 026
S28.10.A, Main Generator H2 Leak Survey

Issue Reports
1387751

Miscellaneous
A1867453

Section 1R22: Surveillance Testing

Issue Reports
1390866 691575

Procedures
ST-6-107-883-1, SRM Operability Verification, Revision 3
ST-6-049-230-2, RCIC Pump Valve and Flow Test, Revision 71
ST-6-052-236-1, Safeguard Piping Fill Comprehensive Test, Revision 2
ST-4-052-953-1, Functional Leak Test of Safeguard Piping Fill Pump, Loop 'A' and 'B', Revision 4
S52.1.C, Operation of Safeguard Piping Fill System, Revision 011
S49.9.A, Routine Inspection of RCIC System, Revision 028

Section 1EP4: .1 Emergency Action Level and Emergency Plan Changes

EP-AA-1000, "Standardized Radiological Emergency Plan," Revision 21
EP-AA-112, "Emergency Response Organization (ERO) Emergency Response Facility (ERF) Activation and Operation," Revision 16

Section 1EP6: Drill Evaluation

Issue Reports
1386344

Section 2RSO5: Radiation Monitoring Instrumentation

Procedures
ST-2-026-415-0, North Stack Channel B Calibration/Functional Test (October 2011) (Noble gas)
ST-2-026-605-1, North Stack Functional Check (June 2012)
St-2-026-440-0, North Stack Flow-Rate Monitor
St-2-026-400-1, Unit 1 South Stack Channel Calibration (Channel 'A') (April 2012)
ST-2-02ST-2-026-401-1, Unit 1 South Stack Channel Calibration (Channel 'B') (March 2012)
ST-2-026-442-1, Unit 1 South Stack Flow (January 2012)
ST-2-026-605-1, Unit 1 South Stack Functional (Channel 'A')
ST-2-026-400-2, Unit 2 South Stack Channel Calibration (Channel 'A')(August 2011)
ST-2-026-401-2, Unit 2 South Stack Channel Calibration (Channel 'B')(August 2011)
ST-2-026-442-2, Unit 2 South Stack Flow (January 2012)

Documents
CY-LG-170-301, Change Log, Rev 25

Section 2RSO6: Radioactive Gaseous and Liquid Effluent Treatment

Issue Reports

752414	911591	805533	1297197	1388650	1388653
1390217	1390235	1390239	1390500	1390496	1390483
1390510	1390533	1390552	1390562	1390567	1390577
1390579	1390652	1390570	1390757	1049470	1297197

Procedures
RP-AA-228, 10 CFR 50.75 (g) and 10 CFR 72.30(d) Documentation Requirements, Revision 1
RT-5-104-800-0, Tritium Analysis of Non-Contaminated Systems
CY-LG-120-1102, Outside Chemistry NPDES Related Sampling and Analysis Schedule, Revision 32
CY-LG-170-202, Sampling of Noble Gas, Tritium, Iodine and Particulate at the GA Gaseous Effluent Radiation Monitor, Revision 11
ST-5-076-815-0, North Stack and Hot Machine Shop Weekly Iodine and Particulate Analysis, Revision 32
CY-AA-130-201, Radiochemistry Quality Control, Revision 1
EN-AA-408-4000, Radiological Groundwater Protection Program Implementation, Revision 2
CY-AA-170-200. Radioactive Effluent Control Program, Revision 1
S57.5.A, De-Inerting and Purging Primary Containment, Revision 44
ST-5-026-571-0 SW/RWR Effluent Line Inop Monitoring April 2012
ST-5-061-570-0, Quarterly Composite SR-89, 90; Fe-55
ST-5-061-820-0, Batch Liquid Waste Release Quarterly Composite Analysis – Fe-55, Sr-89/90
ST-5-061-570, Rad Waste Discharge Permit (12-0009)
ST-5-061-810-0, Batch Liquid Waste Release Monthly Composite
ST-5-076-810-0 North Stack Monthly Noble Gas Sampling and Analysis
ST-5-076-827-0, North Stack Monthly Tritium
RT-5-104-800-0, Tritium Analysis of Non-Contaminated Systems

Documents
2010, 2011, Annual Effluent Release and Environmental Reports
CY-LG-170-301, Change Log, Revision 25
EN-LG-408-4160, RGPP Reference Material for Limerick, Revision 2
EN-AA-408-4000, Radiological Groundwater Protection Program Implementation, Revision 2

2011 Groundwater Monitoring Report
Liquid Release Permits (Various)
10 CFR Part 61 Report (2011)
Land Use Census (2010, 2011)
Quality Control Matrix
Criteria for Choosing Radiological Gaseous EAL Thresholds Values – Limerick Generating Station
10 CFR 50.75(g) list

Audits
NUPIC Audit Teledyne, Brown, February 2011
NORMA-2009-1, October 2009
Audit (Teledyne Brown) December 2005
FASA -1141537-03 August 2011
2011 Quality Assurance Report

Section 2RSO7: Radiological Environmental Monitoring Program

2010, 2011, Annual Effluent Release and Environmental Reports

Section 4OA1: Performance Indicator Verification

Condition Reports
1391598

Section 4OA2: Problem Identification and Resolution

Issue Reports
1096676 1393199 60832 1392190 1390033 1355930
1356941 1083732

Procedures
M-200-002, 2.3 kV and 4 kV Power Circuit Breaker Overhaul, Revision 7
RT-6-041-490-2, Suppression Pool Gross Input Leak Rate Determination, Revision 20
GP-4, Rapid Plant Shutdown to Hot Shutdown, Revision 031
OT-114, Inadvertent Opening of a Relief Valve, Revision 26
TCP 12-0350-0, GP-3 Normal Plant Shutdown, Revision 142
M-092-003, Air Cooled Transformer Maintenance, Revision 002

Miscellaneous
ECR 06-00123
A1529328-E01
R025504
A1678313
CMO Maintained Thermography Component List as of 10/1/12
124A Generator Area Load Center Power PCM Template for 093-480 V System

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

(Also See Section 1R15: Operability Determinations for Additional References)

Issue Reports
1387831 1387851 1355930

Procedures
ARC-MCR-107, Turbine Control Valve/Stop Valve Scram Bypassed, Revision 3
M-092-003, Air Cooled Transformer Maintenance
M-200-004

Miscellaneous
A0992712
E-010-00178, ABB Vendor Manual – 480 VAC Load Center Transformer Installation/Maintenance Instructions
IEEE C57.94, Maintenance of Dry-Type Distribution and Power Transformers

Section 4OA5: Other Activities

TI-2515/182 Issue Reports
1089111 1272669 1297266 1397540 1384683 1384684

TI-2515/182 Procedures
ER-AA-5400, Buried Piping and Raw Water Corrosion Program (BPRWCP) Guide, Revision 5
ER-AA-5400-1001, Raw Water Corrosion Program Guide, Revision 5
ER-AA-5400-1002, Buried Piping Examination Guide, Revision 4
ER-AA-5400-1003, BPRWCP Performance Indicators, Revision 4

TI-2515/182 Miscellaneous
Buried Pipe and Raw Water Systems Long Term Asset Management Strategy, Revision 5
Buried Pipe Inspection Plan, Limerick Generating Station, dated 6/15/11
Buried Pipe Raw Water Corrosion Program Self-Assessment, dated 5/26/09
CSI Report No. 0600.105-01, Buried Piping Risk Analysis, Revision 1
Limerick BPRWCP Health Report, 2nd Quarter 2012
Monthly Rectifier Availability, Cathodic Protection System, July 2011-June 2012

TI-2515/182 Work Orders
C0240431 C0242769

TI-2515/187 Issue Reports
1398114 1397696

TI-2515/187 Procedures
SE-4-3, Flooding External to Power Block, Revision 5
M-200-047, Specification A-11, Special Doors Examination and Maintenance, Revision 5

TI-2515/187 Miscellaneous
Exelon Mid-Atlantic Sites NTTF Recommendation 23 Flood Walkdown Phase I Preparation Report, Limerick Generating Station
Enercon Report Number EXLNLM047-PR-001, August 2, 2012
Calculation LM-0615, Assessment of Safety Related Equipment for Potential Flooding, Revision 0
Drawing A-307, Water Boundaries Floor Plant, Elevation 217'0", Unit 1, Revision 27
Drawing A-307, Water Boundaries Floor Plant, Elevation 217'0", Unit 2, Revision 10

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Is Reasonably Achievable
ARC	Alarm Response Card
ATC	Air Terminal Cabinet
BPRWCP	Buried Piping and Raw Water Corrosion Program
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CS	Core Spray
EDG	Emergency Diesel Generator
GPI	Groundwater Protection Initiative
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IR	Issue Report
kV	Kilo-Volt
LER	Licensee Event Report
LC	Load Center
LOCA	Loss of Coolant Accident
LPT	Low Pressure Turbine
LTC	Load Tap Changer
MCR	Main Control Room
MOC	Mechanism Operated Contact
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NUREG	NRC Technical Report Designation
ODCM	Offsite Dose Calculation Manual
OPCON	Operational Condition
PM	Preventive Maintenance
RCIC	Reactor Core Isolation Cooling
RCR	Root Cause Report
REMP	Radiological Environmental Monitoring Program
RG	Regulatory Guide
RHR	Residual Heat Removal
RPS	Reactor Protection System
SSC	Structure, System, or Component
TCV	Turbine Control Valve
TI	Temporary Instruction
TS	Technical Specifications
TSV	Turbine Stop Valve
UFSAR	Updated Final Safety Analysis Report
VAC	Volt-Alternating Current