UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

November 9, 2010

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 05000352/2010004 AND 05000353/2010004

Dear Mr. Pacilio:

On September 30, 2010, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Limerick Generating Station Units 1 and 2. The enclosed integrated inspection report documents the inspection results which were discussed on October 15, 2010, with Mr. E. Callan and other members of your staff.

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

This report documents two NRC-identified findings and one self-revealing finding of very low safety significance (Green). Two of these findings were determined to involve violations of NRC requirements. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program (CAP), the NRC is treating these violations as non-cited violations (NCVs), consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administration, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Limerick facility. If you disagree with the cross-cutting aspect assigned to any finding on 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 Senior Resident Inspector at the Limerick facility. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

In accordance with 10 Code of Federal Regulations (CFR) Part 2.390 of the NRC's "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 document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Paul G. Krohn

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

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

Enclosure: Inspection Report 05000352/2010004 and 05000353/2010004
w/Attachment: Supplemental Information

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Sincerely,

/RA/
Paul G. Krohn, Chief
Projects Branch 4
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REGION I

Docket Nos:	50-352, 50-353
License Nos:	NPF-39, NPF-85
Report No:	05000352/2010004 and 05000353/2010004
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 & 2
Location:	Sanatoga, PA 19464
Dates:	July 1, 2010 through September 30, 2010
Inspectors:	E. DiPaolo, Senior Resident Inspector N. Sieller, Resident Inspector J. Lilliendahl, Reactor Inspector J. Bream, Project Engineer J. D'Antonio, Senior Operations Engineer
Approved by:	Paul G. Krohn, Chief Projects Branch 4 Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000352/2010004; 05000353/2010004; 07/01/2010-09/30/2010; Limerick Generating Station, Units 1 and 2; Fire Protection, Maintenance Effectiveness, and Problem Identification and Resolution.

The report covered a three-month period of inspection by resident inspectors, a reactor inspector, and an announced inspection by a senior operations engineer. Three Green findings were identified, two of which were non-cited violations (NCVs). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. Cross-cutting aspects associated with findings were determined using IMC 0310, "Components Within the Cross-Cutting Areas," dated February 2010. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. A self-revealing Green finding was identified for the failure to identify that the latching mechanism on a bus 114A/124A control power auxiliary relay (27X) was incorrectly adjusted during prior post-maintenance testing activities. Specifically, proper post-maintenance testing activities in 1992 and 2004 should have identified that the latching mechanism was incorrectly adjusted. The incorrectly adjusted latching mechanism prevented the automatic swap of control power to the alternate source (bus 124A) when preferred power (bus 114A) was lost due to an electrical fault. This resulted in a loss of stator water cooling runback signal that would have caused the trip of both recirculation motor-generator sets and resulted in operators having to manually initiate a reactor scram. Exelon's corrective actions taken or planned included verifying the latching mechanism adjustment on the site's other similarly designed control power auxiliary relays, testing the automatic undervoltage transfer circuit on a periodic basis, and performing a failure analysis on the faulted underground supply cable which initiated the event.

  The finding was more than minor because it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was determined to have very low safety significance (Green) in accordance with NRC IMC 0609, Attachment 4, "Phase 1- Initial Screening and Characterization of Findings," because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or function would not be available. Because the opportunities to identify the incorrectly adjusted latching relay occurred in 1992 and 2004, the inspectors determined that this finding was not reflective of current licensee performance, and, therefore, did not have a cross-cutting aspect. Enforcement action does not apply because the performance deficiency did not involve a violation of regulatory requirements (Section 1R12).

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of Limerick Generating Station operating License Condition 2.C.3, in that Exelon failed to take compensatory actions for an inoperable fire door. Specifically, on two occasions a required fire door was found in a condition where the latching mechanism did not function. Although issue reports (IRs) were written which identified this door to be a Technical Requirements Manual (TRM) fire door, actions were not taken to station the required hourly fire watch. Corrective actions included setting the required hourly fire watches, distributing guidance to all senior licensed operators, and implementing procedural changes to clarify the requirements of fire doors for future operability determinations.

  The finding was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. This issue was found to be of very low safety significance (Green) based upon a Phase 2 SDP screening. The inspectors determined that this finding did not have a cross-cutting because the incorrect operability decisions were based on a 1999 engineering evaluation and, therefore, was not reflective of current licensee performance. (Section 1R05)

- Green. The inspectors identified a Green NCV of Limerick Unit 2 Technical Specification (TS) 6.8.1, "Procedures and Programs," in that Exelon did not provide an adequate procedure for preventive maintenance (PM) of the Limerick Emergency Diesel Generator (EDG) lube oil (LO) filter bypass valves. As a result, Exelon did not identify that the EDG D23 LO filter bypass valves were degraded and allowed oil to bypass the filter during engine operation. This condition, combined with historical foreign material in the LO system, led to the failure of the EDG D23 number 5 upper piston assembly during a 24-hour endurance test run on May 5, 2010. Corrective actions implemented included repairing the damage to D23, performing a flush of the D23 LO system, revising the applicable PM procedure to include specific instructions for inspecting the LO filter bypass valves, and revising performance monitoring guidance to ensure spuriously lifting LO filter bypass valves would be identified in the future.

  The finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating System cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was determined to be of very low safety significance (Green) in accordance with Inspection Manual Chapter (IMC) 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," using SDP Phases 1, 2, and 3. This finding has a cross-cutting aspect in the area of Human Performance, Resources, because Exelon did not provide complete, accurate and up-to-date design documentation, procedures, and work packages [H.2(c)]. Specifically, Exelon did not provide site engineers with complete and accurate resources to ensure performance centered maintenance (PCM) template revisions were thoroughly reviewed and implemented. (Section 4OA2.3)

B. Licensee-Identified Violations

A violation of very low safety significance, which was identified by the licensee, has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and corrective actions tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period operating at full rated thermal power (RTP). On July 1, 2010, operators reduced Unit 1 power to approximately 65 percent to facilitate a control rod pattern adjustment. The unit returned to full RTP on July 3. Operators reduced power on September 4 to 65 percent to facilitate main turbine valve testing, main steam isolation valve testing, control rod scram time testing, and secondary plant maintenance. Power was restored to full RTP on September 7. A power reduction was performed on September 17 to facilitate a follow-up control rod pattern adjustment. The unit returned to full RTP on September 18. Unit 1 remained at full RTP for the remainder of the inspection period.

Unit 2 began the inspection period operating at full RTP. Operators reduced power on September 9 to 62 percent to facilitate main turbine valve testing, main steam isolation valve testing, control rod scram time testing, and other secondary plant maintenance. Power was restored to full RTP on September 12. A power reduction was performed on September 16 to facilitate a follow-up control rod pattern adjustment. The unit returned to full RTP later that day. Unit 2 remained at full RTP for the remainder of the inspection period. Also, during the inspection period, Unit 2 power was reduced several times for short durations (e.g., operating shift) as a result of periods of high condensate temperature due to environmental conditions (i.e., high outside temperatures).

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems and Barrier Integrity

1R04 Equipment Alignment

.1 Partial Walkdown (71111.04Q - 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the plant systems listed below to verify operability following realignment after a system outage window or while safety-related equipment in the opposite train was inoperable, undergoing surveillance testing (ST), or potentially degraded. The inspectors used Technical Specifications (TS), Exelon operating procedures, plant piping and instrumentation diagrams (P&ID), and the Updated Final Safety Analysis Report (UFSAR) as guidance for conducting partial system walkdowns. The inspectors reviewed the alignment of system valves and electrical breakers to ensure proper in-service or standby configurations as described in plant procedures and drawings. During the walkdowns, the inspectors evaluated the material condition and general housekeeping of the systems and adjacent spaces. The documents reviewed are listed in the Attachment. The inspectors performed walkdowns of the following areas:

- Unit 1, High Pressure Coolant Injection (HPCI) system when Unit 1 'A' Core Spray system was out-of-service (OOS);
- Common, Standby Gas Treatment system room unit coolers when Reactor Enclosure Heating Ventilation and Air Conditioning was OOS; and
- Unit 1, 'B' Residual Heat Removal (RHR) loop when the 'A' RHR loop was OOS.

b. Findings

No findings were identified.

.2 Complete Risk Important System Walkdowns (71111.04S – 1 Sample)

a. Inspection Scope

The inspectors conducted one complete system walkdown of the Emergency Service Water (ESW) system to verify that equipment was properly aligned and there were no apparent deficiencies that could affect the ability of the system to perform its functions. The walkdown included verifying the alignment of major system components, availability of electrical power, and general equipment condition of pumps, accessible piping, and valves. The inspectors also reviewed outstanding maintenance work requests, IRs, and equipment performance history to determine if there were any outstanding deficiencies that could affect the ability of the system to perform its function. Specific focus items included the performance history of the emergency core cooling system rooms' unit coolers and the 'D' ESW pump. The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R05 Fire Protection

Fire Protection - Tours (71111.05Q – 5 samples)

a. Inspection Scope

The inspectors conducted a tour of the five areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that combustible materials and ignition sources were controlled in accordance with Exelon's procedures. Fire detection and suppression equipment was verified to be available for use, and passive fire barriers were verified to be maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for OOS, degraded, or inoperable fire protection equipment in accordance with the station's fire plan. The documents reviewed are listed in the Attachment. The inspectors toured the following areas:

- Common, 13.2 kV Switchgear Room, Fire Area 2;
- Unit 1, Class 1E Battery Room 425, Fire Area 8;
- Unit 1, Class 1E Battery Room 436, Fire Area 9;
- Unit 2, Class 1E Battery Room 426 and 454, Fire Area 10; and
- Unit 2, Class 1E Battery Room 427, Fire Area 11.

b. Findings

Introduction: The inspectors identified a Green NCV of Limerick Generating Station operating License Condition 2.C.3, in that Exelon failed to take compensatory actions for an inoperable fire door. Specifically, on two occasions a required fire door was found in a condition where the latching mechanism did not function. Although issue reports (IRs) were written which identified this door to be a Technical Requirements Manual (TRM) fire door, actions were not taken to station the required hourly fire watch. Corrective actions included setting the required hourly fire watches, distributing guidance to all senior licensed operators, and implementing procedural changes to clarify the requirements of fire doors for future operability determinations.

Description: On July 29, 2010, the inspectors observed that the magnetic latching mechanism for the 288N fire door (between the reactor enclosure and turbine building) was not operating and the condition was identified with a deficiency tag. The inspectors questioned why no compensatory action had been taken to address the degraded condition.

The inspectors found that the applicable Surveillance Test (ST) for door 288N, ST-7-084-925-0, "Fire Door Closing Mechanism Inspection," required verifying that "the operable door hardware, hinges, handles, latches, or dogs and wedges are functional and will secure the door in a closed position." With the magnetic locking device inoperable for door 288N, the door hardware was no longer functional for securing the door in a closed position. System operating procedure S22.8.H, "Inoperable Fire Protection Equipment Actions," provides guidance for determining fire watch applicability. This guidance, consistent with ST-7-084-925-0, lists, "Fire door will not close and latch," as an example of inoperable fire protection equipment. S22.8.H required an hourly fire watch as a compensatory measure for an inoperable fire door, consistent with Technical Requirements Manual (TRM) section 3.7.7.

Exelon determined that the operability determination that was performed on July 26, 2010, was incorrect. On July 29, Exelon documented this issue in IR 1097766 and proactively established an hourly fire watch while reviewing the issue. Exelon reviewed past operability of door 288N, and determined that the magnetic lock had previously failed on April 7, 2009, and July 7, 2010. On April 7, 2009, Exelon had properly determined that the door was inoperable and had established the required hourly fire watch. On July 7, 2010, as on July 26, Exelon had incorrectly concluded that the fire door was operable.

The operators performing the operability determinations on July 7 and on July 26 based their decisions on their knowledge of an evaluation performed in 1999. The evaluation incorrectly concluded that the fire door was functional with the magnetic latch nonfunctional. This was based mainly on the weight of the door and the minimum required force to open the door. Exelon has developed and distributed guidance on this issue to all senior licensed operators and is working to increase the clarity of guidance related to this and similar fire doors.

Also, in response to questions from the inspectors, Exelon reviewed the design history of the affected fire door. Exelon determined that in 1985, the mechanical latch for the door had been replaced with a magnetic latch. This modification invalidated the manufacturer's determination of equivalency to a rated three-hour fire door. In response to this, Exelon set an hourly fire watch for the two affected doors until the door hardware

could be restored to the original configuration. The inspectors reviewed this failure to maintain the door in its correct configuration and determined that while the magnetic latch was operating, there was a reasonable expectation that the fire door could fulfill its design function.

Analysis: The inspectors determined that the failure to take compensatory actions for an inoperable fire door was a performance deficiency that was reasonably within Exelon's ability to foresee and prevent. The finding was more than minor because it was associated with the protection against external events attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the Nuclear Regulatory Commission's (NRC's) regulatory function, and was not the result of any willful violation of NRC requirements.

In accordance with NRC Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," was evaluated using a Phase 1 and Phase 2 review. The issue affected the fire containment area and was determined to be Moderate A level degradation since the door would provide some protection in its degraded condition. Therefore the issue screen to Phase 2. Based upon a conservative evaluation of the issue and the screening criteria of Appendix F, this finding screened to very low risk significance (Green) per Task 2.3.5. Specifically, after walking down the turbine building area adjacent to the affected fire door, it was determined that no potentially challenging fire scenarios existed which could damage safe shutdown equipment even if the fire door was not given any isolation credit.

Because the incorrect operability decisions were based on a 1999 engineering evaluation, the inspectors determined that this finding was not reflective of current licensee performance, and, therefore, did not have a cross-cutting aspect.

Enforcement: License Condition 2.C.3 states that, "Exelon Generation Company shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the UFSAR." The Fire Protection Program is described in Appendix 9A of the UFSAR, which states, "Door openings in fire barriers are protected with equivalently rated doors, frames, and hardware." System operating procedure S22.8.H, "Inoperable Fire Protection Equipment Actions," states that the required compensatory action for an inoperable fire door, such as door 288N, is to initiate a fire system impairment and establish an hourly fire watch. Contrary to the above, on July 7, 2010, and from July 26, 2010, to July 29, 2010, when door 288N was found without a functional latching mechanism, an hourly fire watch was not established. Because the finding was of very low safety significance and has been entered into Exelon's corrective action program (CAP) (IR 1097766), this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement policy. **(NCV 05000352, 353/2010004-01, Failure to Take Compensatory Action for Inoperable Fire Door)**

1R06 Flood Protection Measures (71111.06 – 1 Underground Cables sample)

a. Inspection Scope

The inspectors performed inspections of safety-related underground electrical manholes 104 East, 107 East, 108 West, and 109 East containing control and power cables to

equipment in the Spray Pond Pumphouse (e.g., ESW pumps, residual heat removal service water (RHRSW) pumps, etc.). The inspectors reviewed the UFSAR and related design basis documents to identify the requirements for the manhole design. Cable support trays and cable insulation were inspected for material condition. The inspectors reviewed items entered in the licensee's CAP related to conditions discovered during other manhole inspections. The inspectors assessed whether the discovered conditions had any adverse impact on operability and whether appropriate corrective actions were planned. The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A - 1 sample)

a. Inspection Scope

The inspectors selected the Limerick spray pond for review to determine the heat sink's readiness and availability to perform its safety functions. The inspectors reviewed the design and licensing basis for the pond pertaining to required flow rates, pressures, and spray nozzle (SN) flow. The inspectors reviewed recent ST results and SN inspection results on the 'C' RHRSW spray network to assess the condition of the piping and SNs, and to ensure all requirements were being met. The inspectors verified that degraded conditions were being identified at an appropriate threshold and being entered into the CAP. The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program

.1 Resident Inspector Quarterly Review (71111.11Q - 1 sample)

a. Inspection Scope

On July 29, 2010, the inspectors observed a licensed operator requalification simulator training session. The simulator scenario tested the operators' ability to respond to operating equipment failures, a recirculation pump seal failure, a failure of the reactor protection system, a fuel failure, and a steam leak into secondary containment. The inspectors observed licensed operator performance including operator critical tasks, which are required to ensure the safe operation of the reactor and protection of the nuclear fuel and primary containment barriers. The inspectors also assessed crew dynamics and supervisory oversight to verify the ability of operators to properly identify and implement appropriate TS actions, regulatory reports, emergency event declarations, and notifications. The inspectors observed training instructor critiques and assessed whether appropriate feedback was provided to the licensed operators. The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2 Limited Senior Reactor Operator (LSRO) Requalification (71111.11B – 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG 1021, Revision 9, "Operator Licensing Examination Standards for Power Reactors," Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program," and Appendix A "Checklist for Evaluating Facility Testing Material."

A review was conducted of recent operating history documentation regarding fuel handling found in the licensee's corrective action program. The inspectors also reviewed specific events from the licensee's CAP to determine if possible training deficiencies existed. The inspector noted repeated instances at Peach Bottom of misoriented or mispositioned fuel bundles during refueling activities, and reviewed the root cause evaluation and corrective actions that were performed by the facility.

The inspector evaluated the 2010 Limerick and Peach Bottom LSRO refueling operating tests and the Limerick LSRO written examinations for quality and compliance with the Examination Standards. Administration of five job performance measures to four operators at Limerick was observed on August 2, 2010.

On September 7, 2010, the results of the biennial written examinations at Limerick and annual operating tests for 2010 were reviewed to determine whether pass/fail rates were consistent with the guidance of NUREG-1021, Revision 9, "Operator Licensing Examination Standards for Power Reactors." All LSROs passed their examinations. Performance of all individuals over two years was reviewed and indicated no adverse trends.

The remediation plans for one individual's written failure in 2008 was reviewed to assess the effectiveness of the remedial training.

Two years of records for requalification training attendance and license reactivation for all four LSROs were reviewed for compliance with license conditions and NRC regulations. Medical records for these four individuals were also reviewed.

A sampling of feedback was reviewed and training materials were evaluated for response to this feedback. These materials were also reviewed for incorporation of plant modifications and industry events.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12 - 3 samples)

a. Inspection Scope

The inspectors evaluated Exelon's work practices and follow-up corrective actions for three issues within the scope of the maintenance rule. The inspectors reviewed the performance history of these structures, systems, and components (SSCs) and assessed the effectiveness of Exelon's corrective actions, including any extent-of-condition (EOC) determinations to address potential common cause or generic

implications. The inspectors assessed Exelon's problem identification and resolution actions for these issues to evaluate whether Exelon had appropriately monitored, evaluated, and dispositioned the issues in accordance with Exelon procedures and the requirements of 10 CFR Part 50.65, "Requirements for Monitoring the Effectiveness of Maintenance." In addition, the inspectors reviewed the maintenance rule classifications, performance criteria, and goals for these SSCs and evaluated whether they appeared reasonable and appropriate. The documents reviewed are listed in the Attachment. The inspectors reviewed the following issues:

- IR 1083732, Failure of under voltage relay (27UV) to transfer control power upon loss of power to load center 114A;
- IR 1086865, Delayed fan start on start of EDG D22; and
- IR 1065596, EDG D23 failure during endurance run.

b. Findings

Introduction: A Green self-revealing finding was identified for failure to identify that the latching mechanism for the 114A/124A load center control power undervoltage auxiliary relay (27X) was incorrectly adjusted. This resulted in the loss of both recirculation pumps and a manual reactor scram following a fault on a nonsafety-related 13kV load center supply cable.

Description: On June 23, 2010, at 20:51, operators manually scrammed Unit 1 in accordance with procedural requirements following the loss of both recirculation motor-generator (M/G) sets. Review of the event determined that the trip of the M/G sets was due to a loss of lubricating oil for the 'A' M/G set and a stator cooling water runback for the 'B' M/G set following the loss of power to General Area Load Center Bus 114A. The loss of power to bus 114A was caused by an underground fault on a parallel 13 kV supply cable to Technical Support Center Bus 144D. When the supply cable faulted, the feeder breaker to bus 114A and 144D tripped on phase overcurrent. This resulted in a loss of power to the operating stator water cooling pump as well as the recirculation M/G sets' lubricating oil pumps. Exelon entered the issue into the CAP as IR 1083732.

Exelon determined the root cause of the event to be an incorrectly adjusted latching mechanism for the 114A/124A load center control power undervoltage auxiliary relay 27X. The incorrectly adjusted latching mechanism caused excessive relay cycling in the past which damaged relay contacts. This resulted in relay 27X being unable to swap control power from the preferred source (114A) to the non-preferred source (124A) following the loss of power to bus 114A. When power was lost to 114A the operating Unit 1 'A' stator water cooling pump tripped. The Unit 1 'B' stator water cooling pump, powered from bus 124A, should have auto started. However, the failure of bus 114A/124A breaker control power to swap sources prevented the auto start feature from functioning. The loss of stator water cooling generates a runback signal, which, after a time delay, trips any operating M/G set by design. The inspector noted that the 'A' M/G set actually tripped earlier in the transient because its standby lubricating oil pump failed to auto-start due to an unrelated relay issue. Inspector review of that issue (IR 1083736) did not reveal any performance deficiencies (e.g., relay was properly periodically tested). The loss of both M/G sets required a manual reactor scram in accordance with procedure.

Exelon concluded that there were prior opportunities to identify the incorrectly adjusted latching mechanism on relay 27X. Relay 27X is a subcomponent of the bus

undervoltage automatic bus transfer switch (27UV). In both 1992 and 2004, maintenance activities were performed on 27UV. Proper post-maintenance testing following these maintenance activities should have identified that the 27X latching mechanism was not operating properly. The post-maintenance testing removed the power supply fuses from the preferred source. Upon restoring the fuses, control power auto swapped back to the preferred source. A properly adjusted latching mechanism on the 27X relay would have maintained the control power supply on the alternate source upon restoring power supply fuses. This would have required a manual transfer of the bus transfer switch to swap control power back to the preferred source. With the latching mechanism improperly adjusted, control power automatically swapped back to the preferred source following the restoration of power supply fuses.

Exelon's corrective actions included verifying the latching mechanism adjustment on the site's other nine similarly designed control power auxiliary relays, testing the automatic undervoltage transfer circuit on a periodic basis, and performing a failure analysis on the faulted underground supply cable to bus 144D with the aid of the Electric Power Research Institute to determine, in part, whether the failure was related to operating in a wet/submerged environment. At the time of the inspection, test results of the faulted cable were not available. The inspector determined that the initiator for the event, the fault of 13 kV supply cable to bus 144D, would have had minimal impact on plant operation had relay 27X properly auto-swapped control power from bus 114A to bus 124A. The inspector noted that the standby 'B' stator water cooling pump would have started and the recirculation pumps would not have received a stator water cooling runback signal had the control power properly swapped.

Analysis: The inspectors determined that the failure to identify that the bus 114A/124A control power auxiliary relay 27X latching mechanism was incorrectly adjusted during prior post-maintenance testing activities was a performance deficiency which was within Exelon's ability to foresee and prevent. Specifically, proper post-maintenance testing activities in 1992 and 2004 should have identified that the latching mechanism was incorrectly adjusted. The incorrectly adjusted latching mechanism prevented the automatic swap of control power to the alternate source (bus 124A) when preferred power (bus 114A) was lost due to an electrical fault. This resulted in a loss of stator water cooling runback signal that would have caused the trip of both recirculation motor-generator sets and resulted in operators having to manually initiate a reactor scram. The finding was more than minor because it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. This issue has been entered in the CAP as IR 1083732.

The finding was determined to have very low safety significance (Green) in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings" because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or functions would not be available.

Because the opportunities to identify the incorrectly adjusted latching relay occurred in 1992 and 2004, the inspectors determined that this finding was not reflective of current licensee performance, and, therefore, did not have a cross-cutting aspect.

Enforcement

Enforcement action does not apply because the performance deficiency did not involve a violation of regulatory requirements. Specifically, the 27X control power auxiliary relay is not a safety-related component. Because this finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as **FIN 05000352/2010004-02, Failure to Identify Incorrectly Adjusted Control Power Relay Resulting in Unit 1 Manual Scram.**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 3 samples)

a. Inspection Scope

The inspectors evaluated the effectiveness of Exelon's maintenance risk assessments required by 10 CFR Part 50.65(a)(4). This inspection included discussion with control room operators and risk analysis personnel regarding the use of Exelon's on-line risk monitoring software. The inspectors reviewed equipment tracking documentation, daily work schedules, and performed plant tours to gain assurance that the actual plant configuration matched the assessed configuration. Additionally, the inspectors verified that Exelon's risk management actions, for both planned and emergent work, were consistent with those described in Exelon procedure, ER-AA-600-1042, "On-Line Risk Management." The documents reviewed are listed in the Attachment. The inspectors reviewed the following samples:

- Unit 1, online risk during various system outage windows and testing ('C' RHRSW pump, ('D' RHR pump, and EDG D14 testing) on July 19, 2010;
- Unit 1, online risk during troubleshooting EDG D12 ESW loop 'A' inlet valve (HV-011-131B) on August 9, 2010; and
- Unit 1, online risk during emergent failure of the 'B' backup nitrogen supply valve to the automatic depressurization system (HV-059-151B) on August 20, 2010.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15 - 5 samples)

a. Inspection Scope

The inspectors assessed the technical adequacy of a sample of five operability evaluations to ensure that Exelon properly justified TS operability and verified that the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors reviewed the UFSAR to verify that the system or component remained available to perform its intended safety function. In addition, the inspectors reviewed compensatory measures implemented to ensure that the measures worked and were adequately controlled. The inspectors also reviewed a sample of IRs to verify that Exelon identified and corrected deficiencies associated with operability evaluations. The documents reviewed are listed in the Attachment. The inspectors reviewed the following evaluations:

- IR 10883404, Pinhole leak discovered on RHRSW supply to Unit 2 'B' RHR heat exchanger;
- IR 1094218, ESW Piping pinhole leak;
- IR 1092478, Reactor enclosure recirculation system Flow Transmitter out of calibration;
- IR 1105530, Evaluate calibration requirement for drywell (DW) temperature instrument; and
- IR 1117520, Evaluate electrical penetration seal for acceptability as a steam barrier.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 - 5 samples)

a. Inspection Scope

The inspectors reviewed five post-maintenance tests to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed Exelon's test procedures to verify that the procedures adequately tested the safety functions that may have been affected by the maintenance activity, and that the acceptance criteria in the procedures were consistent with information in the licensing and design basis documents. The inspectors also witnessed the test or reviewed test data to verify that the results adequately demonstrated restoration of the affected safety functions. The documents reviewed are listed in the Attachment. The inspectors reviewed the following samples:

- CO23393A, Replace nuclear steam supply shutoff system relay B21H-K14B;
- R1098868, Perform preventive maintenance (PM) on isolation damper HV-078-071A;
- A1770205, Emergency core cooling room cooler isolation valve HV-011-046 failed to open on demand;
- Troubleshooting, Rework, and Testing (TRT) 10-127, Investigate changing leak rate of Unit 2 DW equipment drain tank sump; and
- C0233734, Change HPCI steam leak detection setpoints.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples; 1 routine surveillances and 3 in-service testing (IST))

a. Inspection Scope

The inspectors either witnessed the performance of, or reviewed test data, for four ST associated with risk-significant SSCs. The reviews verified that Exelon personnel followed TS requirements and that acceptance criteria were appropriate. The inspectors also verified that the station established proper test conditions, as specified in the procedures, that no equipment preconditioning activities occurred, and that acceptance criteria were met. The documents reviewed are listed in the Attachment. The inspectors reviewed the following samples:

- ST-6-055-230-1, Unit 1 HPCI Pump, Valve and Flow Test (IST);
- ST-6-011-203-0, "A" Loop ESW Valve Test (IST);
- ST-6-092-114-2, D24 Diesel Generator 24 Hour Endurance Test; and
- ST-6-011-232-0, "B" Loop Emergency Service Water Pump, Valve and Flow Test (IST).

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 3 samples)

a. Inspection Scope

The inspectors observed the three emergency preparedness drills listed below to assess Exelon's emergency response organization's (ERO's) implementation of the Limerick emergency plan and implementing procedures. The inspectors reviewed the ERO's response to simulated degraded plant conditions to identify weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. In addition, the inspectors assessed licensed operator performance required to ensure the safe operation of the reactor and the protection of the nuclear fuel and primary containment barriers. The inspectors observed Exelon's critiques of the drill to evaluate their ability to identify weaknesses and deficiencies at an appropriate threshold. The inspectors verified that the licensee appropriately assessed ERO performance with regard to activities contributing to the Drill and Exercise Performance PI training evolution and drills. The documents reviewed are listed in the Attachment. The inspectors assessed the following samples:

- Emergency Drill Exercise conducted on July 13, 2010;
- Emergency Drill Exercise conducted on July 27, 2010; and
- Emergency Drill Exercise conducted on August 3, 2010.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope (71151 - 6 samples)

The inspectors sampled Exelon's submittal of the PIs listed below to verify the accuracy of the data recorded. The inspectors utilized PI definitions and guidance contained in Nuclear Energy Institute 99-02, "Regulatory Assessment PI Guidelines," Revision 6, to verify the basis in reporting for each data element. The inspectors reviewed various documents, including portions of the main control room logs, IRs, work orders, and system derivation reports. The inspectors also discussed the method for compiling and reporting PIs with cognizant engineering personnel and compared graphical representations from the most recent PI report to the raw data to verify that the report correctly reflected the data. The documents reviewed are listed in the Attachment.

Cornerstone: Initiating Events

- Units 1 and 2 Unplanned Scrams per 7000 Critical Hours from July 2009 – June 2010 (IE01);
- Units 1 and 2 Unplanned Scrams with complications from July 2009 – June 2010 (IE04); and

Cornerstone: Mitigating Systems

- Units 1 and 2 Mitigating System Performance Index RHR from July 2009 – June 2010 (MS09).

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152 – 2 Samples)

.1 Review of Items Entered into the CAP

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors screened all items entered into Limerick's CAP. The inspectors accomplished this by reviewing each new condition report, attending management review committee meetings, and accessing Exelon's computerized database.

b. Findings

No findings were identified.

.2 Annual Sample: Unit 1 Manual Scram (71152 – 1 sample)

a. Inspection Scope

On June 23, 2010, operators manually scrammed Unit 1 per procedural requirements in response to the trip of both recirculation pump motor-generator sets. This was caused by a loss of the operating main generator stator water cooling pump when its power supply was lost as a result of an underground cable fault and the failure of the standby pump to start due to a control power problem. The inspectors assessed Exelon's problem identification threshold, cause analyses, extent-of-condition reviews, and prioritization and timeliness of corrective actions as documented in IR 1083732. The documents reviewed are listed in the Attachment.

b. Findings and Observations

A finding resulted from this event due to the failure to identify that the latching mechanism on a bus 114A/124A control power auxiliary relay (27X) was incorrectly adjusted during prior post-maintenance testing activities. This finding is documented in section 1R15 of this report.

The inspectors assessed that Exelon's cause analysis of the issues revealed by the event was reasonable. The inspectors determined that Exelon properly implemented their corrective action process regarding the Unit 1 manual scram. Corrective actions were timely and appeared appropriate to prevent recurrence of the issue.

.3 Annual Sample: D23 Diesel Failure Root Cause Evaluation (71152 – 1 sample)

a. Inspection Scope

On May 5, 2010, the Limerick EDG D23 experienced a catastrophic failure of the number 5 upper piston assembly during a 24-hour endurance test run. Exelon's immediate actions included running the other three Unit 2 EDGs as required by the TS action statement. Repairs to D23 were completed on May 24. Exelon performed an investigation under IR 1065596 to determine the root cause and contributing causes for the diesel failure. The inspectors reviewed Exelon's root cause report to assess the reasonableness of the identified causes, ensure the corrective actions were appropriate for the identified causes, evaluate the timeliness of the corrective actions, and verify that Exelon appropriately addressed EOC concerns. The documents reviewed are listed in the Attachment.

b. Findings and Observations

Introduction: The inspectors identified a Green NCV of Limerick Unit 2 TS 6.8.1, "Procedures and Programs," in that Exelon did not provide an adequate procedure for PM of the Limerick EDG LO filter bypass valves. As a result, Exelon did not identify that the D23 LO filter bypass valves were degraded and allowed oil to bypass the filter during engine operation. This condition, combined with historical foreign material in the LO

system, led to the failure of the D23 number 5 upper piston assembly during a 24-hour endurance test run on May 5, 2010.

Description: On May 5, the Limerick EDG D23 experienced a catastrophic failure of the number 5 upper piston assembly during a 24-hour endurance test run. Exelon's investigation (IR 1065596) determined that the root cause was a failure of the number 5 connecting rod bearing. The most probable cause of the bearing failure was degraded operation of the D23 LO filter bypass valves. This conclusion was reached after close examination of performance monitoring data indicated that the LO filter bypass valves had been spuriously lifting during monthly D23 runs. Additionally, the root cause team discovered that D23 had experienced a blower failure during initial plant commissioning in 1989, which likely contaminated the LO system with foreign material and debris. Exelon concluded that the D23 LO filter bypass valves were degraded and lifting, allowing abrasive particles to bypass the filter and damage the diesel's bearings. Engineers noted that D23 had undergone twice as many bearing replacements as any other EDG at Limerick due to degraded bearings being identified during diesel overhauls.

Exelon determined that they had failed to implement appropriate PM for the LO filter bypass valves. Specifically, the Exelon PCM template for the Limerick EDGs contained a requirement to inspect the LO filter bypass valves on a two-year frequency. However, the Limerick maintenance procedure used to implement this requirement, M-C-792-001, "Fairbanks Morse Opposed Piston Diesel Engine Examination and General Maintenance," did not contain sufficient detail for workers in the field to perform the inspection as intended. The procedure directed technicians to remove and clean the filter spring plate, but did not direct a focused examination or test of the bypass valve portion of the filter. Corrective actions implemented by Exelon included repairing the damage to D23 (completed May 24), performing a flush of the D23 LO system, revising M-C-792-001 to include specific instructions for cleaning and inspecting the LO filter bypass valves, and revising performance monitoring guidance to ensure spuriously lifting LO filter bypass valves would be identified in the future. Exelon performed EOC reviews for the remaining seven EDGs and determined that the LO filter bypass valves did not appear to be degraded or lifting. Additionally, Exelon scheduled an inspection of each EDG's LO filter bypass valves during the next two year overhaul.

The inspectors reviewed Exelon's root cause report and questioned whether Exelon had previous opportunities to identify that the LO filter bypass valve inspection was not properly incorporated into the maintenance procedure. The inspectors performed a historical review of the diesel PCM template and discovered that the LO filter bypass valve inspection had been a required inspection task since the original PCM template was established in 2002. However, the original template did not contain any details or supporting information in the "Basis for Task" section. Subsequent revisions to the template, in 2003 and 2009, included increasing levels of detail in the Basis. Most relevant was the 2009 revision, which added specific guidance regarding the inspection scope: "This is a visual inspection of the valve mechanisms to verify integrity of the disc, retaining springs, pivot pins, etc."

Through interviews with engineers, the inspectors learned that Exelon provided its engineers with an internet tool to use when implementing PCM template revisions. The internet tool was supposed to highlight all PM tasks that had changed, so engineers could easily compare new revisions to former ones and update procedures and processes as necessary. The inspectors identified that the tool had a flaw, in that it only

highlighted a task if the title or frequency had changed. It did not highlight a task if only the Basis section had been revised. Consequently, when the Basis for the LO filter bypass valve inspection was augmented in 2003 and 2009, the responsible system manager was never alerted to the change, and did not have the opportunity to review the new inspection details for incorporation into the maintenance procedure. The 2009 diesel PCM template revision had an implementation deadline of January 2010. Therefore, if the inspection guidance had been incorporated into M-C-792-001 by this date, Exelon would likely have identified the degraded bypass valves during the D23 overhaul in February 2010, and may have prevented the D23 failure in May 2010. Exelon documented this PCM process deficiency under IR 1114118 and initiated an apparent cause evaluation. Exelon preliminarily determined that the deficiency has fleet-wide impacts and plans to implement fleet-wide corrective actions.

Analysis: The inspectors determined that Exelon's failure to provide adequate procedural guidance for PM of the LO filter bypass valves was a performance deficiency. The finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating System cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, because Exelon did not perform adequate inspections of the LO filter bypass valves, they did not identify that the valves were degraded and allowing oil to bypass the filter assembly. This condition, combined with historical foreign material in the LO system, led to the failure of D23 on May 5, 2010. The inspectors coordinated with an NRC Senior Reactor Analyst (SRA) to determine the significance of this finding. The SRA determined that the failure was most likely proportional to the amount of time the D23 had run. As such, based on a review of past surveillance tests and given the 22 hours that D23 operated for on May 5, 2010, D23 would not have been able to perform its safety function for its 24 hour mission time between April 5 and May 5, 2010. Further, D23 was inoperable from May 5 until it was returned to service on May 24, following completion of repairs.

The finding was determined to be of very low safety significance (Green) in accordance with Inspection Manual Chapter (IMC) 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," using significance determination process (SDP) Phases 1, 2, and 3. Phase 1 screened the finding to Phase 2 because it represented a loss the D23 safety function for longer than the TS allowed outage time, in that between April 5 and May 5, 2010, D23 could not have operated for its 24 hour mission time. A Region I SRA conducted a Phase 3 analysis because the Phase 2 analysis, conducted by the inspectors using the Pre-solved Risk-Informed Inspection Notebook for Limerick Generating Station Units 1 and 2, indicated that the finding could be more than very low significance.

The SRA completed the Phase 3 internal initiating events analysis using the Limerick Unit 1 SPAR model, Revision 3.50, May 27, 2009, updated to a Unit 2 models which accounted for the differences in EDG loading between the two units. The following assumptions were used:

- The loss of offsite power (LOOP) initiating event frequency was updated from the average 3.59E-2/year to 3.8 E-2/year for Limerick based on information from NUREG 6890, "Reevaluation of Station Blackout Risk at Nuclear Power Plants, Analysis of Loss of Offsite Power," dated 2005.
- Given the exposure period discussed above the results were partitioned into two portions.

Time Frame	Run Time between Failure	Exposure Period
Between May 5 and 24, 2010 - repair time	0 (EDG inoperable)	19 days
Between April 5 and May 5, 2010	22 hrs	30 days

- Between April 5 and May 5, the failure would only have affected the loss of offsite power sequences that were beyond the 22.0 hour point. The analyst modified the SPAR model so that time=0 in the SPAR model corresponded to time = 22.0 hours post-LOOP.
- The finding resulted in an increased common cause failure probability for the remaining three EDGs. This was conservative given that the potential for common cause failures was not well understood and that the failure to perform adequate preventative maintenance on the D23 LO filter relief valves took several years to result in the D23 failure.
- Conservatively no credit was given for:
  1. The potential that the D23 could have run for a longer period of time on May 5.
  2. Recovery of the D23 after the failure.
  3. Electrical cross-ties that allow operators to power safety buses from other safety buses. No credit was provided for this flexibility in this significance determination.

This analysis indicated an increase in core damage frequency (ΔCDF) for internal initiating events in the range of 1 core damage accident in 1,500,000 years of reactor operation, in the mid-E-7 range per year. This result was strongly dominated by the 15 day repair period with the dominant core damage sequence being a LOOP initiating events; with failures of: other EDGs; offsite power recovery in 5 and 10 hours; recirculation pump seals, and high pressure coolant injection. Equipment that helped mitigate the significance included EDG redundancy (four EDG per unit) and the reactor core isolation cooling system. In accordance with IMC 0609A, for a finding with an internal events ΔCDF above 1E-7, the SRA assessed the impact of the finding relative to external initiating events such as fire, seismic and flooding, determining, based on review of the Limerick Generating Station Units 1 and 2 Individual Plant Examination for External Events, dated June 1995, that the total ΔCDF (internal plus external) would not be above the 1 E-6 threshold. The evaluation of potential increase in large early release frequency was not required because the pre-solved SDP worksheets identified that ΔCDF was the dominant contributor to risk for the D23 finding.

This finding has a cross-cutting aspect in the area of Human Performance, Resources, because Exelon did not provide complete, accurate and up-to-date design documentation, procedures, and work packages [H.2(c)]. Specifically, Exelon did not provide site engineers with complete and accurate resources to ensure PCM template revisions were thoroughly reviewed and implemented. The internet tool provided by Exelon for engineers to use when implementing a PCM template revision did not alert the engineer to changes in the Basis for a PM task. As a result, relevant details added to the LO filter bypass valve inspection Basis in July 2009 were not evaluated for implementation in M-C-792-001.

Although the D23 failure was a self-revealing issue, this finding was determined to be an NRC-identified finding in accordance with NRC IMC 0612 due to the value added by the

inspectors. The inspectors identified weaknesses in Exelon's PCM revision process, which were not identified by Exelon's root cause evaluation, and resulted in the implementation of several additional corrective actions with fleet-wide implications.

Enforcement: Limerick Unit 2 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, Revision 2, February 1978. Regulatory Guide 1.33, Appendix A, Section 9b states, in part, that PM schedules should be developed to specify inspections of equipment, replacement of such items as filters and strainers, and inspection or replacement of parts that have a specific lifetime. Contrary to this requirement, Exelon did not provide an adequate procedure for PM of the Limerick EDG LO filter bypass valves. As a result, Exelon did not identify that the valves were degraded and allowing LO to bypass the filter assembly. This condition, combined with historical foreign material in the LO system, led to the failure of the D23 number 5 upper piston assembly during a 24-hour endurance test run on May 5, 2010. Because this violation was determined to be of very low safety significance and has been entered into the Exelon CAP (IRs 1065596 and 1114118), it is being treated as an NCV, consistent with section 2.3.2 of the Enforcement Policy. **(NCV 05000352, 353/2010004-03 Failure to Perform Adequate PM on EDGs.)**

4OA3 Event Follow Up

.1 (Closed) Licensee Event Report (LER) 05000352/2010-001-00: Valid Actuation of the Reactor Protection System with the Reactor Critical.

On June 23, with the unit at 100 percent power, operators manually scrammed Unit 1 due to an automatic trip of both recirculation pumps following the loss of main generator stator cooling water flow. The event was initiated by the failure of a 13kV cable that supplies electrical power to the 144D non-safeguard 480V load center transformer. When the supply cable faulted, the feeder breaker to Bus' 114A and 144D tripped on phase overcurrent. This resulted in a loss of power to the operating stator water cooling pump. The failure of the 114A/124A load center control power undervoltage auxiliary relay to automatically provide control power to the 24A load center prevented the automatic start of the standby stator water cooling pump. The details of this event are discussed in Section 1R12 of this report and resulted in a Green finding. The inspectors did not identify any new issues in review of this LER. This LER is closed.

.2 (Closed) LER 05000353/2010-001-00: Inoperable Reactor Enclosure Cooling Water (RECW) Radiation Monitor.

On April 29, Exelon discovered that an incorrect method for calculating the RECW radiation monitor was being used. Test procedures incorrectly directed use of the background radiation level from the previous month's test. As a result, the RECW radiation monitor was inoperable from March 19, 2010 until April 22, 2010, and the required grab samples were not obtained. The enforcement aspects of this issue are discussed in Section 4OA7. The inspectors did not identify any new issues during the review of the LER. This LER is closed.

4OA6 Meetings, Including Exit

On October 15, the inspectors presented the inspection results to Mr. E. Callan and other members his staff. The inspectors confirmed that proprietary information was not included in the inspection report.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by Exelon and is a violation of NRC requirements which met the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

- TS 3.3.7.1, "Radiation Monitoring Instrumentation", requires one operable RECW radiation monitor channel "at all times." With the radiation monitor inoperable, Table 3.3.7.1-1, Action 72 requires obtaining and analyzing RECW grab samples every 24 hours. Contrary to TS 3.3.7.1, the RECW radiation monitor was inoperable from March 19, 2010, until April 22, 2010, and the required grab samples were not obtained. The cause of the inoperability was due to an incorrect method for calculating the monitor's Hi-Hi Alarm setpoint; the test incorrectly directed use of the background radiation level from the previous month's test. This issue was entered into Exelon's CAP as IR 1063446. The finding was determined to have very low safety significance (Green) in accordance with NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings", Containment Barrier, because the finding did not represent a degradation of a radiological barrier, a degradation of the barrier function of the control room against smoke or a toxic atmosphere, or an actual open pathway in the physical integrity of reactor containment, containment isolation system, or heat removal components.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:

W. Maguire, Site Vice President
E. Callan, Plant Manager
S. Johnson, Assistant Plant Manager
R. Dickinson, Director of Training
P. Gardner, Director of Operations
R. Kreider, Director of Maintenance
C. Gerdes, Security Manager
M. Gillin, Balance of Plant Engineering Manager
K. Slough, Mechanica/Structural Engineering Design Manager
M. DiRado, Engineering Rapid Response Manager
D. Merchant, Radiation Protection Manager
D. Palena, Manager Nuclear Oversight
J. Hunter, Manager, Regulatory Assurance
S. Bobyock, Manager, Plant Engineering Programs
N. Dennin, Shift Operations Superintendent
J. Risteter, Radiation Protection Manager
R. Harding, Regulatory Assurance Engineer

NRC Personnel:
E. DiPaolo, Senior Resident Inspector
N. Sieller, Resident Inspector
J. Bream, Project Engineer

LIST OF ITEMS OPENED OR CLOSED

Opened

None

Closed

05000352/2010-001-00	LER	Valid Actuation of the Reactor Protection System with the Reactor Critical (Section 4OA3.1)
05000353/2010-001-00	LER	Inoperable Reactor Enclosure Cooling Water Radiation Monitor (Section 4OA3.2)

Opened and Closed

05000352, 353/2010004-01	NCV	Failure to Take Compensatory Action for Inoperable Fire Door (Section 1R05)
05000352/2010004-02	FIN	Failure to Identify Incorrectly Adjusted Control Power Relay Resulting in Unit 1 Manual Scram (Section 1R12)
05000352, 353/2010004-03	NCV	Failure to Perform Adequate PM on EDGs (Section 4OA2.3)

Discussed

None.

LIST OF DOCUMENTS REVIEWED

(* Indicates NRC Identified)

Common References
Limerick Unit 1 and Unit 2 UFSAR
Limerick Unit 1 and Unit 2 TSs
Limerick Unit 1 and Unit 2 Technical Requirements Manual
Limerick Unit 1 and Unit 2 Operator Logs

Section 1R04: Equipment Alignment

Issue Reports

1019308	997302	975559	1001431	986374	1001230
1011742	1011740	932772	1010866	1039376	1039376
1098498	912386	1096795	1075240	1074913	1011718

Procedures:
1S55.1.A (COL), Equipment Alignment for Automatic Operation of HPCI System, Revision 27
S55.1.A, Normal HPCI Line-Up for Automatic Operation, Revision 33

Drawings:
8031-M-55, P&ID High Pressure Coolant Injection, Revision 57
8031-M-56, P&ID HPCI Pump/Turbine, Revision 40

Miscellaneous
System Health Report for System 11, 2nd quarter 2010

Section 1R05: Fire Protection

Issue Reports
1111626 904250 1088299 1094361 1096332 1097766*

Procedures:
A-C-134-5, Control of Hazard Doors/Hatches/Panels at Limerick Generating Station, Revision. 19
F-A-336 (Fire Area 2), 13.2 KV Switchgear Room 336, Revision. 12
OP-MA-201-007, Fire Protection System Impairment Control, Revision. 6
S22.8.H, Inoperable Fire Protection Equipment Actions, Revision. 24
ST-7-084-925-0, Fire Door Closing Mechanism Inspection, Revision. 5
F-A-425, Unit 1 Class 1E Battery Room 425, Fire Area 8, Revision 12
F-A-436, Unit 1 Class 1E Battery Room 436, Fire Area 9, Revision 10
F-A-426, Unit 2 Class 1E Battery Room 426 and 454, Fire Area 10, Revision 9
F-A-427, Unit 2 Class 1E Battery Room 427, Fire Area 11, Revision 10

Section 1R06: Flood Protection

Issue Reports
1117088 117085 1108239 1115475 847642

Miscellaneous
Response to NRC Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients,: dated May 7, 2007

Section 1R07: Heat Sink Performance

Issue Reports
1103864 1105753* 1114245*

Procedures:
RT-6-012-900-0, Spray Pond Spray N Test, Revision. 6
RT-6-012-600-0, Spray Pond Spray Network Flush, Revision. 16

Work Orders
R1149299, 'C' Spray Network Clean Spray Ns and Flush

Miscellaneous
L-S-04, RHR Service Water System, Revision. 11

Section 1R11: Licensed Operator Requalification Program

Issue Reports
972679

Procedures
TQ-AA-150: Operator Training Programs Revision 4

Miscellaneous:
Limerick Generating Station Simulator Training Scenario, LSTS-1046, Revision 2
Limerick Generating Station Simulator Training Scenario, LSTS-2012, Revision 4
Limerick Generating Station Simulator Training Scenario, LSTS-3336, Revision 0
Lesson Plan NLSROR0801C Industry Events, Operating Experience, and Human Performance Fundamentals
Lesson Plan NLSRO1001C Industry Events and Selected SOERs
Lesson Plan LLOR1001I 1R13 Plant Modifications
Lesson Plan NLSROR0901D 2R10 Plant Modifications

Section 1R12: Maintenance Effectiveness

Issue Reports
1086865 1065596

Procedures
ER-AA-310, Implementation of the Maintenance Rule, Revision. 8
ER-AA-310-1004, Maintenance Rule – Performance Monitoring, Revision. 8
MA-AA-716-210, PCM Process, Revision. 10

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Issue Reports

Procedures
WG-AA-101, Online Work Control Process, Revision. 17
WG-LG-101-1001, Guideline for the Performance of Online Work/Online System Outages, Revision. 13
RT-2-011-251-0, ESW Loop 'A' Flow Balance, Revision. 20

Miscellaneous
TRM 3.5.4, Long Term Gas Supply System to the ADS Valves
LGS 1&2 In-Service Testing Bases, 3rd Ten Year Interval, 2/18/10

Section 1R15: Operability Evaluations

Issue Reports
1094281 1094419* 1102717* 1105530 1092478

Procedures
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OP-AA-108-115, Operability Determinations, Revision. 9
ST-6-107-590-2, Daily Surveillance Log, Revision. 122

Miscellaneous
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Generic Letter 90-05, Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping
Part 9900: Technical Guidance, Operability Determination Process, Issue Date 4/16/08
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Section 1R19: Post-Maintenance Testing

Issue Reports
1090202 585174 1119833 1117800 1100955*

Procedures
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ST-4-LLR-001-2, The LLRT Program and Accountability Test, Revision. 10
CC-AA-112, Temporary Configuration Changes, Revision. 15
CC-AA-309-101, Engineering Technical Evaluations, Revision. 11
ER-LG-390-1001, Control Room Envelope Habitability Program, Revision. 0

Work Orders
C0233341, Blank Duct to Support Damaged Seat Replacement
R1098868, Perform PM on Isolation Damper HV-078-071
R0926628, LLRT DW Sump Drains

Miscellaneous
Engineering Change 09-00551, Permanent Setpoint Change for TIS-025-101/201 B & D
Calculation 1001, Compartment Temperature Transients for Steam and Water Leaks, Revision 4b
TRT 10-127, Investigate Changing Leakrate of U2 DW Equipment Drain Sump Leak Rate
P&ID 8031-M-61, Liquid Radwaste Collection, Sheet 4, Revision. 15
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Section 1R22: Surveillance Testing

Issue Reports
1093002 1098081 1111541 1101010* 202873

Procedures
S92.9.N, Routine Inspection of the Diesel Generators, Revision. 59
ST-6-092-114-2, D24 Diesel Generator 24 Hour Endurance Test, Revision. 29

Section EP6:Drill Evaluation

Issue Reports:
1098708 1096028

Procedures
EP-AA-112-100-F-01, Shift Emergency Director Check List, Revision. K
EP-AA-114-F-01, Release In Progress Determination Guidance, Revision. D
Limerick Station Annex Table LGS 3-1, Emergency Action Matrix, Revision. 18
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Miscellaneous

Section 4OA2: Problem Identification and Resolution

Issue Reports

921180	928574	958587	1012357	1055147	1058705
1068659	1068659	1085282*	1067240	1069250	1069249
1068601	1065596	1067282	1066831	1065596	1067282
1067288	1067650	1067662	1066831	1066475	1066489
1066684	1066748	1066769	1066804	1066819	1066827
1066203	1066178	1066175	1066155	1066124	1065881
1065596	1067281	1114118*	584611	1093882	1097603
945466	1084665	1084627			

Procedures
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M-C-792-001, Fairbanks Morse Opposed Piston Diesel Engine Examination and General Maintenance, Revision. 5
LS-AA-125, CAP Procedure, Revision. 14
LS-AA-125-1003, Apparent Cause Evaluation Manual, Revision. 8
OT-112, Recirculation Pump Trip, Revision 45

Work Orders
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Miscellaneous
Regulatory Guide 1.33, Quality Assurance Program Requirements (Operation), Revision. 2
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Limerick Generating Station PM Implementation Tool (Online)

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access Management System
CAP	Corrective Action Program
CFR	Code of Federal Regulations
DW	Drywell
EDG	Emergency Diesel Generator
EOC	Extent of Condition
ERO	Emergency Response Organization
ESW	Emergency Service Water
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IR	Issue Report
LER	Licensee Event Report
LO	Lube Oil
LOOP	Loss of Offsite Power
LSRO	Limited Senior Reactor Operator
M/G	Motor Generator
SN	Spray Nozzle
NCVs	Non-Cited Violations
NRC	Nuclear Regulatory Commission
OOS	Out of Service
P&ID	Piping and Instrumentation Drawing
PI	Performance Indicator
PARS	Publicly Available Records
PCM	Performance Centered Maintenance
PM	Preventive Maintenance
RECW	Reactor Enclosure Cooling Water
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RTP	Rated Thermal Power
SDP	Significance Determination Process
SRA	Senior Reactor Analyst
SSC	Structure, System, Component
ST	Surveillance Test
TRM	Technical Requirements Manual
TRT	Troubleshooting, Rework, and Testing
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report