

April 29, 2004

Mr. Christopher M. Crane
President and CNO
Exelon Nuclear
Exelon Generation Company, LLC
200 Exelon Way KSA 3-E
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION - NRC INTEGRATED INSPECTION
REPORT 05000352/2004002, 05000353/2004002

Dear Mr. Crane:

On March 31, 2004, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Limerick Generating Station Units 1 and 2. The enclosed integrated report documents the inspection findings which were discussed on April 6, 2004, with Mr. R. DeGregorio and other members of your staff.

This 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), both of which involved violations of NRC requirements. However, because of their very low safety significance and because they are entered into your corrective action program, the NRC is treating these two issues as non-cited violations (NCVs), in accordance with Section VI.A of the NRC's Enforcement Policy. A licensee-identified violation which was determined to be of very low safety significance is listed in Section 40A7 of this report. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Limerick facility.

Since the terrorist attacks on September 11, 2001, the NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. In addition to applicable baseline inspections, the NRC issued Temporary Instruction (TI) 2515/148, "Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," and its subsequent revision, to audit and inspect licensee implementation of the interim compensatory measures required by the Orders. Phase 1 of TI 2515/148 was completed at all commercial nuclear power plants during calendar year (CY) 2002, and the remaining inspection activities for Limerick were completed in February 2003. The NRC will continue to monitor overall safeguards and security controls at Limerick.

Mr. Christopher Crane

2

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 Web site at <http://www.nrc.gov/reading-rm/adams.html> (The Public Electronic Reading Room).

Sincerely,

/RA/

Mohamed Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

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

Enclosure: Inspection Report 05000352/2004002, 05000353/2004002
w/Attachment: Supplemental Information

cc w/encl: Chief Operating Officer, Exelon Generation Company, LLC
Site Vice President - Limerick Generating Station
Plant Manager, Limerick Generating Station
Regulatory Assurance Manager - Limerick
Senior Vice President - Nuclear Services
Vice President - Mid-Atlantic Operations
Vice President - Operations Support
Vice President - Licensing and Regulatory Affairs
Director - Licensing Exelon Generation Company, LLC
Manager, Licensing - Limerick and Peach Bottom
Vice President, General Counsel and Secretary
T. O'Neill, Associate General Counsel, Exelon Generation Company
Correspondence Control Desk
J. Johnsrud, National Energy Committee
R. Janati, Chief, Division of Nuclear Safety, Pennsylvania Bureau
of Radiation Protection
Chairman, Board of Supervisors of Limerick Township
J. Bradley Fewell, Assistant General Counsel, Exelon Nuclear
D. Allard, Director, Department of Environmental Protection, Bureau of
Radiation Protection (SLO)

Distribution w/encl: H. Miller, RA/J. Wiggins, DRA
 M. Shanbaky, DRP
 A. Blamey, DRP
 D. Screnci, ORA
 N. Sheehan, ORA
 A. Burritt, DRP - Senior Resident Inspector
 B. Welling, DRP - Resident Inspector
 J. Jolicoeur, RI EDO Coordinator
 J. Clifford, NRR
 S. Wall, PM, NRR
 G. Wunder, PM, NRR
 Region I Docket Room (with concurrences)

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML041210087.wpd

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	ABurritt/AB for/ by phone		ABlamey/AB		MShanbaky/MS	
DATE	04/29/04		04/29/04		04/29/04	

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION 1

Docket Nos: 50-352; 50-353

License Nos: NPF-39, NPF-85

Report No: 05000352/2004002 and 05000353/2004002

Licensee: Exelon Generation Company, LLC

Facility: Limerick Generating Station, Units 1 & 2

Location: Evergreen and Sanatoga Roads
Sanatoga, PA 19464

Dates: January 1, 2004 through March 31, 2004

Inspectors: A. Burritt, Senior Resident Inspector
B. Welling, Resident Inspector
T. Moslak, Health Physicist
B. Bickett, Reactor Inspector
G. Bowman, Reactor Inspector
C. Hott, Reactor Inspector
S. Iyer, Reactor Inspector
J. Jang, Senior Health Physicist
N. McNamara, Emergency Preparedness Inspector
M. Modes, Senior Reactor Inspector

Approved by: Mohamed Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

TABLE OF CONTENTS

SUMMARY OF FINDINGS	iii
REACTOR SAFETY	1
1R04 Equipment Alignment	1
1R05 Fire Protection	2
1R07 Heat Sink Performance	2
1R08 Inservice Inspection	3
1R11 Licensed Operator Requalification	4
1R12 Maintenance Effectiveness	5
1R13 Maintenance Risk Assessments and Emergent Work Evaluation	7
1R14 Personnel Performance During Non-routine Plant Evolutions	8
1R15 Operability Evaluations	9
1R17 Permanent Plant Modifications	11
1R19 Post Maintenance Testing	12
1R20 Refueling and Other Outage Activities	13
1R22 Surveillance Testing	14
1R23 Temporary Plant Modifications	14
1EP4 Emergency Action Level (EAL) and Emergency Plan Changes	15
2OS1 Access Control to Radiologically Significant Areas	15
2OS2 ALARA Planning and Controls	19
2PS3.1 Radiological Environmental Monitoring Program (REMP)	22
2PS3.3 Radioactive Material Control Program	23
OTHER ACTIVITIES	23
4OA2 Problem Identification and Resolution	23
4OA3 Event Followup	27
4OA5 Other	27
4OA6 Meetings, Including Exit	27
4OA7 Licensee-identified Violations	28
ATTACHMENT: SUPPLEMENTAL INFORMATION	
KEY POINTS OF CONTACT	A-1
LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED	A-1
LIST OF DOCUMENTS REVIEWED	A-1
LIST OF ACRONYMS	A-6

SUMMARY OF FINDINGS

IR 05000352/2004002, IR 05000353/2004002; 01/01/2004-03/31/2004; Limerick Generating Station, Units 1 and 2; Maintenance Effectiveness, Operability Evaluations.

The report covered a 3-month period of inspection by resident inspectors and announced inspections by a regional emergency preparedness inspector, health physicist, senior health physicist, and reactor inspectors. Two Green non-cited violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 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. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

Reactor Safety

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because Exelon did not take adequate corrective actions for an undersized breaker charging spring found during post maintenance testing in October 2003. As a result, a similar spring in a residual heat removal pump breaker did not properly charge following breaker operation in February 2004.

This finding is more than minor because it affected the Mitigating System Cornerstone objective of maintaining equipment reliability, in that failure of the charging spring to function could inhibit equipment operation by preventing breakers from properly closing causing equipment unavailability. The finding is of very low safety significance, because while equipment reliability was degraded, there was no actual loss of safety function. (Section 1R12)

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because Exelon did not identify and correct a faulty emergency diesel generator (EDG) relay on the D12 and D23 EDGs.

This finding is more than minor because it affected the Mitigating System Cornerstone objective of maintaining equipment reliability, in that intermittent failure of the EDG relay inhibited the ability of the EDG to synchronize and share load with the offsite source as required by Technical Specifications. The finding is of very low safety significance, because while equipment reliability was degraded, there was no actual loss of safety function. (Section 1R15)

Summary of Findings (cont'd)

B. Licensee-Identified Violations

Violations of very low safety significance, which were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. One licensee-identified violation and associated corrective actions are listed in Section 4OA7 of this report.

Report Details

Summary of Plant Status

Unit 1 began this inspection period operating at 100% power. On January 4, 2004, the unit entered end-of-cycle coastdown. On February 19 through 21, operators reduced power to perform power suppression testing for a fuel leak. On March 1, operators shut down Unit 1 for a planned refueling outage (1R10). On March 18, operators took the reactor critical, and on March 22, the unit was restored to 100% power.

Unit 2 began this inspection period operating at 100% power and remained at or near that power level except for brief periods of planned testing.

1. REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment (71111.04 - 3 samples)

a. Inspection Scope

Partial System Walkdown. (71111.04Q) The inspectors performed partial system walkdowns to verify system and component alignment and to note any discrepancies that would impact system operability. The inspectors verified selected portions of redundant or backup systems or trains were available while certain system components were out-of-service. The inspectors reviewed selected valve positions, general condition of major system components, and electrical power availability. This inspection activity represented three samples. The partial walk-downs included the following systems:

- D12, D13, D14 emergency diesel generators with D11 out-of-service for overhaul
- Unit 1 high pressure coolant injection with reactor core isolation cooling out-of-service for pump seal replacement
- Unit 1 high pressure coolant injection and reactor core isolation cooling with 1A reactor feedwater pump out-of-service for maintenance

The following documents were also reviewed:

- S55.1.A, "Normal HPCI Line-Up for Automatic Operation"
- S55.9.A, "Routine Inspection of HPCI System"
- S49.1.A, "Normal RCIC Line-Up for Automatic Operation"
- S49.9.A, "Routine Inspection of RCIC System"

b. Findings

No findings of significance were identified.

Enclosure

1R05 Fire Protection (71111.05 - 10 samples)a. Inspection Scope

Tour Plant Areas Important to Reactor Safety. (71111.05Q) The inspectors toured high risk areas at Limerick Units 1 and 2 to assess Exelon's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures. The inspectors reviewed the respective pre-fire action plan procedures and Section 9A of the Updated Final Safety Analysis Report. This inspection activity represented ten samples. The following fire areas were inspected:

- reactor water cooling unit hold pump Comp RERS fan, area & corridors (Fire Area 48E)
- reactor water cooling unit hold pump Comp RERS fan, area & corridors (Fire Area 48W)
- refuel floor (Fire Area 78)
- D12 emergency 4KV switchgear room (Fire Area 15)
- Unit 2 high pressure coolant injection room (Fire Area 57)
- Unit 2 class 1E battery rooms 426 and 454 (Fire Area 10)
- Unit 2 class 1E battery room (Fire Area 5)
- Unit 2 class 1E battery room (Fire Area 6)
- control rod drive hydraulic equipment area - east (Fire Area 45E)
- control rod drive hydraulic equipment area - west (Fire Area 45W)

The following documents were reviewed:

- F-A-426, "Unit 2 Class 1E Battery Room 426 and 454 (el. 239) Area 10"
- 2F-R-180, "Unit 2 HPCI Pump Room 180 (elev. 177) Fire Area 57"
- F-A-433, "Unit 1 D12 Emergency 4kV Switchgear Room (elev. 239) Fire Area 15"
- 2F-A-360, "Unit 2 Class 1E Battery Room (el. 217) Fire Area 5"
- LGS UFSAR Appendix 9A, Fire Protection Evaluation Report

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07A - 2 samples)a. Inspection Scope

The inspector reviewed performance testing and processes to ensure that the following heat exchangers could perform their design functions as intended:

- D22 emergency diesel generator heat exchanger performance testing
- 1B residual heat removal heat exchanger visual inspection, cleaning and eddy current testing

The EDG heat exchangers included the air coolant heat exchangers, lube oil coolers, and jacket water heat exchangers which provide cooling to the EDGs to support continuous operation under full-load conditions.

To ensure compatibility with commitments made in response to Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment," the inspector reviewed Exelon's inspection, cleaning, and performance monitoring methods and frequency. The inspector compared surveillance test and inspection data to the established acceptance criteria to verify that the results were acceptable and that operation was consistent with design. The inspector walked down the selected heat exchangers to assess the material condition of these areas.

The following documents were reviewed:

- D22 emergency diesel generator heat exchanger performance test of August 26, 2003
- Condition Report 174574
- PECO's response to Generic Letter 89-13
- Calculation LM-225
- Design Specification 8031-M-71-DS-14
- CH-1010.1, "Spray Pond Chemistry Guide"

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (71111.08G - 5 samples)

a. Inspection Scope

The inspectors reviewed selected activities, administrative controls and interviewed individuals associated with the inservice inspection program. The inspectors reviewed a non-Code repair and a Code repair / replacement. The non-Code repair utilized mechanical stress improvement to sequester the cracks in the safe-end-to-nozzle weld of reactor vessel nozzle N-2H, identified as weld VRR-1RD-1A. The Code repair / replacement of reactor core isolation cooling system valve FW1001 was reviewed including the associated weld radiograph HV-049-1F080. The inspectors reviewed these repair / replacement activities for compliance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI. The inspectors also verified the technicians' qualifications in accordance with 10 CFR 50.55a(a)(xiv).

The inspectors reviewed a number of Ultrasonic (UT) data packages and interviewed various inservice inspection personnel including a site Level III examiner and program owners. The UT data packages were reviewed for conformance with the requirements of the ASME Code. The inspector accompanied the responsible Exelon Level III examiner and observed UT technicians insonify reactor vessel pipe-to-safe-end nozzle

Enclosure

welds N4F and N4E by manual ultrasonic testing. Concurrent with this activity, the inspector observed the Exelon Level III examiner perform specific owner oversight activities. The inspectors also directly observed the ultrasonic scanning, by computer directed mechanical manipulation, of reactor vessel nozzle N-2H weld VRR-1RD-1A. The inspectors reviewed the UT data accumulated during a UT scan and interviewed the vendor Level III examiner responsible for evaluating the data and dispositioning the cracks in reactor vessel nozzle N-2H, weld VRR-1RD-1A. The inspectors also reviewed the historical ultrasonic data used to evaluate the predicted growth rate of the indications in this weld.

The inspectors also reviewed the actions taken by Exelon to correct deficiencies in their in-vessel inspection program identified during an external audit. The inspectors reviewed condition report (CR) 171398 addressing visual inspection video tape discrepancies, CR 177759 which addressed video tape quality, and CR 206663, which discussed the failure of 9 out of 12 ultrasonic examinations of the jet-pump hold-down beams to meet the standards suggested in the applicable guideline. The inspectors reviewed other related action requests detailing vessel internals inspection program deficiencies. The inspectors reviewed the licensee's, "Improvement for Fall 2003 Outages In Vessel Visual Inspection (IVVI) Performance Review Report C91927.1," report which discussed the corrective actions taken to bring the Limerick vessel internals visual examination program into conformance with the recommendations in the "Boiling Water Reactor Vessel Internal Program" guideline BWRVIP-03, Revision 06. The inspectors reviewed visual examination tapes with the contractor Level III examiner and reviewed the contractor's six-sigma program implemented in response to the findings of the external assessment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11 - 1 sample)

1. Simulator Evaluation (71111.11Q)

a. Inspection Scope

On February 11, 2004, the inspector observed a licensed operator requalification training program as-found simulator scenario to assess licensed operator performance and the evaluator's critique. This inspection activity represented one sample. The inspector also referred to the simulator scenario document, LSES-8001, and the following off-normal plant procedures and emergency operating procedures:

- ARC-MCR-109, Alarm Response Procedure for Reactor Enclosure Refuel Floor Vent Exhaust Radiation Monitor A/B Hi-Hi/Downscale
- ON-120, Fuel Handling Problems
- S12.1.A, RHR Service Water System Startup

- S53.0.A, Normal Makeup/Response to Low Level in Fuel Storage Pool or Reactor Well

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12 - 3 samples)

a. Inspection Scope

The inspectors evaluated the follow-up actions for selected system, structure, or component (SSC) issues and reviewed the performance history of these SSCs to assess the effectiveness of Exelon's maintenance activities. The inspectors reviewed Exelon's problem identification and resolution actions, as applicable, for these issues to evaluate whether Exelon had appropriately monitored, evaluated, and dispositioned the issues in accordance with Exelon's procedures and the requirements of 10 CFR 50.65(a)(1) and (a)(2), "Requirements for Monitoring the Effectiveness of Maintenance." In addition, the inspectors reviewed selected SSC classification, performance criteria and goals. The inspectors reviewed the associated maintenance action request and discussed the issue with engineering personnel. This inspection activity represented three samples. The following issues were reviewed:

- residual heat removal to shutdown cooling valve HV-051-182B failure to open (A1453515)
- trip of 'A' main control room supply fan (CR 194107)
- '1A' residual heat removal pump with deficient closing spring (CR 199580)

b. Findings

1. Inadequate Corrective Actions for Deficient Breaker Charging Spring

Introduction. The inspector identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" because Exelon did not take adequate corrective actions for a deficient breaker charging spring found during post maintenance testing.

Description. In October 2003, the licensee completed an in-house overhaul of an Asea Brown Bovari (ABB) 4 KV 5HK350 model spare circuit breaker. Following the overhaul, post-maintenance testing identified that the breaker charging mechanism cycled repeatedly following breaker closure. Troubleshooting by maintenance personnel determined that a defective charging spring was the most likely cause of the cycling. The charging spring is used to provide the motive force necessary to close the circuit breaker. Once the breaker closes, the breaker charging motor is energized and tensions the charging spring until it reaches a latch. If another closing operation is required, the spring becomes unlatched and forces the breaker closed.

In October 2003, a replacement spring was obtained and compared with the suspected deficient spring. In spite of the fact that both springs had the same part number, the new spring was constructed of a heavier material with more spring tension. When the new spring was installed in the breaker, it functioned properly. Exelon suspected that the lower spring tension prevented the charging spring from latching, resulting in repeated cycling. Exelon discussions with ABB did not definitively identify the undersized spring as the cause of the breakers failure to latch. However, the licensee determined that it was the most likely cause. Additionally, Exelon had a similar problem with an ABB 2.3 KV 5HK250 model spare circuit breaker in July 2003, and had been in contact with another utility regarding similar problems experienced there. The post maintenance testing failure was not entered into the corrective action program. Additionally, no extent of condition review was conducted to determine if other breakers in the plant could be susceptible to charging problems.

In February 2004, following start of the 1A residual heat removal pump, an equipment operator heard approximately ten loud banging sounds coming from the pump breaker. Exelon determined that the noise was due to repeated attempts of the breaker to charge, and that the breaker's failure to charge was due to the same undersized charging spring described above. Further investigation indicated that from approximately 2002 to 2003, ABB's charging spring vendor supplied a lighter gauge six-turn spring (as opposed to a heavier gauge five-turn spring used previously). While the spring still met ABB's specifications, it had a significantly lower spring tension than the springs used prior to 2002. The licensee replaced the six-turn spring in the 1A RHR pump breaker with the heavier five-turn spring and successfully tested the breaker 10 times with no cycling. The licensee also conducted an extent of condition review and evaluated the use of six turn springs on other breakers.

Analysis. The inspectors determined that Exelon's failure to take adequate corrective actions for the identification of a faulty breaker charging spring is a performance deficiency. The identification of the faulty spring in October 2003 was not entered into the corrective action program and there was no extent of condition review done to determine if the spring was used elsewhere in the plant. As a result of not performing an adequate extent-of-condition review a similar condition occurred with the 1A RHR pump breaker not properly latching, in February 2004. The use of six turn springs adversely impacted operation of the safety related breaker. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function, and was not the result of any willful violation of NRC requirements or licensee procedures.

This finding is more than minor because it affected the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events, in that the charging spring failure affected the reliability of the 1A RHR pump. This finding was assessed using Phase 1 of the Significance Determination Process (SDP) for Reactor Inspection Findings for At-Power Situations. The finding was determined to be of very low safety significance (Green), because while equipment reliability was affected, there was not an actual loss of safety function, and the finding is

not potentially risk significant due to seismic, flood, fire, or severe weather initiating events.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. Additionally, in the case of significant conditions adverse to quality, the measures must assure that the cause of the condition is determined and corrective actions are taken to preclude repetition. Contrary to the above, Exelon's corrective actions for the identification of the deficient charging spring for a safety related breaker, a condition adverse to quality in October 2003, were not of sufficient scope to prevent repetition. Because this issue is of very low safety significance and has been entered into the licensee's corrective action program (CR 210731), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000352, 353/2004002-01, Inadequate Corrective Actions for Faulty Breaker Charging Spring)**

1R13 Maintenance Risk Assessments and Emergent Work Evaluation (71111.13 - 6 samples)

a. Inspection Scope

The inspectors reviewed the assessment and management of selected maintenance activities to evaluate the effectiveness of Exelon's risk management for planned and emergent work. The inspectors compared the risk assessments and risk management actions to the requirements of 10 CFR 50.65(a)(4) and the recommendations of NUMARC 93-01 Section 11, "Assessment of Risk Resulting from Performance of Maintenance Activities." The inspectors evaluated the selected activities to determine whether risk assessments were performed when required and appropriate risk management actions were identified.

The inspectors reviewed scheduled and emergent work activities with work control center planning personnel to verify whether risk management action threshold levels were correctly identified. The inspectors assessed those activities to evaluate whether appropriate implementation of risk management actions were performed in accordance with Exelon's procedures.

The inspectors compared the assessed risk configuration to the actual plant conditions and any in-progress evolutions or external events to evaluate whether the assessment was accurate, complete, and appropriate for the issue. The inspectors performed control room and plant walkdowns to verify whether the compensatory measures identified by the risk assessments were appropriately performed. This inspection activity represented six samples. The selected maintenance activities included:

- D11 emergency diesel generator out-of-service for overhaul
- Unit 1 reactor core isolation coolant out-of-service for pump seal replacement
- 1A reactor feed pump out-of-service for modification

- D11 4KV emergency bus undervoltage test (RT-2-092-321-1)
- high pressure coolant injection valve test (ST-6-055-200-2)
- 1A residual heat removal system outage for valve work

The following document was also reviewed:

- M-050-001, RCIC Pump Mechanical Seal and/or Bearing Replacement

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions (71111.14 - 2 samples)

a. Inspection Scope

Non-routine/Transient Operations. The inspectors observed and reviewed licensed operator performance during the following non-routine evolution and off-normal conditions:

- transformer 114C failure
- Unit 1 fuel failure and the associated power suppression testing

This inspection activity represented two samples.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 6 samples)a. Inspection Scope

The inspectors reviewed operability determinations that were selected based on risk insights, to assess the adequacy of the evaluations, the use and control of compensatory measures, and compliance with the Technical Specifications. In addition, the inspectors reviewed the selected operability determinations to verify whether the determinations were performed in accordance with Exelon Procedure LS-AA-105, "Operability Determinations." The inspectors used the Technical Specifications, UFSAR, associated Design Basis Documents, and applicable action request and condition report documents during these reviews. This inspection activity represented six samples. The issues reviewed included:

- 1L safety relief valve and vacuum breaker w/main seat valve leak (A1415414)
- emergency diesel generator jacket water leaks including D11 adapter gasket failure during a hydrostatic test (A1454963)
- control room D/P low (A1441303)
- turbine building positive pressure (A1441303)
- 2B residual heat removal heat exchanger operability with spray pond chemistry at operating limits. The inspectors evaluated Exelon's analysis of spray pond chemistry bounding limits specific to their effect on accelerated corrosion mechanisms with respect to the material condition of the degraded 2B RHR heat exchanger. The evaluation was focused on the 2B RHR heat exchanger's structural integrity during the 180 day mission time following a post-LOCA event. (CRs 149191, 164393, 166575, 174978)
- D12 and D23 emergency diesel generator load changes during testing (A1456726). The inspectors reviewed corrective action documents associated with the anomalous performance of the D12 and D23 emergency diesel generators (EDG) while sharing load with the offsite source during testing. The EDGs exhibited unexplained load shifts and on one occasion exceeded the D12 continuous apparent power rating. The review focused on the licensee's actions to identify and correct equipment problems associated with the anomalous performance of the EDGs causing the unexplained load shifts

The inspector reviewed the following documents:

- Exelon Procedure CY-LG-120-1102, "Outside Chemistry/NPDES Related Sampling and Analysis Schedule"
- Position Paper on Spray Pond Chemistry Conditions and their effects on 2B RHR heat exchanger
- ST-6-092-116-1, "D12 Diesel Generator 4 KV SFGD Loss of Power LSF/SSA and Outage Testing"
- ST-6-092-312-1, "D12 Diesel Generator Slow Start Operability Test Run"
- ST-6-092-313-2, "D23 Diesel Generator Slow Start Operability Test Run"
- LS-AA125-1006, "CAP Process Expectations Manual"
- Action Requests A1456726, 1456740

- CR 205101

b. Findings

1. Inadequate Corrective Actions for a Faulty EDG Relay

Introduction. The inspector identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because Exelon did not identify and correct a faulty relay on the D12 and D23 EDGs.

Description. On February 28, 2004, while testing the D12 EDG, operators noted an unexplained load change between the EDG and the offsite power source. The operator restored the EDG load to within the test specifications, noted the load change in the test comments, as required, and initiated an action request to address the anomaly. Action request A1456726 documented that the only plausible explanation for the load excursion was a voltage regulator problem but the EDG remained operable since the EDG operated properly for two hours following the load shift. No troubleshooting or repairs were attempted. Condition report 205101 was initiated on March 1, 2004.

On March 2, 2004, during another test the D12 EDG again exhibited unexplained load changes between the EDG and the offsite power source. Action request A1456726 was updated to include another possible failure mode based on a review of industry operating experience. The system manager recommended performing additional troubleshooting during the next scheduled monthly test, but the EDG was still considered operable.

The inspector identified that Exelon's conclusions regarding potential component failures were flawed, and on March 5, 2004, following the discussion with the inspectors, the EDG was declared inoperable and additional troubleshooting was performed. The troubleshooting revealed a faulty relay that was causing the EDG to shift back and forth between the load-sharing and non load-sharing modes. The faulty relay was causing the intermittent load changes and adversely affected the ability to synchronize the EDG with the offsite source. Exelon's evaluations following two sets of anomalous test results were incorrect in that they identified the wrong component problem.

Technical Specification surveillance requirement 4.8.1.1.2.E.10 requires, in part, that the EDG be capable of synchronizing to the offsite power source and transfer its load to the offsite source. The faulty relay caused the EDG to shift back and forth between the load sharing and non load sharing modes. The shifting modes caused unstable load sharing as evidenced by the large load shifts and would cause problems during synchronization. Exelon procedure LS-AA-125-1006, "CAP Process Expectations Manual," section 5.1.10, requires a condition report be initiated when risk significant plant systems or component performance that is abnormal or is not the result of normal wear and is not tracked as a chronic system problem. Exelon staff did not initiate a condition report following the abnormal performance of the EDG during the March 2, 2004 test. Additionally, based on interviews the load shifts had been seen during several previous tests, but not documented on the test, an action request, or a condition report.

Enclosure

On February 29, 2004, while testing the D23 EDG, operators noted an unexplained load change between the EDG and the offsite power source. The operator restored the EDG load to within the test specifications and initiated an action request to address the anomaly. The D23 EDG was considered operable and no troubleshooting or repairs were attempted, similar to the D12 issue documented above.

Analysis. The inspectors determined that Exelon's failure to identify and correct faulty EDG relays is a performance deficiency. Further, a condition report was not initiated to address the anomalous EDG operation as required by procedures. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function, and was not the result of any willful violation of NRC requirements or licensee procedures. This finding is more than minor because it affected the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events, in that the intermittent failure of the relay made synchronization and load sharing less reliable. This finding was assessed using Phase 1 of the Significance Determination Process (SDP) for Reactor Inspection Findings for At-Power Situations. The finding was determined to be of very low safety significance (Green), because while equipment reliability was affected, there was not an actual loss of safety function, and the finding is not potentially risk significant due to seismic, flood, fire, or severe weather initiating events.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. Contrary to the above, prior to March 5, 2004, Exelon staff did not identify and correct a condition adverse to quality, in that the defective relays adversely affected the ability of the D12 and D23 EDGs to be synchronized and share loads with the offsite source. Because this issue is of very low safety significance and has been entered into the licensee's corrective action program (CR 213536), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000352, 353/2004002-02, Inadequate Corrective Actions for Emergency Diesel Generator Relay)**

1R17 Permanent Plant Modifications (71111.17 - 1 sample)

a. Inspection Scope

The inspectors reviewed the analysis for the Unit 1 feedwater level control system modification to replace the analog feedwater level control system with a digital control system. The inspectors reviewed the following documents to verify that the design basis, licensing basis, and performance capability of the reactor feed system were not degraded by this modification:

- ECR 03-00085, "P00988 FWLCS Replacement - Engineering Documents - Unit 1."
- A1379359

- A1379396
- 10 CFR 50.59 Safety Evaluation for Modification P00988, LGS Feedwater Level Control System Upgrade
- LGS Response to NRC GL 89-19
- PORC meeting notes for 50.59 screening, 12/31/03

This inspection activity represented one sample.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19 - 6 samples)

a. Inspection Scope

The inspectors observed portions of post-maintenance testing activities in the field to determine whether the tests were performed in accordance with the approved procedures. The inspectors assessed the test's adequacy by comparing the test methodology to the scope of maintenance work performed. In addition, the inspectors evaluated the test acceptance criteria to verify whether the test demonstrated that the tested components satisfied the applicable design and licensing bases and the Technical Specification requirements. The inspectors reviewed the recorded test data to determine whether the acceptance criteria were satisfied. This inspection activity represented six samples. The maintenance activities reviewed included:

- D11 emergency diesel generator jacket water system following an overhaul
- D13 emergency diesel generator fuel oil transfer pump (C0208614)
- Unit 1 RCIC pump seal replacement (C020697, ST-6-049-230-1, TRT 04-0017, A1367868)
- HV-041-1F022D main steam isolation valve operator replacement (R0764259)
- reactor core isolation cooling major inspection (R0571169)
- high pressure coolant injection inspection (R0906918)

The following documents were reviewed:

- ST-2-041-469-1, "RPS-Main Steam Isolation Valve Closure; Division IIA/IIB, Channel A2/B2 Calibration/Functional Test (ZS-41-122D)"
- ST-6-041-202-1, "MSIV Cold Shutdown Valve - Test"
- ST-4-041-491-1, "Inboard MSIV Accumulator Leak Test and Springs Only Full Stroke Closing Test"
- ST-2-072-105-1, "MSIV's and Main Steam Line Drain Valves LSF/SAA"

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (71111.20 - 1 sample)a. Inspection Scope

The inspectors observed and/or reviewed numerous refueling outage activities and controls, including:

- Plant shutdown and cool down activities
- Outage risk management including changes due to emergent work or unexpected conditions
- Outage configuration controls including:
 - 1) availability and accuracy of reactor coolant system instrumentation
 - 2) electrical power alignments
 - 3) decay heat removal system operation
 - 4) availability of reactor inventory makeup water systems
 - 5) secondary containment controls and integrity
- Fuel handling operations including fuel movement, fuel assembly tracking, and core verification activities.
- Reactor startup, including system restoration, preparation for reactor mode changes, control rod withdrawal, reactor criticality, reactor coolant system heat up, and reactor power increases.

During the conduct of the refueling inspection activities the inspector reviewed the associated documentation to ensure that the tasks were performed safely and in accordance with plant technical specifications and operating procedures. The procedures reviewed are listed in the attachment.

Prior to the commencement of the reactor startup, the inspector also performed a walkdown of selected SSCs to assess the readiness of the SSCs to support plant restart following the refueling outage. This inspection activity represents one sample.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 6 samples)a. Inspection Scope

The inspectors reviewed and observed portions of the following surveillance tests, and compared test data with established acceptance criteria to verify the systems demonstrated the capability of performing the intended safety functions. The inspectors also verified that the systems and components maintained operational readiness, met applicable Technical Specification requirements, and were capable of performing the design basis functions. This inspection activity represented six samples. The observed or reviewed surveillance tests included:

- D11 jacket water pressure switch calibration
- ST-6-092-313-02, "D23 Slow Start"
- ST-6-051-232-2, "U2 B Residual Heat Removal Pump Valve and Flow Test"
- ST-6-049-230-2, "U2 Reactor Core Isolation Coolant Pump Valve and Flow Test"
- ST-6-092-116-1, "D12 Diesel Generator 4 KV SFGD Loss of Power LSF/SSA and Outage Testing"
- ST-2-001-806-1, "RPS and EOC-RPT Turbine Control Valve Fast Closure Trip System Oil Pressure - Low; Division IIA, Channel A2, Response Time Test (PS-001-102B) EOC-RPT Logic System Functional (Control Valve 4)"

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 3 samples)a. Inspection Scope

The inspector reviewed the following temporary plant modification:

- D11 diesel generator outboard bearing shaft non-conformance (ECR LG 04-0030)
- maintain the hot gas bypass valve on the B control enclosure chiller open (ECR LG 03-00539)
- cut and cap the vent line to the 1B recirculation pump seals (ECR LG 04-00157)

The inspector verified that the temporary change did not adversely affect system or support system availability, or adversely affect a function important to plant safety. The inspector verified that the applicable design and licensing bases were considered and that 10 CFR 50.59 reviews were appropriate. This inspection activity represented three samples.

Documents Reviewed

- CM NCR A1403993
- A1452231
- C0208245

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness (EP)

1EP4 Emergency Action Level (EAL) and Emergency Plan Changesa. Inspection Scope (IP 71114.04 - 1 sample)

A regional in-office review was conducted of licensee-submitted revisions to the emergency plan, implementing procedures and EALs which were received by the NRC during the period of January - March 2004. A thorough review was conducted of plan aspects related to the risk significant planning standards (RSPS), such as classifications, notifications and protective action recommendations. A cursory review was conducted for non-RSPS portions. These changes were reviewed against 10 CFR 50.47(b) and the requirements of Appendix E and they are subject to future inspections to ensure that the combination of these changes continue to meet NRC regulations. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 4, and the applicable requirements in 10 CFR 50.54(q) were used as reference criteria. This inspection activity represented one sample.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety (OS), Public Radiation Safety (PS)

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 21 samples)a. Inspection Scope

During the period January 12 -16, 2004, the inspector conducted the following activities to verify that the licensee was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas and other radiologically controlled areas, and that workers were adhering to these controls when working in these areas. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and the licensee's procedures. This inspection activity represents completion of eleven (11) samples relative to this inspection area.

During the period March 15 - 19, 2004, the inspector conducted the following activities to verify that the licensee was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas and other radiologically controlled areas, and that workers were adhering to these controls when working in these areas during the Unit 1 refueling outage. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and the licensee's procedures. This inspection activity represent completion of ten (10) samples relative to this inspection area.

Completion of the 10 (outage related) Access Control samples in conjunction with the 11 Access Control (power operations related) samples, completed during the period January 12 - 16, 2004, completes the 71121.01 annual inspection requirement of 21 samples.

Plant Walkdown and RWP Reviews

- The inspector identified exposure significant work areas within Unit 1 and Unit 2, including areas in the Reactor Buildings, Control Structure, Radwaste Processing Building, Off-Gas Building, and Turbine Buildings. The inspector reviewed radiation survey maps and radiation work permits (RWP) associated with these areas to determine if the associated controls were acceptable.
- The inspector toured the accessible radiological controlled areas and with the assistance of a radiation protection technician performed independent radiation surveys of selected areas to confirm the accuracy of survey data and the adequacy of postings.
- In evaluating RWP's, the inspector reviewed electronic dosimeter dose/dose rate alarm setpoints to determine if the setpoints were consistent with the survey indications and plant policy. The inspector verified that the workers were knowledgeable of the actions to be taken when the electronic dosimeter alarms or malfunctions for tasks being conducted under selected RWP's. Work activities reviewed included new fuel transfer to the Unit 1 reactor building (RWP-00057) and installation of end bells on the Unit 1 B-Fuel Pool Cooling Heat Exchanger (RWP 00017).
- The inspector reviewed RWP's and associated instrumentation and engineering controls for potential airborne radioactivity areas. The inspector confirmed that no worker received an internal dose in excess of 50 mrem due to airborne radioactivity for 2003.
- The inspector examined the physical and programmatic controls for highly activated materials stored in the spent fuel pools.
- During the Unit 1 refueling outage, the inspector identified exposure significant work areas in the Unit 1 drywell, reactor cavity, and refuel floor. The inspector reviewed

radiation survey maps and RWP's associated with these areas to determine if the associated controls were acceptable.

- The inspector toured the accessible radiological controlled areas, including the drywell, reactor building, and radwaste building, and with the assistance of a radiation protection technician performed independent surveys of selected areas to confirm the accuracy of survey data and the adequacy of postings.
- In evaluating the RWP's, the inspector reviewed electronic dosimeter dose/dose rate alarm setpoints to determine if the set points were consistent with the survey indications and plant policy. The inspector verified that the workers were knowledgeable of the actions to be taken when the dosimeter alarms or malfunctions for tasks being conducted under selected RWP's. Work activities reviewed included inspection of the Unit 1 reactor vessel head flange (RWP 63), reactor reassembly after cavity draindown (RWP 61), reactor cavity decontamination (RWP 64) and reactor vessel protective cover removal (RWP 63).
- The inspector reviewed RWP's and associated instrumentation and engineering controls for potential airborne radioactivity areas located in the Unit 1 reactor building and drywell. The inspector confirmed that no worker received an internal dose (in excess of 50 mrem) due to airborne radioactivity when performing outage related activities.

Problem Identification and Resolution

- The inspector reviewed elements of the licensee's Corrective Action Program related to controlling access to radiologically controlled areas, completed since the last inspection of this area, to determine if problems were being entered into the program for resolution. Details of this review are contained in Section 4OA2 of this report.

Jobs-In-Progress Review

- The inspector observed aspects of various maintenance and operational activities being performed during the inspection period to verify that radiological controls, such as required surveys, area postings, job coverage, and pre-job RWP worker briefings were implemented; personnel dosimetry was properly worn; and that workers were knowledgeable of work area radiological conditions. Tasks observed were transfer of new fuel to the Unit 1 reactor building, installation of end bells on the Unit 1B-Fuel Pool Cooling heat exchanger, and movement of the Unit 1 Traversing Incore Probe (TIP).

High Risk Significant, High Dose Rate HRA and VHRA Controls

- The inspector discussed with the Radiation Protection Manager High Dose Rate (HDR) areas and Very High Radiation Area (VHRA) controls and procedures. The inspector verified that any changes to relevant licensee procedures did not substantially reduce the effectiveness and level of worker protection. Controls for

significant high risk areas review included the Unit 1 and Unit 2 drywell and TIP rooms.

- The inspector discussed with first-line radiation protection supervisors the controls in place for special areas that have the potential to become VHRA during certain plant operations. The inspector evaluated the prerequisite communications to the radiation protection department, so as to allow completion of timely actions, such as properly posting and controlling the affected areas.
- Keys to Unit 1 and Unit 2 locked high radiation areas (LHRA) and very high radiation areas (designated A and B keys) were inventoried and accessible LHRA were verified to be properly secured and posted during plant tours.
- Keys to Unit 1 and Unit 2 LHRAs and very high radiation areas (designated A and B keys) were inventoried and accessible LHRA were verified to be properly secured and posted during plant tours.

Radiation Worker/Radiation Protection Technician Performance

- The inspector observed radiation worker and radiation protection technician performance by attending the pre-job briefings for transferring new fuel to the Unit 1 reactor building and installation of end bells on the Unit 1 B-Fuel Pool cooling heat exchanger; and by evaluating the preparations for movement of the Unit 1 TIP, to determine whether the individuals were aware of radiological conditions, RWP requirements, and electronic dosimetry setpoints; and that the skill level was sufficient with respect to the radiological hazards and the work involved.
- The inspector reviewed condition reports related to radiation worker and radiation protection technician errors to determine if an observable pattern traceable to a similar cause was evident.
- The inspector observed radiation worker and radiation protection technician performance during reactor cavity decontamination, reactor reassembly, and a drywell entry during power operations. The inspector determined whether the individuals were aware of current radiological conditions, access controls, that the skill level was sufficient with respect to the radiological hazards and the work involved.
- The inspector attended the pre-job briefings for exposure significant tasks to determine the adequacy and accuracy of information provided to workers. Pre-job briefings attended included a drywell entry during power operations to perform emergent work, a reactor vessel head flange inspection, and removal of the reactor vessel protective cover.
- The inspector reviewed condition reports, related to radiation worker and radiation protection errors, and personnel contamination event (PCE) reports to determine if an observable pattern traceable to a similar cause was evident.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope (7 Samples)

During the period March 15 - 19, 2004, the inspector conducted the following activities to verify that the licensee was properly implementing operational, engineering, and administrative controls to maintain personnel exposure as low as is reasonably achievable (ALARA) for tasks conducted during the Unit 1 refueling outage. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and the licensee's procedures. This inspection activity represents completion of seven (7) samples relative to this inspection area.

Radiological Work Planning

- The inspector reviewed pertinent information regarding cumulative exposure history, current exposure trends, and ongoing activities to assess current performance and outage exposure challenges. The inspector determined the site's 3-year rolling collective average exposure.
- The inspector reviewed the refueling outage work scheduled during the inspection period and the associated work activity exposure estimates. Scheduled work reviewed included reactor cavity decontamination, reactor reassembly, and a drywell entry during power operations.
- The inspector reviewed procedures associated with maintaining worker dose ALARA and with estimating and tracking work activity specific exposures.
- The inspector reviewed 1R10 dose summary reports, detailing worker estimated and actual exposures, through March 18, 2004, for jobs performed during the refueling outage.
- The inspector evaluated the exposure mitigation requirements, specified in RWP's and ALARA Plans (AP), and compared actual worker cumulative exposure to estimated dose for tasks associated with these work activities. Jobs reviewed included control rod drive exchange (RWP 91, AP 04-01), drywell in-service inspection tasks (RWP 101, AP 04-17), drywell scaffolding installation/removal (RWP 81, AP 04-13), suppression pool diving (RWP 40, AP 04-04), and reactor cavity decontamination (RWP 63, AP 04-39).
- The inspector evaluated the departmental interfaces between radiation protection, operations, maintenance crafts, and engineering to identify missing ALARA program elements and interface problems. The evaluation was accomplished by interviewing

Enclosure

the ALARA Coordinator and Radiation Protection Manager, reviewing Station ALARA Committee minutes (Meeting Nos. 04-02 and 04-03), reviewing outage related Nuclear Oversight field observation reports, and attending pre-job briefings for jobs in progress (reactor reassembly and drywell entry at power).

- The inspector compared the person-hour estimates provided by maintenance planning and other work groups with actual work activity time requirements and evaluated the accuracy of these time estimates. Specific work activities evaluated included the control rod drive change-outs and reactor reassembly.
- The inspector determined if work activity planning included the use of temporary shielding, system flushes, and operational considerations to further minimize worker exposure. The inspector examined the recently installed hydrolazing fitting on the scram discharge volume header, temporary shielding installed in the drywell, and temporary shielding installed in the reactor building to facilitate changing out reactor core isolation cooling piping (RCIC). The inspector reviewed pre and post dose rate surveys for selected systems to evaluate the effectiveness of the source term reduction efforts.

Verification of Dose Estimates and Exposure Tracking Systems

- The inspector reviewed the assumptions and basis for the annual site collective exposure estimate and the Unit 1 refueling outage dose projection. The inspector reviewed three (3) PCE reports, whole body counting data, and related calculations for internal dose and shallow dose estimates for selected personnel.
- The inspector reviewed the licensee's method for adjusting exposure estimates, and replanning work, when emergent work was encountered. The inspector reviewed the Work-In-Progress (WIP) ALARA reviews to determine if actual exposure was correlating with forecasted estimates. WIP reviews evaluated included hydrolazing the scram discharge volume header (04-25) and suppression pool diving (04-04).

- The inspector reviewed the licensee's exposure tracking system to determine whether the level of dose tracking detail, exposure report timeliness, and exposure report distribution was sufficient to support the control of collective exposures. Included in this review were departmental dose compilations, highest personnel exposures year-to-date, and individual exposure records.

Job Site Inspection and ALARA Control

- The inspector observed maintenance and operational activities being performed for reactor cavity decontamination, reactor reassembly, and a drywell entry at power for reactive maintenance to verify that radiological controls, such as required surveys, job coverage, and contamination controls were implemented; personnel dosimetry was properly worn; and that workers were knowledgeable of work area radiological conditions.
- The inspector reviewed the exposure of individuals in selected work groups, including mechanical maintenance, radiation protection, and outage services to determine if supervisory efforts were being made to equalize doses among the workers. The inspector also interviewed the Radiation Protection Manager regarding the monitoring the distribution of dose for site personnel.

Source Term Reduction and Control

- The inspector reviewed the current status and historical trends of the Unit 1 source terms. Through interviews with the Radiation Protection Manager and a radiological engineer, the inspector evaluated the licensee's source term measurements and control strategies. Specific strategies being employed by the licensee included system flushes, installation of temporary shielding, and hydrolazing of system components. During the refueling outage a permanent hydrolazing fitting was installed on the scram discharge volume header to facilitate decontamination.

Declared Pregnant Workers

- The inspector reviewed the radiological control records for three (3) declared pregnant workers performing outage related activities during the inspection period.

Problem Identification and Resolution

- The inspector reviewed elements of the licensee's Corrective Action Program related to implementing the radiological controls program, to determine if problems were being entered into the program for resolution. Details of this review are contained in Section 4OA2 of this report.

b. Findings

No findings of significance were identified.

2PS3.1 Radiological Environmental Monitoring Program (REMP) (71122.03 - 7 samples)

a. Inspection Scope

The inspector reviewed the following documents and observed the licensee's activities to evaluate the effectiveness of Exelon's REMP at the Limerick site. The requirements of the REMP are specified in the Technical Specifications/Offsite Dose Calculation Manual (TS/ODCM). This inspection activity represents the completion of seven (7) samples relative to this inspection area (i.e., inspection procedure sections 02.01a,b,c,d and 02.02a, b, c, d, e, f, g, h, i).

- the 2003 Annual REMP Report;
- the most recent ODCM (Revision 21) and technical justifications for ODCM changes, including sampling media, locations, and the UFSAR;
- selected analytical results for 2003 REMP samples;
- the 2003 QA Audit (NOS Audit #NOSA-LIM-03-08) for the REMP/ODCM implementations;
- Corporate Comparative Audit Report 2003 REMP/ODCM/Non-Radiological Effluent Monitoring/NPDES, including Limerick Station;
- the most recent calibration results for all TS/ODCM air samplers;
- implementation of QA/QC by the contractor laboratory;
- implementation of the environmental thermoluminescent dosimeters (TLDs) program;
- most recent calibration results for meteorological monitoring systems;
- 2003 data recovery rates for wind speed, wind direction, and delta temperatures required by NRC Safety Guide 23;
- the Land Use Census procedure and the 2002/2003 results;
- associated procedures to implement the REMP;
- observation for air iodine/particulate, water, and milk sampling techniques; and
- walkdown for determining whether all air samplers and 25%TLDs were located as described in the ODCM (including control and indicator stations) and for determining the equipment material condition.

b. Findings

No findings of significance were identified.

2PS3.3 Radioactive Material Control Program (71122.03 - 2 samples)

a. Inspection Scope

The inspector reviewed the following documents to ensure that Exelon met the requirements specified in its program for the unrestricted release of material from the Radiologically Controlled Area (RCA). The review was against criteria contained in 10CFR20, NRC Circular 81-07, NRC Information Notice 85-92, NUREG/CR-5569, Health Position Data Base (Positions 221 and 250), and the licensee's procedures. This inspection activity represents the completion of two (2) samples relative to this inspection area (i.e., inspection procedure sections 02.03a and 02.03 b, c, d, e).

- the most recent calibration results for the radiation monitoring instrumentation (SAM-9s and a bag monitor);
- the survey and release of potentially contaminated bulk material;
- observations for the operations of SAM-9s and a bag monitor;
- the methods used for control, survey, and release from the RCA; and
- associated procedures.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

1. Annual Sample Review - Manganese Pitting of Residual Heat Removal Heat Exchangers (71152 - 1 sample)

a. Inspection Scope

The inspectors completed one sample review regarding Exelon's evaluation and corrective actions for an unsatisfactory Eddy Current Test on the 2B residual heat removal (RHR) heat exchanger during refueling outage 2R07 in March 2003. Condition report 149191 was selected for detailed review to ensure that the full extent of the issue was understood. CR 149191 documented Exelon's root cause analysis for this issue and identified corrective actions to prevent the degradation of other RHR heat exchangers. AR A0403107 was also reviewed to determine if Exelon understood and identified all ineffective corrective actions from a previous related issue on the 1A RHR heat exchanger in 1992. These reports were reviewed to ensure an appropriate evaluation was performed, and current corrective actions were identified and adequate to prevent recurrence. The inspectors evaluated Exelon's actions against the requirements of Exelon's corrective action program as delineated in procedure LS-AA-125, "Corrective Action Program," and 10 CFR 50, Appendix B, Criterion XVI (Corrective Action).

b. Findings and Observations

No findings of significance were identified.

2. Annual Sample Review - Adequacy of Testing for Main Steam Isolation Valves (71152 - 1 sample)

a. Inspection Scope

The inspectors reviewed the licensee's response to NCV 2003003-02. This violation was related to the licensee's practice of stroke time testing main steam isolation valves (MSIVs) in a cold shutdown condition. The licensee's test procedure and specifications did not provide assurance that the MSIVs would be capable of closing between three and five seconds during power operation, as required by Technical Specifications. The inspectors reviewed corrective action documents, revised test procedures, and observed MSIV stroke time testing during the Unit 1 shutdown to refueling outage 1R10. The purpose of this review was to verify that the licensee's response to the NCV corrected the inadequacies in their test methodology.

b. Findings and Observations

No findings of significance were identified. The inspectors determined that the licensee conducted a thorough analysis to develop their revised test procedure. The revised procedure and test specifications accounted for the effect of pneumatic time delay (the time from switch operation to beginning of valve stroke), the effect of steam flow at power assisting valve closure, the effect of increased temperature on the valve's hydraulic controls, and the distance from valve position indicators to the fully open or closed position.

3. Annual Sample Review - Unacceptable Preconditioning (71152 - 1 sample)

a. Inspection Scope

During 2003, The NRC identified two inspection findings related to inadequate surveillance testing practices, in that unacceptable preconditioning occurred prior to the surveillance tests. (FIN 03-02-03, FIN 03-03-01) Limerick did not test as-found component conditions in accordance with NRC guidance and did not properly evaluate the acceptability of the preconditioning prior to tests.

Exelon addressed both findings through the corrective action program documents CR 146966 and CR 162698. The inspector reviewed these documents as well as corrective actions related to Exelon's strategy to identify possible situations where unacceptable preconditioning could occur. In addition, corrective actions were reviewed to ensure the full extent of the issue was identified, properly evaluated, and completed in a timely manner. The inspector also reviewed Exelon's implementation of these corrective actions during the recent 1R10 refueling outage to verify that preconditioning was appropriately evaluated and that unacceptable preconditioning did not recur.

b. Findings and Observations

There were no findings identified associated with the reviewed sample; however, the inspector noted that Exelon missed the opportunity to identify possible unacceptable preconditioning associated with a D124-24 MCC feeder breaker that had previously been degraded but was evaluated as fully operable by Exelon. Exelon did not evaluate the possibility of masking the as-found condition and testing functionality of this breaker prior to its removal during the LOCA/LOOP surveillance test that would verify its safety function during an accident. However, it was determined, after the surveillance test was performed, that a portion of the surveillance test completed prior to the original breaker removal sufficed for evaluating the as-found condition and safety function of the breaker.

4. Cross-References to PI&R Findings Documented Elsewhere

Sections 1R12 and 1R15 of the report describe two cross-cutting findings in the area of Problem Identification and Resolution. Exelon did not identify and correct problems with safety related circuit breakers and emergency diesel generators.

5. Access Control to Radiologically Significant Areas

a. Inspection Scope

The inspector reviewed sixteen (16) CRs, a Radiation Protection Department Focused Area Self-Assessment, recent Station ALARA Council Meeting Minutes, the 2003-2005 Exposure Reduction Plan, the 2004 Departmental Exposure Reduction Plans, and a Nuclear Oversight Department Quarterly Assessment Report, relating to controlling work activities in radiologically controlled areas, to evaluate the licensee's threshold for identifying, evaluating, and resolving occupational radiation safety problems. The review included a check of possible repetitive issues such as radiation worker and radiation protection technician errors.

The inspector also attended the daily leadership morning meeting, a Human Performance Evaluation meeting, a daily radiation protection technician meeting, a Dose Zealot meeting, and a Unit 1 outage planning meeting to evaluate current radiation protection issues.

This review was conducted against the criteria contained in 10CFR20, Technical Specifications, and the licensee's procedures.

b. Findings and Observations

No findings of significance were identified.

6. Public Radiation Safety

a. Inspection Scope

The inspector reviewed the following 2002-2003 CRs to evaluate the effectiveness of the licensee's problem identification and resolution processes in the areas of the REMP, the Radioactive Material Control Program, and the Meteorological Monitoring Program. This inspection activity represents the completion of one (1) samples relative to this inspection area (i.e., inspection procedure section 02.04a, b, c).

- CRs for the REMP (00196430, 00183946, 00169269, 00168083, 00113678, and 00105103);
- CRs for the Radioactive Material Control Program (00186378, 00162764, 00156781, 00156785, 00149240, 00143486, 00135324, 00130639, 00125697, and 00117837); and
- CRs for the Meteorological Monitoring Program (00191912, 00188049, 00193233, 00187219, 00183849, 00183574, 00179177, 00140724, 00107400, 00102481, 00130443, and 00108378).

b. Findings and Observations

No findings of significance were identified.

7. Inservice Inspection

a. Inspection Scope

The inspectors's reviewed a sample of corrective action reports associated with the inservice inspection program, as identified in the Attachment, to verify that Exelon was identifying issues at an appropriate threshold, entering them in the corrective action program, and taking appropriate corrective actions.

b. Findings and Observations

No findings of significance were identified.

8. ALARA Planning and Controls

a. Scope

The inspector reviewed twenty-five (25) Condition Reports and a Nuclear Oversight Department report, relating to maintaining personnel exposure ALARA, to evaluate the threshold for identifying, evaluating, and resolving problems in implementing the ALARA program. This review was conducted against the criteria contained in 10 CFR 20, Technical Specifications, and the licensee's procedures.

b. Findings and Observations

No findings of significance were identified.

40A3 Event Followup (71153 - 1 sample)

a. Inspection Scope

On January 13, 2004, the inspector responded to an event that involved a fault on a non safety related load center. The operations shift manager declared an Unusual Event based on the report of a loud noise, similar to an explosion, caused by the fault. The inspector observed control room operator actions, and reviewed Exelon's classification of the event as specified in plant procedures. The inspectors reviewed the following procedures:

- OT-101, "High Drywell Pressure"
- EP-AA-1008, "Radiological Emergency Plan Annex for Limerick Generating Station"

b. Findings

No findings of significance were identified.

4OA5 Other (2515/TI-154)a. Inspection Scope

Temporary Instruction 2515/TI-154, "Spent Fuel Material Control and Accounting at Nuclear Power Plants." Phase I and Phase II of the inspection was completed during this inspection period. Appropriate documentation was provided to NRC management as required.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including ExitExit Meeting

On April 6, 2004, the resident inspectors presented the inspection results to Mr. DeGregorio and other members of his staff, who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

4OA7 Licensee-identified Violations

The following violation of very low significance was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as an NCV.

- 10 CFR 50.47(b)(5) requires notification of offsite agencies during an actual event. 10 CFR Appendix E.D.3, further states that offsite notifications shall be made within 15 minutes after declaring the event. The licensee identified a performance problem related to inadequate training during an Unusual Event that occurred on January 13, 2004. The Emergency Communicator was not proficient at making notifications which led to the offsite notification being late by three minutes. Exelon entered this issue into their corrective action program as condition report 195048. This finding is of very low safety significance because the notification was delayed for a short duration and there was no impact on the offsite agencies for implementing their emergency plans because at this classification level offsite agency actions are minimal.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Exelon Generation Company

E. Callan	Director - Operations
T. Dougherty	Manager - Nuclear Oversight
B. Hanson	Plant Manager
W. Harris	Radiation Protection Manager
J. Karkoska	Mid-Atlantic Emergency Preparedness Manager
K. Kemper	Manager - Regulatory Assurance
J. Kraus	Senior Manager - Design Engineering
C. Mudrick	Director - Engineering
P. Orphanos	Shift Operations Superintendent
J. Perry	Director - Maintenance

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

NCV 05000352,353/2004002-01	Inadequate Corrective Actions for Faulty Breaker Charging Spring (Section 1R12).
NCV 05000352, 353/2004002-02	Inadequate Corrective Actions for Emergency Diesel Generator Relay (Section 1R15).

LIST OF DOCUMENTS REVIEWED

Section 1R08: Inservice Inspection Activities

GE-UT-209 Procedure for Automated Ultrasonic Examination of Dissimilar Metal Welds, and Nozzle to Safe End Welds

Station Work Order C0206603, NDE-VT-3 Exam

GE Inspection Services RT Reader for LG 1 049 PV, HV-049-1FO80, FW11

GE Inspection Services RT Reader for LG 1 049 PV, HV-049-1FO80, FW1001

QCP-300 Radiographic Examination of ASME/ANSI Components

GE-ASM-1061 Administrative Procedure for In Vessel Inspection

CR 206852 Condition Report, Welding Radiography Lessons Learned

GE Nuclear Energy March 1999 Discussion of Changes in Automated Examination Techniques and Results for Dissimilar Metal Nozzle to Safe End Welds from 1984-1999

BWRVIP-03 Revision 06 / TR-105696 "BWR Vessel and Internals Project, Reactor Pressure Vessel and Internals Examinations Guideline".

"Mechanical Stress Improvement and Fracture Mechanics Evaluation for the N2H Recirculation Inlet Nozzle-to-Safe-End weld Limerick Generating Station – Unit 1" September 1990

"Historical Documents Related to N2H" Dated 3/2004

Procedure 2R-AA-330 Rev 2 "Conduct of Inservice Inspection Activities"

BWR Rx Internals Management Program Activities Rev 2

Improvement for Fall 2003 Outages IVVI Performance Review Report C91927.1

Limerick Specific 1R10 Oversight Program

Oversight of Vendor NDE Activities ER-AA-335-025 Revision 0

VT-1 Visual Examination ER-AA-335-014 Rev 1

BWR Reactor Internals Management Program Activities ER-AB-331 Rev 2

Corrective Actions: CR00177759, CR00171398, CR001711406, CR00206852, CR0020663, CR00206974, CR00206560, CR00206566, CR00206572, CR00206662, CR00206680, CR00207022, CR00206984

Section 1R12: Maintenance Effectiveness

CRs 194107, 199580, 205820

ARs A1452996, A1453157

NER LI-04-024, 4 kV ABB HK Breaker Charging Spring Cycling

ER-LG-310-1010, "Maintenance Rule Implementation for Limerick Generating Station," Revision 32

LS-AA-125-1006, "CAP Process Expectations Manual," Revision 5

Section 1R14: Personnel Performance During Non-routine Plant Evolutions

OT-101, Rev. 24, High Drywell Pressure

EP-MA-114-100, Rev. 2, Mid-Atlantic State/local Notification

SY-AA-101-108, Rev. 2, Response to events maliciously directed at plant safety or security

OP-AA-106-101, Rev. 3, Significant Event Reporting Procedure

S43.7.A, Rev. 27, Manual Operation of Scoop Tube Positioners
Condition Report 195002
NF-AA-430 Failed Fuel Action Plan

Section 1R20: Refueling and Other Outage Activities

GP-2, "Normal Plant Shutdown"
GP-3, "Normal Plant Startup"
GP-6.1, "Shutdown Operations - Refueling, Core Alteration and Core Off-Loading"
GP-6.2, "Normal Plant Startup"
GP-13, "Control Rod Drive/Control Rod Blade Outage Maintenance Coordination"
ON-104, "Control Rod Problems"
ON-121, "Loss of Shutdown Cooling"
ON-125, "Loss of Fuel Pool Cooling"
S51.7.A, "Draining Reactor Well and Dryer/Separator Storage Pool with RHR"
S51.8.L, "RHR Alternate Decay Heat Removal Startup and Shutdown"
MA-AA-716-008, "Foreign Material Exclusion Program"
Design Specification 8031-M0176
LER 1-95-008
Action Requests: A0964111, A1412976, A1460024, A1459748
Condition Reports 209072, 205319
ECR 01-01146, 95-01080

Section 20S1: Access Control to Radiologically Significant Areas

PROCEDURES:

Cavity Decon and Drain-down Plan
GP-2, APPENDIX 6, Normal Plant Start-up - Health Physics
HPJS 7.5, Rev 4, Electron Capture Isotope Control
HPJS 11.1:2, Rev 4, SCRAM Response
HPJS-7.16, Health Physics Actions During a Reactor Start-up
LS-AA-125, Rev 6, Corrective Action Program (CAP) Procedure
RP-AA-210, Rev 4, Dosimetry Issue, Usage, and Control
RP-AA-250, Rev 2, External Dose Assessments From Contamination
RP-AA-270, Rev 2, Prenatal Radiation Exposure
RP-AA-350, Rev 1, Personnel Contamination Monitoring, Decontamination, and Reporting
RP-AA-376, Rev 1, Radiological Postings, Labeling, and Markings
RP-AA-400, Rev 2, ALARA Program
RP-AA-401, Rev 2, Operational ALARA Planning and Controls
RP-AA-403, Rev 1, Administration of the Radiation Work Permit Program
RP-AA-460, Rev 3, Controls for High and Very High Radiation Areas
RP-LG-460-0105, Rev 0, Drywell Entries at Power
RP-LG-460-1016, Rev 0, Radiation Protection Controlled Keys
RP-LG-460-2000, Rev 0, Addition High Radiation Exposure Controls
RP-LG-700-1001, Rev 0, Radiation Protection Instrumentation Operations Guidelines

Section 2OS2: ALARA Planning and Controls

PROCEDURES:

RP-AA-210, Rev 4, Dosimetry Issue, Usage, and Control
RP-AA-250, Rev 2, External Dose Assessments From Contamination
RP-AA-270, Rev 2, Prenatal Radiation Exposure
RP-AA-350, Rev 1, Personnel Contamination Monitoring, Decontamination, and Reporting
RP-AA-376, Rev 1, Radiological Postings, Labeling, and Markings
RP-AA-400, Rev 2, ALARA Program
RP-AA-460, Rev 3, Controls for High and Very High Radiation Areas
RP-LG-460-0105, Rev 0, Drywell Entries at Power
RP-LG-460-2000, Rev 0, Addition High Radiation Exposure Controls
RP-LG-460-1016, Rev 0, Radiation Protection Controlled Keys
RP-AA-401, Rev 2, Operational ALARA Planning and Controls
RP-AA-403, Rev 1, Administration of the Radiation Work Permit Program
GP-2, APPENDIX 6, Normal Plant Start-up - Health Physics
HPJS-7.16, Health Physics Actions During a Reactor Start-up
LS-AA-125, Rev 6, Corrective Action Program (CAP) Procedure
Cavity Decon and Drain-down Plan

CONDITION REPORTS:

208220, 207005, 203389, 206227, 199911, 206785, 207005, 208128, 201466, 201769,
206916, 195356, 195852, 197925, 198264, 199130, 206679, 205949, 194078, 197594,
205591, 207063, 206526, 206937, 207108

STATION ALARA COMMITTEE MEETING MINUTES:

Meeting Nos. 04-03, 04-02

NUCLEAR OVERSIGHT REPORTS:

NOS Weekly Updates for March 1-7, 2004

Section 4OA2: Identification and Resolution of Problems

CONDITION REPORTS and ACTION REQUESTS:

CR146966, CR162698, CR162284, CR152854, AR A1362338, CR185907, CR205919

CR 149191, AR A0403107, NCR 92-00188, NCR-92-00207, 00166248, 00167045, 00167202,
00167332, 00168193, 00169061, 00170305, 00170790, 00170799, 00171465, 00174260,
00176017, 00182244, 00184488, 00186916, 00187048

CR147485, CR164391, CR205365, CR157263, AR A1406673, AR A1457023, AR A1457107

STATION ALARA COUNCIL MEETING MINUTES:

Meeting Nos. 03-02, 03-05, 03-07

NUCLEAR OVERSIGHT REPORTS:

NOS Health Physics/Radiation Protection Audit Reports, 03-06
NOS Quarterly Assessment Report 03-3Q

FOCUSED AREA SELF ASSESSMENT REPORTS:

Radiation Protection, April 7 -14, 2003

PROCEDURES

LS-AA-125, "Corrective Action Program"
ST-6-041-202-2, "MSIV Cold Shutdown Valve Test," Revision 18
ST-6-107-200-0, "IST Valve Stroke Surveillance Log," Revision 18

LICENSEE EVENT REPORTS:

LER 2-03-002, "MSIV Closure Time Considerations," Revision 0

Section 40A7: Licensee Identified Violations

Limerick Generating Station Annex Emergency Plan
CR 195002, Unusual Event
CR 195048, Notification to the State/Local Counties Exceeded Procedural Requirements
CR 196325, Unannounced Table-Top Drill Conducted on "E" Crew
CR 197173, Unannounced Table-Top Drill Conducted on "D" Crew

LIST OF ACRONYMS

ABB	Asea Brown Bovari
ALARA	As Low As Reasonably Achievable
AP	ALARA Plan
AR	Action Request
ASME	American Society Mechanical Engineers
CFR	Code of Federal Regulations
CR	Condition Report
EAL	Emergency Action level
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
HDR	High Dose Rate
LER	Licensee Event Report
LGS	Limerick Generating Station
LHRA	Locked High Radiation Area
LOCA	Loss of Coolant Accident
MSIV	Main Steam Isolation Valve
NCV	Non-cited Violation
NOS	Nuclear Oversight
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PCE	Personnel Contamination Event
QA	Quality Assurance
RCA	Radiologically Controlled Area
RCIC	Reactor Core Isolation Cooling
REMP	Radiological Environmental Monitoring Program
RHR	Residual Heat Removal
RSPS	Risk Significant Planning Standards
RWP	Radiation Work Permit
SDP	Significance Determination Process
SSC	System, Structure, or Component
TIP	Traversing Incore Probe
TLD	Thermoluminescent dosimeter
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
VHRA	Very High Radiation Area
WIP	Work In Progress