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

January 28, 2010

Mr. Charles G. Pardee
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 05000352/2009005 AND 05000353/2009005

Dear Mr. Pardee:

On December 31, 2009, 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 January 8, 2010, with Mr. C. Mudrick 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 of very low safety significance (Green). 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 findings as non-cited violations (NCVs), consistent with Section VI.A.1 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. In addition, if you disagree with the characterization of the cross-cutting aspect of 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 CFR 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, Chief
Projects Branch 4
Division of Reactor Projects

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

Enclosure: Inspection Report 05000352/2009005 and 05000353/2009005
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

In accordance with 10 CFR 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,
/RA/
Paul G. Krohn, Chief
Projects Branch 4
Division of Reactor Projects

Distribution w/encl:
S. Collins, RA **(R1ORAMAIL Resource)**
M. Dapas, DRA **(R1ORAMAIL Resource)**
D. Lew, DRP **(R1DRPMAIL Resource)**
J. Clifford, DRP **(R1DRPMAIL Resource)**
D. Roberts, DRS **(R1DRSMail Resource)**
P. Wilson, DRS **(R1DRSMail Resource)**
P. Krohn, DRP
R. Fuhrmeister, DRP
A. Rosebrook, DRP
E. Torres, DRP
J. Bream, DRP
E. DiPaolo, DRP, SRI
N. Sieller, DRP, RI
L. Pinkham, Resident OA
L. Trocine, RI, OEDO
RidsNrrDorlLpl1-2 Resource
RidsNrrPMLimerick Resource
ROPreportsResource@nrc.gov

SUNSI Review Complete: PGK (Reviewer's Initials) **ML100280834**

DOCUMENT NAME:G:\DRP\BRANCH4\INSPECTION REPORTS\LIMERICK\LIM 4TH QTR 2009\ LIM 2009-005.DOC

After declaring this document "An Official Agency Record" it **will** be released to the Public.

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	RI/DRP		RI/DRP		RI/DRP	
NAME	EDiPaolo/ PGK for		ARosebrook/ PGK for		PKrohn/ PGK	
DATE	01/19 /10		01/ 20 /10		01/27 /10	

OFFICIAL RECORD COPY

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	50-352, 50-353
License Nos:	NPF-39, NPF-85
Report No:	05000352/2009005 and 05000353/2009005
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 & 2
Location:	Sanatoga, PA 19464
Dates:	October 1, 2009 through December 31, 2009
Inspectors:	E. DiPaolo, Senior Resident Inspector N. Sieller, Resident Inspector N. Lafferty, Reactor Inspector A. Rosebrook, Senior Project Engineer E. Torres, Project Engineer J. D'Antonio, Senior Operations Engineer W. Schmidt, Senior Reactor Analyst
Approved by:	Paul G. Krohn, Chief Projects Branch 4 Division of Reactor Projects

TABLE OF CONTENTS

SUMMARY OF FINDINGS....3

REPORT DETAILS....5

1. REACTOR SAFETY....5

1R01 Adverse Weather Protection....5
1R04 Equipment Alignment....5
1R05 Fire Protection....6
1R06 Flood Protection Measures....7
1R07 Heat Sink Performance....8
1R11 Licensed Operator Requalification Program....10
1R12 Maintenance Effectiveness....11
1R13 Maintenance Risk Assessments and Emergent Work Control....13
1R15 Operability Evaluations....14
1R19 Post-Maintenance Testing....14
1R22 Surveillance Testing....15

4. OTHER ACTIVITIES....15

4OA1 Performance Indicator (PI) Verification....15
4OA2 Identification and Resolution of Problems....16
4OA3 Event Follow-up....19
4OA5 Other Activities....20
4OA6 Meetings, Including Exit....22
4OA7 Licensee-Identified Violations....22

ATTACHMENT: SUPPLEMENTAL INFORMATION....22

SUPPLEMENTAL INFORMATION....A-1

KEY POINTS OF CONTACT....A-1

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED....A-2

LIST OF DOCUMENTS REVIEWED....A-2

LIST OF ACRONYMS....A-7

SUMMARY OF FINDINGS

IR 05000352/2009005, 05000353/2009005; 10/01/2009 - 12/31/2009; Limerick Generating Station, Units 1 and 2; Maintenance Effectiveness, Heat Sink Performance.

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional reactor inspectors. Two Green findings were identified, both 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 0305, "Operating Reactor Assessment Program," dated August 2009. 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.

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for improperly positioning the Emergency Service Water (ESW) throttle valve to the Unit 1 'A' Residual Heat Removal (RHR) room unit cooler during an ESW flow balance surveillance test in April 2008. During the test, Exelon failed to adequately evaluate ESW flow data, and established ESW flow to the unit cooler at less than the minimum required. This rendered the 'A' RHR room unit cooler incapable of removing its design heat load for a period of approximately 13 months. Exelon entered this issue into their corrective action program for resolution.

  This finding is more than minor because it is associated with the Equipment Performance attribute of the Mitigating Systems cornerstone, and it impacted the cornerstone objective of ensuring the availability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon's failure to accurately evaluate test data resulted in an inadequate ESW flow rate through the 'A' RHR room unit cooler, rendering it incapable of removing its design heat load. The finding is of very low safety significance because it did not represent a loss of safety function of a TS train or risk-significant non-TS train. This finding has a cross-cutting aspect of Human Performance, Work Practices, because Exelon personnel did not utilize adequate human error prevention techniques, such as self and peer checking, to ensure work activities were performed properly [H.4(a)]. Specifically, Exelon personnel did not utilize human error prevention techniques to ensure an accurate flow calculation in April 2008. (Section 1R07)

- Green. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for Exelon's failure to identify a condition adverse to quality associated with the 'A' ESW pump discharge pressure instrument line. Specifically, Exelon had previous opportunity to identify and repair a degraded 'A' ESW instrument line following a leak on a similar instrument line in August 2008. However, the degraded condition of the 'A' instrument line was not detected until it resulted in a through-wall leak on November 7, 2009. In response to the leak, Exelon was required to isolate the 'A' ESW pump and enter the associated 45-day TS action statement. Exelon entered this issue into their corrective action program as Issue Report (IR) 990204 and IR 993012. Corrective actions included performing an investigation and scheduling extent of condition testing on the remaining 18 similar instrument lines.

The finding is more than minor because it is associated with the Equipment Performance attribute of the Mitigating Systems cornerstone, and it impacted the cornerstone objective of ensuring the availability of systems that respond to initiating events to prevent undesirable consequences. Specifically, upon discovery of the through-wall leak, Exelon was required to isolate the 'A' ESW pump and enter the associated 45 day TS action statement. The finding is of very low safety significance because it did not represent the loss of a TS train for greater than its allowed outage time. This finding has a cross-cutting aspect of Problem Identification and Resolution, Corrective Action Program, because Exelon did not take appropriate corrective actions to address a safety issue regarding corrosion in the ESW instrument lines [P.1(d)]. Specifically, although Exelon directed non-destructive examination (NDE) be performed to identify degraded ESW instrument lines, Exelon failed to ensure the scope of the NDE was sufficient to identify the degraded condition in the 'A' ESW pump instrument line. (Section 1R12)

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 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 November 7, operators performed a planned power reduction to approximately 85 percent to facilitate a control rod pattern adjustment. The unit returned to full RTP on November 8. On November 20, operators reduced power to 90 percent to facilitate a follow-up control rod pattern adjustment. The unit returned to full RTP later that day. On December 12, operators initiated a planned power reduction to approximately 84 percent to facilitate control rod scram time testing, control rod friction testing, main turbine valve testing, and other secondary plant maintenance. Unit 1 was returned to full RTP on December 13. Operators reduced power to approximately 90 percent for a control rod pattern adjustment on December 19. Power was returned to full RTP later that day. Unit 1 remained at full RTP for the remainder of the inspection period.

Unit 2 began the inspection period operating at full RTP. On December 5, operators performed a planned power reduction to approximately 94 percent to facilitate main turbine valve testing and other secondary plant maintenance. Power was returned to full RTP on December 6. Unit 2 remained at full RTP for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 - 1 Sample)

Site Imminent Weather Conditions

a. Inspection Scope

The inspectors evaluated implementation of adverse weather preparation procedures as a result of a winter storm warning that was issued for Montgomery County, Pennsylvania for December 18-19, 2009. The inspectors verified that Exelon entered the appropriate procedures and conducted walkdowns of the site, as necessary, to ensure plant equipment would not be affected by the adverse weather. The inspectors reviewed Exelon's plans to address the ramifications of potentially lasting effects that may have resulted from the adverse weather conditions. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

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, or potentially degraded. The inspectors used 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 reactor core isolation cooling (RCIC) system was out of service (OOS);
- Offsite power to onsite distribution system when 13 kilovolt #20 station auxiliary bus was OOS; and
- 'A', 'B', and 'C' ESW pumps and spray pond pumphouse when 'D' ESW pump was OOS.

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown (71111.04S - 1 Sample)

a. Inspection Scope

The inspectors conducted one complete system walkdown of the Unit 1 RHR 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 reviews of valve positions, major system components, electrical power availability, and general equipment condition. The inspectors reviewed system checklists, operating procedures, P&IDs and the UFSAR to assist in the walkdown. The inspectors also reviewed outstanding maintenance activities and IRs associated with the Unit 1 RHR system to ensure there were no outstanding issues that could adversely affect the RHR system functions. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Protection - Tours (71111.05Q - 4 Samples)

a. Inspection Scope

The inspectors conducted a tour of the four 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:

- Unit 2 B&D residual heat removal room (elevation 177 and 201), fire area 55;
- Unit 1 control rod drive and neutron monitoring area (elevation 253), fire area 45;
- Unit 2 control rod drive and neutron monitoring area (elevation 253), fire area 68; and
- Unit 1 standby liquid control and general equipment area (elevation 283), fire area 47.

b. Findings

No findings of significance were identified.

.2 Fire Protection – Observe Plant Fire Drill (71111.05A - 1 Sample)

a. Inspection Scope

On October 15, 2009, the inspectors observed multiple fire drills at the PECO Fire Training Facility in Conshohocken, PA. The inspectors observed pre-job briefs, fire brigade assembly and donning of protective equipment, fire brigade performance, and communications between the fire brigade leader and simulated control room. The inspectors observed instructor critiques and assessed whether appropriate feedback was provided to the fire brigade.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 - 1 Sample)

a. Inspection Scope

The inspectors performed an inspection of the Unit 1 safeguard room and emergency core cooling system rooms. The inspectors reviewed the UFSAR and related design basis documents to identify the required flooding barriers in the safeguard room. Specifically, the inspectors questioned the flooding protection function of the RHR, RCIC, and HPCI blowout panels located in the safeguard rooms. In addition, the inspectors reviewed items entered in the licensee's CAP related to the Unit 1 RHR blowout panel leakage into the 'B' RHR room and blowout panel preventive maintenance documents. 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 of significance were identified.

1R07 Heat Sink Performance (71111.07 – 1 Sample)

a. Inspection Scope

The inspectors reviewed IR 920567, which documented a condition where a RHR room unit cooler was found to have less than the minimum ESW flow during the performance of an ESW flow verification test. The inspectors reviewed the actions taken by Exelon to correct and investigate the cause of the low flow condition. The inspectors reviewed the availability of the redundant RHR room unit cooler to determine whether it was available to remove the required heat load from the RHR room during the period of unavailability of the primary unit cooler. The inspectors reviewed the UFSAR, TS, supporting design calculations, thermal performance calculations, and historical trend information to determine whether the RHR room temperature could be maintained below design limits. The inspectors verified that issues identified during the performance of ESW flow tests were entered into the licensee's CAP for evaluation. Documents reviewed are listed in the attachment.

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for improperly positioning the Emergency Service Water (ESW) throttle valve to the Unit 1 'A' Residual Heat Removal (RHR) room unit cooler during an ESW flow balance surveillance test in April 2008. During the test, Exelon failed to adequately evaluate ESW flow data, and established ESW flow to the unit cooler at less than the minimum required. This rendered the 'A' RHR room unit cooler incapable of removing its design heat load for a period of approximately 13 months.

Description: On May 16, 2009, Exelon performed a regularly scheduled 'A' ESW flow verification test. Flow through ESW valve 1015A, the throttle valve to the Unit 1 'A' RHR room unit cooler, was found to be 10.81 gallons per minute (gpm). This was significantly below the required flow of 25.41 gpm and the last recorded flow of 100.3 gpm, which was documented during the previous 'A' ESW flow balance in April 2008. Exelon performed a valve flush, and flow increased to 24.17 gpm. Although still below the minimum flow rate required by design, Exelon performed an evaluation to demonstrate that the 'A' unit cooler was capable of removing its design heat load with the as-left flow of 24.17 gpm. Therefore, Exelon considered the 'A' unit cooler to be considered available until the 1015A throttle valve could be repositioned during the next ESW flow balance, scheduled for the following month. Exelon documented the low flow condition in IR 920567 and performed an investigation to determine the cause of the degraded flow. The investigation failed to determine a cause for the change in unit cooler flow rate.

The next 'A' ESW Loop flow balance was performed on July 18, 2009. The as-found flow through the 'A' unit cooler was 25.35 gpm. During the flow balance, the associated throttle valve was adjusted from ¼ turns open to 1 ¼ turns open in order to attain the desired flow of 67.49 gpm. Upon seeing how far the valve had to be opened to pass the desired flow, the inspectors questioned why the valve had initially been set to ¼ turns open. Exelon showed the inspectors the results of the last 'A' ESW loop flow balance, performed on April 25, 2008, which recorded the as-left flow at 100.3 gpm with a valve position of ¼ turns open. The inspectors questioned whether it was reasonable that the valve had passed 100.3 gpm at only ¼ turns open, or whether the valve position or flow may have been improperly recorded. Following additional discussions with engineering, it was concluded

that based on the design of the throttle valve, it was unrealistic that the valve had passed 100.3 gpm at ¼ turns open.

Exelon performed an investigation and determined that they had improperly calculated the ESW flow to the 'A' RHR room unit cooler during the April 2008 flow balance. The room and piping configuration precluded installing a flow box directly in line with the 'A' unit cooler. Therefore, to obtain flow through the 'A' unit cooler, Exelon installed flow instrumentation on the common line to the 'A' unit cooler, 'E' unit cooler, and the 'A' RHR pump motor oil cooler (MOC). Additional flow instrumentation was then installed on the line to the 'E' unit cooler and the line to the 'A' RHR pump MOC. Exelon intended to calculate flow to the 'A' unit cooler by subtracting out the 'E' unit cooler and 'A' RHR pump MOC flows from the flow through the common line. However, when positioning the 1015A valve during the flow balance, Exelon failed to subtract out the flow to the 'E' unit cooler. The as-left data recorded the 'E' unit cooler as receiving 89.63 gpm; therefore, the 'A' unit cooler was receiving only 10.67 gpm, not 100.3 gpm as recorded. The inspectors determined that ESW valve 1015A had been improperly positioned during the April 25, 2008 flow balance due to an inaccurate flow calculation. With the throttle valve only ¼ turns open, the 'A' unit cooler was unable to remove its design heat load from April 25, 2008 through May 16, 2009.

The design function of the 'A' RHR room unit cooler is to provide cooling to the 'A' and 'C' RHR pump room in order to support operability of the 'A' RHR pump. The room contains four unit coolers in total; per Exelon calculation LM-0414, "RHR & Core Spray Room Temperature Response Following a DBA LOCA," any two unit coolers are capable of removing the total heat load from the room and maintaining operability of both the 'A' and 'C' pumps. The inspectors reviewed the Operator Logs for the 13 month time period when the 'A' unit cooler was unable to remove its design heat load and confirmed that there were always at least two unit coolers available in the 'A' and 'C' RHR pump room. Therefore, this issue had no impact on the operability of the 'A' RHR pump.

Exelon entered this issue into the corrective action program as IR 1006912. Corrective actions included performing an apparent cause investigation and re-evaluating the Maintenance Rule preventative functional failure determination for the 'A' RHR unit cooler.

Analysis: The inspectors determined that Exelon's failure to properly evaluate test data to ensure sufficient ESW flow to the 'A' RHR room unit cooler was a performance deficiency. The finding was determined to be more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone, and it impacted the cornerstone objective of ensuring the availability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Exelon's failure to accurately evaluate test data resulted in an insufficient ESW flow rate to the 'A' RHR room unit cooler, rendering it incapable of performing its design safety function.

The finding was determined to be of very low safety significance (Green) in accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," because it did not represent a loss of safety function of a system, a TS train, or a risk-significant non-TS train, and did not screen as potentially risk significant due to external event initiators. This finding has a cross-cutting aspect of Human

Performance, Work Practices, because Exelon personnel did not utilize adequate human error prevention techniques, such as self and peer checking, to ensure work activities were performed in a manner that protected reactor safety [H.4(a)]. Specifically, Exelon personnel did not utilize human error prevention techniques to ensure an accurate flow calculation in April 2008.

Enforcement: 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is performed in accordance with written procedures; test procedures shall include provisions for assuring that adequate test instrumentation is available and used; and test results shall be evaluated to assure that test requirements have been satisfied. Contrary to this requirement, Exelon failed to assure that ESW flow data was properly evaluated during the performance of an ESW flow balance surveillance test, which resulted in less than adequate flow being established to the Unit 1 'A' RHR room unit cooler. This rendered the unit cooler incapable of removing its design heat load for a 13 month period between April 25, 2008 and May 16, 2009. (**NCV 05000352/2009005-01, Failure to Ensure Adequate Cooling Water Flow to Residual Heat Removal Room Unit Cooler**)

1R11 Licensed Operator Requalification Program

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

a. Inspection Scope

On October 28, the inspectors observed the 'C' shift operating crew during a licensed operator requalification simulator evaluation. 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, and an unisolable reactor coolant system leak outside of containment complicated by emergency core cooling system failures. 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 of significance were identified.

.2 Biennial Review of License Operator Requalification Program (71111.11B - 1 Sample)

a. Inspection Scope

On December 1, 2009, one NRC region-based inspector conducted an in-office review of results of licensee-administered annual operating tests and comprehensive written exams for 2009. The inspection assessed whether pass rates were consistent with the guidance

of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspector verified that:

- Crew failure rate was less than 20%. (Crew failure rate was 0%);
- Individual failure rate on the dynamic simulator test was less than or equal to 20%. (Individual failure rate was 0%);
- Individual failure rate on the walk-through test was less than or equal to 20%. (Individual failure rate was 0%);
- Individual failure rate on the comprehensive written exam was less than or equal to 20%. (Individual failure rate was 0%); and
- Overall pass rate among individuals for all portions of the exam was greater than or equal to 80%. (Overall pass rate was 100%)

One individual missed his examination due to illness and will take a makeup exam.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 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 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 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 samples:

- Unit 1 RCIC system;
- IR 808608, Leak from 'D' ESW instrument tap; and
- IR 958587, HPCI steam leak detection setpoint for room differential temperature found to be non-conservative.

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for Exelon's failure to identify a condition adverse to quality associated with the 'A' ESW pump discharge pressure instrument line. Although Exelon had previous opportunities to identify and repair a degraded 'A' ESW instrument line, the condition was not detected until it resulted in a through-wall leak on November 7, 2009.

Description: On August 19, 2008, Exelon identified a pinhole leak in a ¾" instrument line associated with the 'D' ESW pump discharge pressure instrumentation. In order to effect repairs, operators isolated the 'D' ESW pump and entered the associated 45 day TS action statement. Exelon performed an apparent cause evaluation (ACE) for the pinhole leak under IR 808608. Laboratory analysis of the 6 ½" section of pipe concluded there were two pinhole leaks located at the six o'clock position, attributable to under deposit corrosion. The corrosion was caused by the periodic wetting and draining of the instrument line each time the 'D' ESW pump was started and stopped, along with long periods of exposure to air between pump runs.

The ACE determined there were 19 similar instrument lines in the ESW and Residual Heat Removal Service Water (RHRSW) systems that were susceptible to this condition. IR 808608 Assignment #8 was created to "track the performance of extent of condition non-destructive examination (NDE) inspections for ¾" ESW and RHRSW piping in similar conditions," and IR 828934 was generated to implement this assignment. Additionally, Assignment #10 was created to assess the need to proactively replace the piping based on the results of the NDE. When the NDE and data evaluation were completed in March 2009, the station determined that none of the piping required immediate repair or replacement. Assignment #10 was closed stating "the remaining in-service life of the line with the lowest reading was approximately 20 years ... therefore, there is no need to perform pro-active replacement of any piping."

On November 7, 2009, a pinhole leak was identified in the ¾" instrument line associated with the 'A' ESW pump discharge pressure instrumentation. In accordance with Exelon procedure OP-AA-108-115, "Operability Determinations," Exelon was forced to isolate the 'A' ESW pump and enter the associated 45 day TS action statement.

The NRC inspectors questioned why the degraded condition of the 'A' ESW instrument line had not been identified during the NDE extent of condition examinations in 2008. According to the ACE, this line was one of the 19 identified as susceptible to under deposit corrosion. Exelon stated that the 'A' ESW leak was located in the seven o'clock position, approximately two inches from the end of the pipe, and that this location had not been inspected by NDE in 2008. The inspectors reviewed IR 828934 and the associated engineering evaluation A1683097-02, and discovered that the NDE performed in 2008 had been limited by engineering to "the six o'clock position from the center of the pipe, two inches toward the discharge line and two inches towards the instrument root valve," in order to "obtain a general condition assessment of these instrument lines." In other words, although the ACE had directed NDE be performed on all 19 instrument lines, the NDE that was actually implemented was limited to a four inch section at the six o'clock position of each pipe. Exelon concurred that if the NDE had covered the full length of the pipe, and a wider bottom section (more than just the six o'clock position), the degraded 'A' ESW instrument line would have been discovered by the NDE.

Exelon entered the 'A' ESW pinhole leak into the corrective action program as IR 990204. The leak was immediately repaired by replacing the 3/4" carbon steel instructment with stainless steel pipe, and the 'A' ESW pump was returned to operable on November 9, 2009. Engineering performed a 15-day evaluation under IR 990204 and determined that the remaining 18 instrument lines should be re-examined, with 100 percent coverage of the susceptible lines; IR 993012 was written to track the performance of the NDE. Additionally, Exelon has instituted action to replace the remaining 18 instrument lines with stainless steel by the end of 2010.

Analysis: The inspectors determined that Exelon's failure to identify a condition adverse to quality associated with the 'A' ESW pump discharge pressure instrument line was a performance deficiency. Specifically, although Exelon had previous opportunity to identify and repair the degraded 'A' ESW instrument line, the condition was not detected until it resulted in a through-wall leak on November 7, 2009. The finding was determined to be more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone, and it impacted the cornerstone objective of ensuring the availability of systems that respond to initiating events to prevent undesirable consequences. Specifically, upon discovery of the through-wall leak, Exelon was required by OP-AA-108-115 to isolate the 'A' ESW pump and enter an unplanned 45 day TS LCO.

The finding was evaluated in accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and determined to be of very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, did not represent a loss of safety function of a single train for greater than its TS allowed outage time, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross-cutting aspect of Problem Identification and Resolution, Corrective Action Program, because Exelon did not take appropriate corrective actions to address a safety issue [P.1(d)]. Specifically, although Exelon directed NDE be performed to identify degraded ESW instrument lines, Exelon failed to ensure the scope of the NDE was sufficient to identify the degraded condition in the 'A' ESW pump instrument line.

Enforcement: 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, during the conduct of NDE inspections in March 2009, Exelon did not take adequate actions to identify a condition adverse to quality associated with the 'A' ESW pump discharge pressure instrument line. Specifically, although Exelon directed NDE be performed to identify degraded piping in the ¾" instrument lines in the ESW and RHRSW systems, Exelon failed to ensure the scope of the NDE that was actually implemented was sufficient to identify the degraded condition in the 'A' ESW pump instrument line. Because the finding is of very low safety significance and has been entered in Exelon's Corrective Action Program (IRs 993012 and 990204), this violation is being treated as a non-cited violation, consistent with the NRC Enforcement Policy. (**NCV 05000352, 353/2009005-02, Failure to Identify Degraded Instrument Line in Emergency Service Water System**)

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 5 Samples)

a. Inspection Scope

The inspectors evaluated the effectiveness of Exelon's maintenance risk assessments required by 10 CFR 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. Inspectors reviewed the following samples:

- Unit 1 HPCI unit coolers found with no/low flow (IR 977266) and RCIC OOS;
- Units 1 and 2 online risk during 13 kilovolt #20 station auxiliary bus outage during work week 44;
- ESW loop 'B' inspection due to diver work;
- Unit 1 online risk with 'B' stator water cooling pump, 'A' control room emergency fresh air system, and the 101 offsite power source unavailable; and
- Unit 1 online risk during emergent unavailability of the 'A' reactor enclosure recirculation system fan (IR 1008425).

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 4 Samples)

a. Inspection Scope

The inspectors assessed the technical adequacy of a sample of four 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 976983, Spray pond pump house temperature trouble alarm locked in;
- IR 985994, Pinhole leak in ESW water piping;
- IR 997195, Emergency Diesel Generator (EDG) D22 failure to flash generator field common mode failure review; and
- IR 1007904, 101 safeguard transformer load tap changer low oil level.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 - 6 Samples)

a. Inspection Scope

The inspectors reviewed six 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:

- CO230739, Rework RCIC steam valve internals;
- R1026907, Rework ESW 8-inch check valve 011-1011;
- R1132472, Unit 1 'B' RHR system fill and vent following system outage window;
- C02288008, Rebuild 'D' ESW pump;
- CO231160, Repair/replace EDG D22 K1 contactor in voltage regulator; and
- C0231235, Replace Unit 2 RCIC flow controller

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 5 Samples; 3 routine surveillances, 1 IST, 1 RCS Leak)

a. Inspection Scope

The inspectors either witnessed the performance of, or reviewed test data, for five surveillance tests (STs) 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-6-051-231-1, Unit 1 'A' Residual Heat Removal Pump, Valve and Flow Test;
- ST-6-107-590-2, Daily Surveillance Log 1 OPCONS 1, 2, and 3;
- ST-6-057-200-1, Containment Atmosphere Control Valve Test;
- ST-6-011-231-0, 'A' Loop Emergency Service Water Pump, Valve and Flow Test; and
- ST-6-107-590-1, Daily Surveillance Log and ST-107-596-2, Drywell Floor Drain Sump Equipment Drain Tank Surveillance Log/OPCON 1, 2, 3 completed November 29, 2009 (reactor coolant system leakage).

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151 - 6 Samples)

Barrier Integrity and Mitigating Systems Cornerstone PIs

a. Inspection Scope

The inspectors sampled Exelon's submittal of the Barrier Integrity cornerstone and Mitigating Systems cornerstone PIs listed below to verify the accuracy of the data recorded from October 2008 though September 2009. The inspectors utilized performance indicator

definitions and guidance contained in Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guidelines," Revision 5, to verify the basis in reporting for each data element. The inspectors reviewed various documents, including portions of the main control room logs, issue reports, power history curves, work orders, and system derivation reports. The inspectors also discussed the method for compiling and reporting performance indicators 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: Barrier Integrity (4 samples)

- Units 1 and 2 Reactor Coolant System Leak Rate; and
- Units 1 and 2 Reactor Coolant System Activity

Cornerstone: Mitigating Systems (2 samples)

- Units 1 and 2 Mitigating System Performance Index, Cooling Water Systems

b. Findings

No findings of significance were identified.

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

.1 Review of Items Entered into the Corrective Action Program

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 of significance were identified.

.2 Semi-Annual Review to Identify Trends

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," the inspectors performed a review of Exelon's CAP and associated documents to identify whether trends existed that would indicate a more significant safety issue. The review considered the period of July through December 2009 and was focused on repetitive equipment issues. The results of routine inspector CAP item screening, Exelon's trending efforts, and human performance results were also considered. The inspectors reviewed issues documented outside the normal CAP such as Plant Health Committee reports including the Top Ten Equipment Issues List, the Plant Health Committee Issues List, and the Open Action Items List.

b. Findings and Observations

No findings of significance were identified. The review did not reveal any trends that could indicate a more significant safety issue. The inspectors assessed that Exelon was identifying issues at a low threshold and entering the issues into the CAP for resolution.

The inspectors identified a recent potential negative trend concerning the implementation of corrective actions. The inspectors identified three recent issues, two of which were Green NCVs, where implemented corrective actions in the field differed from the intent of the Management Review Committee (MRC) approved CAP products.

- NCV 05000352, 353/2009004-02 was identified for the failure to correct a condition adverse to quality associated with the performance of thermography on safety-related 480 V breakers. IR 874599 investigated an electrical fault on Motor Control Center D224-R-G-08 on January 31, 2009. The root cause analysis concluded that a causal factor for the electrical fault was allowing technicians to skip thermography on breakers that were not in a loaded condition during the scheduled thermography rounds. The root cause acknowledged that all safety-related 480 V breakers were subject to this condition. Despite this conclusion, corrective action implementation was limited to ensuring that the 16 drywell cooling fans would be in the loaded condition during future thermography rounds. Through discussions, the inspectors discovered that MRC members who approved IR 874599 were under the belief that corrective actions would encompass all safety-related 480 V breakers, and ensure the entire population was placed in the loaded condition when thermography was scheduled to be performed.

- Section 1R12 of this report identifies an NCV of 10CFR50, Appendix B, Criterion XVI, "Corrective Action," for Exelon's failure to identify a condition adverse to quality associated with under-deposit corrosion in an 'A' ESW instrument line. Following an ESW leak on a similar instrument line in 2008, corrective actions were established to perform ultrasonic testing (UT) of the 19 similar lines in the ESW and RHRSW systems. MRC approved this corrective action during their review and approval of the associated ACE. On November 7, 2009, the 'A' ESW pump instrument line developed a through-wall leak. The inspectors identified that the corrective action implemented in response to the 2008 leak had been limited to performing UT on a small section of each instrument line, in order to get a "general condition assessment." Had each line received a full UT, the degraded 'A' ESW line would have been identified. Through discussions, the inspectors discovered that MRC members who approved the ACE were under the belief that a full UT would be performed for all 19 instrument lines.

- IR 911733 was written to investigate the cause of a radiation condition caused by low levels of Cobalt-60 in the plant's sewage discharge occurring on April 25, 2009. The levels were well below any regulatory limits, and Exelon was unable to determine the exact source of the Cobalt-60 because it quickly dissipated. Suspecting the in-plant rest rooms may have been the source, an action item was approved by the MRC to evaluate whether or not to isolate these rest rooms from the sewage system. On December 2, 2009, during a monthly sewage sample, Exelon again identified low levels of Cobalt-60 in the sewer line. The inspectors reviewed Exelon's actions from IR 911733 and noted that the action item regarding isolating the rest rooms had been improperly closed out. The completion notes stated that the action item was assigned to the Radiation Protection Department without agreement. There was no

recommendation regarding whether or not the rest rooms should be isolated, nor were assignments generated to have a different group perform the evaluation. The inspectors raised this observation to Exelon management and IR 1003611 was generated to address the issue.

The examples highlight the need for Exelon to ensure that the actions are properly translated to the intended and appropriate corrective actions in the field.

.3 Annual Sample: Radiation Protection Department Plan to Build Trust

a. Inspection Scope

During the first half of 2009, the NRC identified an increasing trend in the number of allegations received relating to the Limerick Generating Station. In 2007, one allegation was received by the NRC, in 2008, three allegations were received, and in 2009, thirteen allegations have been received by the NRC. The majority of the 2009 allegations were concerns related to the Radiation Protection/ Health Physics Department. As such, the NRC was concerned that a Safety Culture or Safety Conscious Work Environment (SCWE) problem may have been developing in this department.

In response to the NRC's concern, Exelon and Limerick Station Management developed a Radiation Protection (RP) Department Work Environment Improvement Plan and began implementing this plan in August of 2008. During this sample, the inspectors reviewed the Improvement Plan, the progress of the corrective actions being completed or scheduled, and made an assessment of the effectiveness of this plan to date. The inspectors reviewed CAP data over the last two years to assess whether technicians were willing to raise safety issues, reviewed the CAP data for potential trends or noticeable changes in technicians raising issues, and compared this data to other Exelon plants to identify if a SCWE issue existed. The inspectors reviewed a sample of the Action Reports (ARs) generated and their resolution, RP management communications, RP department information bulletins, observed RP field activities, observed RP department performance during an emergency preparedness exercise, and attended several RP department end-of-shift meetings.

b. Findings and Observations

No findings of significance were identified.

The inspectors determined that Exelon was properly implementing their RP Department Work Environment Improvement Plan. All significant milestones were implemented in accordance with the plan's schedule and these actions appear to be improving the general work environment (GWE) issues.

Based on the CAP program data, review of IRs, and interviews with RP department personnel, there does not appear to be a fear to raise safety issues. Limerick's RP department generated the second most IRs of the 10 Exelon sites in 2009. While the total number of IRs generated in 2009 is lower than 2008, most of this drop can be attributed to a single technician who wrote 59 IRs in 2008 and 23 through October 2009. All of the issues raised to the NRC via the allegation process, were also documented in the CAP and in most cases these items were in the CAP before the issue was brought to the NRC's

attention. A review of the IRs generated clearly show that RP Technicians are willing to raise safety concerns.

While there did not appear to be a current SCWE issue, it was clear that there was a general work environment (GWE) issue stemming from a number of past events. This has resulted in a level of mistrust between certain RP Technicians and the RP department management. RP management has made a good faith effort to improve communications and the RP technicians have been provided several opportunities to meet with senior management as a group. The efforts to date appear to have helped make progress in this area, but it will take some time to fully reestablish trust and fully correct the underlying issue.

Conclusion:

Exelon has done a reasonable job, to date, in developing and implementing an action plan to address work environment issues in the RP department. It does not appear the GWE issues have resulted in a SCWE concern, but continued management focus and effort is still required to ensure they do not result in a SCWE issue in the future.

4OA3 Event Follow-up (71153 - 1 Sample)

(Closed) Licensee Event Report (LER) 05000352, 353/2009-003-00: Both Isolation Actuation Instrumentation Channels Inoperable.

On August 27, 2009, during a review of steam leak detection setpoint calculations, Exelon identified that the setpoint for the Units 1 and 2 HPCI equipment room high differential temperature isolations specified by Technical Specification 3.3.2, "Isolation Actuation Instrumentation," were non-conservative. The review identified that an automatic start of the two room coolers would prevent room ventilation differential temperature from increasing to the isolation setpoint during an isolation actuation design basis steam line leak of 25 gpm. Exelon determined that an error occurred during a modification in 1994 which increased the environmental qualification temperature in the HPCI equipment room. The modification did not fully account for winter operation of the HPCI room coolers when determining the setpoint. A license amendment request based on the modification was submitted which increased the setpoint from less than or equal to 80 °F to less than or equal to 126 °F differential. Exelon also determined that, during the time period when the non-conservative setpoints were in effect, isolation of the HPCI steam line would have been initiated on room high temperature during a 25 gpm leak.

This issue was entered into Exelon's CAP as IR 958587. Upon discovery, compensatory measures were implemented to disable the HPCI room coolers to restore the isolation actuation system to an operable status. Normal system alignment was restored following the implementation of a temporary configuration change to lower the HPCI system equipment room high differential temperature setpoints. Exelon plans to submit a license amendment request to lower the Technical Specification 3.3.2 HPCI equipment room high differential temperature setpoint. The enforcement aspects of this issue are discussed in Section 4OA7. No new issues were identified during the review of the LER. This LER is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period the inspectors performed observations of security force personnel and activities to ensure that the activities were consistent with site security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours. These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

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

The inspectors reviewed the INPO report documenting the results of an evaluation of the Limerick Generating Station conducted in June 2009. The review determined that the results of the INPO report were generally consistent with the results of similar evaluations conducted by the NRC. The inspectors determined that no additional regional follow-up concerning the results of the INPO report was warranted.

.3 Surveillance Frequency Control Program Implementation (TI2515/178) Complete

a. Inspection Scope

The inspectors reviewed Limerick Generating Station (LGS) implementation of the TS Surveillance Frequency Control Program (SFCP), using Temporary Instruction (TI) 2515/178, "Risk Management Technical Specifications Initiative 5b Surveillance Frequency Control Program". In accordance with TI 2515/178, the following SFCP elements were examined:

- Partial review of five of the twelve surveillance changes made since implementation of the program in November 2006.

- Detailed review of the seven surveillance changes that involved:

  - Control Rod Drive Exercising from Weekly to Monthly, January 2007;
  - Anticipated Transient Without Scram Recirculation Pump Trip Instrumentation Functional from Quarterly to Refueling Cycle, October 2007;
  - Turbine Bypass Valve Cycling from Monthly to Quarterly, November 2007;
  - Scram Discharge Volume Level Instrument Functional from Quarterly to Semiannually, December 2007;
  - Main Steam Isolation Valve Reactor Protection System Limit Switch Channel Functional from Quarterly to Semiannually, April 2008;
  - Standby Gas Treatment Reactor and Enclosure Recirculation System Flow Verification from Monthly to Quarterly, November 2008; and

- Containment Isolation Valve Logic System Functional for High DW Pressure and Shutdown Cooling Isolations from Refueling Cycle to Every Other Refueling Cycle, March 2009.

- Implementation procedures for determining candidate surveillance frequencies for possible change and associated engineering and risk evaluations to assess the potential impact on increasing core damage frequency (CDF) and/or large early release frequency (LERF) as a result of the proposed frequency change.

- Results of the peer review conducted to assess the LGS Probabilistic Risk Assessment (PRA) relative to the ASME Internal Events Standard and the peer review of the LGS Fire PRA.

- Verification that the "Defense in Depth" philosophy was maintained, as discussed in the NRC Safety Evaluation for LGS TS Amendment 186 (Unit 1) and 147 (Unit 2), dated September 28, 2006.

- Interviews with the Independent Decision-Making Panel (IDP) members and a sampling review of IDP meeting minutes.

- Adequacy of corrective actions for internal periodic audits conducted to ensure that performance measures were put in place to monitor the effectiveness of any revised surveillance frequencies.

b. Findings and Observations

No findings of significance were identified. However, the following observations were discussed with the LGS staff based upon the inspectors' review:

- Overall, the SFCP activities were well documented and properly implemented. The surveillance frequency extension process properly addressed the basis for an increased frequency and the associated increased performance monitoring.

- Of the 12 changes implemented, only 1 had a quantitative increase in CDF on the order of 1E-9/year with no increase in LERF. The others showed no or below 1E-7/year increases in CDF and/or 1E-8/year in LERF based on qualitative or bounding analysis. As such the cumulative increase in CDF was 1E-9/year and zero for LERF, based on the 12 changes incorporated.

- Some engineering evaluations concluded that there was no constraint to the extension of the surveillance frequency, but the SFCP does not currently define or provide illustrative examples of what a constraint would entail

- One process issue was identified involving bounding risk analyses that use increased PRA basic event probabilities to ensure that the maximum potential increase in risk satisfied process requirements. The inspectors noted that there was no tracking of the potential repeated use of these basic events in subsequent bounding analysis which could lead to unaccounted for cumulative risk impacts.

- LGS implementation of the SFCP maintained the "Defense in Depth" Philosophy. The inspectors observed one non-risk significant instance where the change to the SBGT flow verification, from monthly to quarterly, did not identify the possible verification of the continuous air purge on the charcoal filters as a defense in depth measure and include it in performance monitoring. This issue was identified and addressed by the Plant Operating Review Committee during discussion of the change, but was handled outside the SFPC process, and had not been implemented as of the time of the inspection.

4OA6 Meetings, Including Exit

On January 8, 2010, the resident inspectors presented the inspection results to Mr. C. Mudrick and other members of 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.

- 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that all applicable regulatory requirements and the design basis for structures, systems, and components are correctly translated into specifications, drawings, procedures and instructions. Contrary to the above, inadequate isolation actuation instrumentation setpoints were translated into Units 1 and 2 Technical Specification 3.2.2, "Isolation Actuation Instrumentation," Table 3.3.2-2, Isolation Actuation Instrument Setpoints, Item 4.e, HPCI Equipment Room ΔTemperature – High. This condition existed from January 1995, when Technical Specification Amendments 85 and 46 were issued, until the condition was discovered on August 27, 2009. This issue was identified during a review of the steam leak detection system calculations and was identified in Exelon's CAP as IR 958587. Upon discovery, appropriate compensatory actions (i.e., disabling of the room coolers) were implemented to return the system to an operable status. This finding was determined to have very low safety significance (Green) using NRC IMC 0609, Appendix H, "Containment Integrity Significance Determination Process," because it did not represent a finding of greater significance for LERF using Table 6.2, "Phase 2 Risk Significance-Type B Findings at Full Power."

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Exelon Generation Company
C. Mudrick, Site Vice President
E. Callan, Plant Manager
M. Lyate, Manager, Radiation Protection
R. Dickinson, Manager of Nuclear Training
P. Gardner, Director, Operations
R. Kreider, Director, Maintenance
J. Hunter, Manager, Regulatory Assurance
D. Palena, Manager, Nuclear Oversight
S. Bobyock, Manager, Plant Engineering
F. Michaels, Manager, Electrical Engineering Systems
E. Dennin, Shift Operations Superintendent
C. Gray, Manager, Radiological Engineering
R. Harding, Engineer, Regulatory Assurance
J. Berg, System Manager, HPCI
R. Gosby, Radiation Protection Technician, Instrumentation
J. Sprucinski, Senior Radiation Protection Technician
R. Harding, Regulatory Assurance
D. Wahl, Environmental Scientist
C. Rich, Director, Work Management
D. Monahan, Simulator Operator/Instructor
R. Harding, Licensing
R. George, Manager, Electrical Design
C. Pragman, Exelon, Corporate Fire Protection Engineer
P. Tarpinian, Probability Risk Assessment
K. Ferich, Limerick Emergency Planning Manager
M. Crim, Emergency Prepardness Coordinator
R. Rogers, Exelon Facility and Equipment Coordinator
E. Bell, Senior Radiation Protection Technician
D. Kern, Senior Radiation Protection Technician
T. Moore, Director, Engineering
J. Risteter, Radiation Protection Supervisor, Technical Support

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

05000352, 353/2009-003-00	LER	Both Isolation Actuation Instrumentation Channels Inoperable (Section 4OA3)
TI 2515/178	TI	Risk Management Technical Specifications Initiative 5b Surveillance Frequency Control Program (Section 4OA5.3)

Opened and Closed

05000352/2009005-01	NCV	Failure to Ensure Adequate Cooling Water Flow to Residual Heat Removal Room Unit Cooler (Section 1R07)
05000352, 353/2009005-02	NCV	Failure to Identify Degraded Instrument Line in Emergency Service Water System (Section 1R12)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
SE-9, Preparation for Severe Weather, Revision 27
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 3
SE-14, Snow, Revision 14
OP-AA-106-101-1001, Event Response Guidelines, Revision 15
S35.0.O, Response to Loss of the 363 or 342 Moser Lines, Revision 0

Issue Reports
IR 954890, Loss of Power to Security Post and Equipment
IR 954909, Safety Concern – Stinger Gates Unable to be Opened

Section 1R04: Equipment Alignment

Issue Reports
IR 00654041, Dual Indication for HV-51-2F024A During Stroke Close
IR 00934267, RHRSW Leak-By into 'A' RHR Heat Exchanger
IR 00807742, 1C RHR Pump in Alert Range
IR 00774661, Inspect Valve Internals No Later Than 1R13

IR 00745021, HV-051-1F068A Poor Seat Condition
Procedures
S51.1.A, Set Up of RHR System for Automatic Operation in LPCI Mode, Revision 45
1S51.1.A (COL – 1), Equipment Alignment for Automatic Operation of the RHR System in the LPCI Mode – "A" Subsystem, Revision 18
S51.8.A, Suppression Pool Cooling Operation (Startup and Shutdown) and Level Control, Revision 41
T-225, Startup and Shutdown of Suppression Pool and Drywell Spray Operation, Revision 20

Work Orders
C0230014, Inspect & Rework 18" Valve HV-051-1F024B

Procedures
1555.1.A (Col), Equipment Alignment for Automatic Operation of HPCI System, Revision 25

Drawings
Limerick Drawing E-1, Station Single Line Diagram, Revision 26

Miscellaneous
S91.2.B, 20 Station Auxiliary Bus Outage with Both Units Operating, Revision 13
E-5, Grid Emergency, Revision 15

Section 1R05: Fire Protection

Procedures
Special Event Procedure, SE-8, Fire Revision 34

Section 1R06: Flood Protection Measures

Procedure:
SE-4-1 "Reactor Enclosure Flooding" Revision 8

Issue Reports
IR 988591
IR 812412
Condition Report L91-220 Revision 2

Section 1R07: Heat Sink Performance

Work Orders
R1060185-01, RT-2-011-251-0, ESW Loop 'A' Flow Balance, April 25, 2008
R1099624-01, RT-6-011-603-0, 'A' Loop ESW Unit Cooler Throttle Valve Flush, June 15, 2008
R1112132-18, RT-2-011-253-0, ESW Loop 'A' D/P and Flow Data Collection, May 16, 2009
R1108989-01, RT-2-011-251-0, ESW Loop 'A' Flow Balance, July 19, 2009

Issue Reports
IR 920567, Unit Cooler 1A-V210 Found with Less than Minimum Flow
IR 1006912, 1A RHR Unit Cooler Flow Left Below Minimum During 2008 Test

Section 1R11: Licensed Operator Requalification Program

Procedures
SE-8, Fire, Revision 34
SE-24, Inplant Evacuations, Revision 1
ON-107, Control Rod Drive System Problems, Revision 15

Miscellaneous
Limerick Generating Station Simulator Examination Scenario, LSES-0071, Revision 012.

Section 1R12: Maintenance Effectiveness

Procedures
OP-AA-108-115, Operability Determinations, Revision 9

Issue Reports
IR 976165, HV-050-1F045 is Leaking by its Closed Seat
IR 961968, Request RCIC Gross Fail Monitoring During HPCI PV&F
IR 961735, PM Work Order Needs Clarification for RCIC Unavailability
IR 927357, HV-049-1F013 RCIC Pump Discharge Inboard PCIV Failed to Stroke
IR 828947, Perform Human Performance Review to Address MRC Comments
IR 828934, Perform NDE on ESW and RHRSW Instrument Lines
IR 808608, Leak from 'D' ESW Instrument Tap
IR 990204, 'A' ESW Discharge Pipe Leak
IR 993007, ESW Pipe Leak Extent of Condition
IR 993012, Perform Extent of Condition NDE on Instrument Lines

Other Documents
Technical Specification Bases 3 /4.5.1
UFSAR Section 6.3, Emergency Core Cooling System
A1683097, Evaluate Results of ESW and RHRSW NDE Examinations

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Issue Reports
IR 984431, 2009 CDBI – Preconditioning of ESW Flow Verification Test
IR 977266, Unit 1 HPCI Unit Coolers Found with No/Low Flow
IR 979516, HPCI Unit Cooler Availability Assessment

Miscellaneous
Ops Brief Sheet – LGS Paragon Model Rev. T Changes, effective February 6, 2006

Section 1R15: Operability Evaluations

Procedures
ARC-MCR-002 E-5, Alarm Response Procedure, Revision 2
OP-AA-108-115, Operability Determinations, Revision 9

Issue Reports
IR 976983, Unexpected Alarm for SPPH Temperature Trouble
IR 925138, Spray Pond HVAC Exhaust Damper Seasonal Operation

IR 985994, Evidence of Pinhole Leak/Corrosion in ESW Piping HBC-239

Section 1R19: Post-Maintenance Testing

Procedures
ST-6-107-370-1, Low Pressure ECCS Keepfill System High Point Venting, Revision 12
ER-AA-410-1000, Air Operated Valve Categorization, Revision 3
ST-6-107-200-0, IST Valve Stroke Surveillance Log, Revision 24
MA-AA-716-012, Post Maintenance Testing, Revision 11
MA-MA-716-010-1007, Post Maintenance Testing (PMT), Revision 2

Work Order
C0230739, Rework 6" RCIC Steam Valve Internals
C0230736, Limitorque Diagnostics and Support for Vlv Work

Miscellaneous
A1565145, Evaluation 17, Engineering Evaluation of Deferral of Quarterly Stroke Testing of ESW Check Valve 011-1011
Test results Evaluation 09-192, dated November 19, 2009
Exelon Nine-month response to Generic Letter 2008-01, October 14, 2008

Section 1R22: Surveillance Testing

Procedures
ST-6-057-2009-1, CAC Valve Test, Revision 47
ST-6-107-590-1, Daily Surveillance Log / OPCONs 1, 2, 3, Revision 148
ST-6-107-590-2, Daily Surveillance Log / OPCONs 1, 2, 3, Revision 148
ST-6-057-200-1, CAC Valve Test, Revision 46

Issue Reports
IR 973472, Unit 1 'A' RHR Supression Pool Spray Flowrate below TS minimum
IR 986284, Check Valve 11-1011 is passing reverse flow of greater than 10 gpm
IR 986374, Check Valve 11-0063 is passing reverse flow of 23 gpm
IR 949148, Steam Line Temperature Not Reading What is Expected
IR 972847, TE-041-2N010D is Potentially Being Influenced by Unit Cooler
IR 972739, RE-025-117C is Potentially Being Influenced by Unit Cooler
IR 963296, Potential Unit Cooler Influence on Steam Leak Detection Probe
IR 987962, FV-DO-101A Started to Close Without Switch Manipulation
IR 987299, FV-DO-101A Failed to Stroke per ST-6-057-200-1 Revision 46

Miscellaneous
Test Results Evaluation for ST-8-051-231-1
T-225, Startup and Shutdown of Suppression Pool and Drywell Spray operation, Revision 20

Work Order
R1142609-01, Daily Surveillance Log for Unit 1 for September 6-12, 2009
R1142610-01, Daily Surveillance Log for Unit 2 for September 6-12, 2009

Other
Troubleshooting rework and testing control form 09-178, troubleshoot ESW check valve 11-0063

Section 4OA2: Problem Identification and Resolution

Action Requests

00799306	00908338	00947774
00807776	00908511	00950675
00824264	00924185	00950810
00845290	00928797	00952745
00852909	00930429	00957181
00856680	00938658	00963458
00893290	00939658	

Radiation Protection Group Info Notices:
09-L-035
09-L-036
09-L-039

Miscellaneous:
Weekly RPM Informational Emails date: 8/7/09, 8/14/09. 8/23/09, 8/31/09, 9/14/09, 9/23/09, 10/2/09, 10/13/09, 11/1/09, 11/2/09
Limerick IR/AR Generation report for RP Technicians for 2008-2009 by individual.
Limerick IR/AR Generation Report for RP Technicians for 2008-2009 by month.
Exelon IR/AR Generation Report for RP Technicians for 2008-2009 by site.
RP Communication Surveys #1 and #2

Section 4OA3: Event Follow-up

Procedures
ER-LG-450, Revision 1 Implementation of the Technical Specification Surveillance Frequency Control Program
ER-LG-450-1000 Revision 1 Selecting a Candidate to be evaluated for a proposed surveillance test interval Change
ER-LG-450-1001 Revision 2, Surveillance Test Interval Evaluation Form
ER-LG-450-1002, Revision 2 Engineering Evaluation of proposed surveillance test Interval changes
ER-LG-450-1005, Revision 1, Monitoring the Effects of Changes to the Surveillance Frequency Control Program
ER-LG-600-1051, Revision 1. Risk Assessment of Surveillance Test Frequency Changes,
LS-LG-1000, Revision 0, Surveillance Frequency Control Program List of Surveillance Frequency Change Process Training and Reference Manual.

Miscellaneous
NEI 04-10, Risk Informed Technical Specification Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies, Industry Guidance Document, dated July 2006
NRC Regulator Guide 1.177, "An approach for Plant-Specific Risk Informed Decision making: Technical Specifications, dated August 1998
Check-In Self-Assessment Report, Surveillance Frequency Control Program, ATI 696937 A02, dated June 2008

LIST OF ACRONYMS

ACE	apparent cause evaluation
ADAMS	Agencywide Documents Access Management System
CAP	Corrective Action Program
CDF	core damage frequency
CFR	Code of Federal Regulations
EDG	emergency diesel generator
ESW	emergency service water
GWE	general work environment
HPCI	high pressure coolant injection
IDP	independent decision-making panel
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
IR	issue report
LER	licensee event report
LERF	large early release frequency
LGS	Limerick Generating Station
MOC	motor oil cooler
MRC	management review committee
NCV	non-cited violation
NDE	non-destructive examination
NRC	Nuclear Regulatory Commission
OOS	out of service
P&ID	piping and instrumentation drawing
PARS	Publicly Available Records
PI	performance indicator
PRA	probabilistic risk assessment
RCIC	reactor core isolation cooling
RHR	residual heat removal
RHRSW	residual heat removal service water
RP	radiation protection
RTP	rated thermal power
SCWE	safety conscious work environment
SDP	significance determination process
SFCP	surveillance frequency control program
SSC	structure, system, component
SBGT	standby gas treatment
ST	surveillance test
TI	temporary instruction
TS	technical specification
UFSAR	updated final safety analysis report
UT	ultrasonic testing