



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
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KING OF PRUSSIA, PA 19406-1415

February 14, 2008

Mr. Charles G. Pardee  
Chief Nuclear Officer and Senior Vice President  
Exelon Generation Company, LLC  
200 Exelon Way  
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION - NRC INTEGRATED INSPECTION  
REPORT 05000352/2007005 AND 05000353/2007005

Dear Mr. Pardee:

On December 31, 2007, 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 18, 2007, 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.

Based on the results of this inspection, no findings of significance were identified.

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

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

Enclosure: Inspection Report 05000352/2007005 and 05000353/2007005  
w/Attachment: Supplemental Information

cc w/encl:

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Sincerely,  
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Paul G. Krohn, Chief  
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U.S. NUCLEAR REGULATORY COMMISSION

REGION 1

Docket Nos: 50-352, 50-353

License Nos: NPF-39, NPF-85

Report No: 05000352/2007005 and 05000353/2007005

Licensee: Exelon Generation Company, LLC

Facility: Limerick Generating Station, Units 1 & 2

Location: Sanatoga, PA 19464

Dates: October 1, 2007 through December 31, 2007

Inspectors: S. Hansell, Senior Resident Inspector  
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C. Acosta, Reactor Engineer  
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Approved by: Paul G. Krohn, Chief  
Projects Branch 4  
Division of Reactor Projects

Enclosure

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## SUMMARY OF FINDINGS

IR 05000352/2007005, 05000353/2007005; 10/01/2007 - 12/31/2007; Limerick Generating Station, Units 1 and 2; Routine Integrated Report.

The report covered a three-month period of inspection by resident inspectors and announced inspections by reactor inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

None.

## REPORT DETAILS

Summary of Plant Status

Unit 1 began this inspection period operating at full rated thermal power (RTP) and operated at full power the entire report period with the exception of routine control rod adjustments.

Unit 2 began this inspection period operating at full RTP and operated at full power the entire report period with the exception of routine control rod adjustments.

**1. REACTOR SAFETY****Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**1R04 Equipment Alignment (71111.04)Partial Walkdown (71111.04Q - 3 samples)a. Inspection Scope

The inspectors performed a partial walkdown of the plant systems listed below to verify the operability of redundant or diverse trains and components when safety-related equipment in the opposite train was either inoperable, undergoing surveillance testing (ST), or potentially degraded. The inspectors used plant Technical Specifications (TS), Exelon operating procedures, plant piping and instrumentation drawings (P&IDs), and the Updated Final Safety Analysis Report (USFAR) 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 walkdown, the inspectors evaluated material condition and general housekeeping of the system and adjacent spaces. The documents reviewed are listed in the Attachment. The inspectors performed walkdowns of the following areas:

- Unit 1 Reactor Core Isolation Cooling (RCIC) system;
- Unit 1 'A' Core Spray (CS) System with 1B CS Out of Service for Maintenance; and
- Unit 2 High Pressure Coolant Injection (HPCI) system.

b. Findings

No findings of significance were identified.

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

The inspectors conducted a tour of the ten areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that combustibles and ignition sources were controlled in accordance with Exelon's

administrative procedures, fire detection and suppression equipment was available for use, and that passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out-of-service, degraded, or inoperable fire protection equipment in accordance with the station's fire plan. The documents reviewed are listed in the Attachment. The inspectors toured the following areas:

- Unit 2 Battery Room 427;
- Diesel-Driven Fire Pump Room;
- Unit 1 Residual Heat Removal (RHR) Heat Exchanger and Pump Rooms;
- Unit 1 RCIC Pump Room;
- D12 Diesel Generator Room during Monthly ST;
- Auxiliary Equipment Room;
- Unit 2 HPCI Pump Room;
- Unit 2 Safeguard System Access Area Room;
- Unit 1 Standby Liquid Control and General Equipment Areas; and
- Unit 1 CS Pump Rooms A and C.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07 – 1 sample)

a. Inspection Scope

The inspectors reviewed the results of Exelon's inspections of the 1C RHR Pump Motor Oil Cooler. The inspectors also reviewed the results of performance testing to assess the capability of the oil cooler to operate as designed. The inspectors reviewed Exelon's response to Generic Letter (GL) 89-13 and their implementation of a testing and maintenance program for safety-related heat exchangers to meet the requirements of GL 89-13. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program – (71111.11- 3 samples)

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

a. Inspection Scope

On October 18, 2007, the inspectors observed two licensed operator requalification simulator scenarios. The first scenario included a simulated control rod insertion, reactor water cleanup system leak, and a failure of the reactor to scram automatically. The second scenario included a simulated loss of Division One direct current electrical power, a drywell unidentified water leak, and a loss of high pressure reactor water injection. The inspectors observed the performance of both operating crews responding to the simulator scenarios. The inspectors assessed licensed operator performance,

including operator critical tasks that measure operator actions required to ensure the safe operation of the reactor and protection of the nuclear fuel and primary containment barriers. The inspectors observed critiques from all the training evaluators at the conclusion of each scenario. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

.2 Biennial Review (71111.11B – 1 sample)

a. Inspection Scope

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

The inspectors reviewed documentation of operating history since the last requalification program inspection. Documents reviewed included NRC inspection reports and Exelon condition reports that involved human performance issues. The purpose of the review was to ensure operational events that occurred during the last two years were not indicative of possible training deficiencies. The inspectors also discussed facility operating events with the resident staff.

The inspectors reviewed the comprehensive written examinations, scenarios, and job performance measures (JPMs) that the facility administered during the weeks of October 22 and 29, 2007, to ensure the quality of these examinations met or exceeded the criteria established in the Examination Standards and 10 CFR 55.59. The inspectors observed facility staff administer opening examinations (JPMs and scenarios) to four crews.

Conformance with Simulator Specified in 10 CFR 55.46

The inspectors observed simulator performance during the conduct of the examinations, and reviewed simulator discrepancy reports to verify facility staff were complying with the requirements of 10 CFR 55.46. The inspectors reviewed a sample of simulator tests including transient, normal, and steady state tests, as well as core performance tests.

Conformance with Operator Licensing Conditions

The inspectors verified the operators were complying with the conditions of their license by reviewing the following:

- Six medical records. The records were complete; restrictions noted by the doctor were reflected on the individual's license; and physical exams were given within 24 months;
- Five proficiency watch-standing records and one reactivation record. Records indicated the licensed operators conformed with proficiency and reactivation watch-standing requirements of 10 CFR 55.53; and

- Remediation training records for eight licensed operators. These operators had failed either the scenario portion of an annual operating test, the JPM portion of an annual operating test, or a comprehensive written exam. The remediation records were acceptable.

#### Exelon's Feedback system

The inspectors interviewed operator requalification instructors, training and operations management, and two licensed operators for feedback regarding the implementation of the licensed operator requalification program. Interview results indicated that the requalification program was meeting the operator's needs; was responsive to their recommended changes; and that the program administrator had modified course content to include issues documented in recent industry operating experience and licensee event reports.

On November 6, 2007, the inspectors conducted an in-office review of licensee requalification examination results. These results reflected the operator's performance on the annual operating tests and the comprehensive written examinations. 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 inspectors verified that:

- Crew failure rate on the dynamic simulator was less than 20 percent (failure rate was 0 percent);
- Individual failure rate on the dynamic simulator test was less than or equal to 20 percent (failure rate was 0 percent);
- Individual failure rate on the walkthrough test (JPMs) was less than or equal to 20 percent (failure rate was 4.9 percent);
- Individual failure rate on the comprehensive written exam was less than or equal to 20 percent (failure rate was 4.9 percent); and
- More than 75 percent of the individuals passed all portions of the exam (90.2 percent of the individuals passed all portions of the exam).

The documents reviewed are listed in the Attachment.

#### b. Findings

No findings of significance were identified.

### .3 Biennial Requalification Review - Limited Senior Reactor Operator (LSRO) – (71111.11B – 1 sample)

#### a. Inspection Scope

On December 5, 2007, the inspectors conducted an in-office review of licensee annual operating tests for Limited Senior Reactor Operator (LSRO) licenses in 2007. 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 inspectors verified that:

- Crew failure rate was less than 20 percent (crew failure rate was 0 percent);
- Individual failure rate on the dynamic simulator test was less than or equal to 20 percent (individual failure rate was 0 percent);
- Individual failure rate on the walk-through test was less than or equal to 20 percent. (individual failure rate was 0 percent); and
- Overall pass rate among individuals for all portions of the exam was greater than or equal to 75 percent. (overall pass rate was 100 percent).

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12 - 2 samples)

a. Inspection Scope

The inspectors evaluated Exelon's work practices and follow-up corrective actions for structures, systems, and components (SSCs) and identified issues to assess the effectiveness of Exelon's maintenance activities. The inspectors reviewed the performance history of risk significant SSCs and assessed Exelon's extent-of-condition determinations for those issues with potential common cause or generic implications to evaluate the adequacy of the station's corrective actions. 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 selected SSC classifications, performance criteria and goals, and Exelon's corrective actions that were taken or planned, to evaluate whether the actions were reasonable and appropriate. The documents reviewed are listed in the Attachment. The inspectors performed the following samples:

- Toxic Gas Analyzers (a)(1) Determination, IR 616714; and
- Unit 2 RCIC System.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 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 risk assessments for the following:

- Unit 1 Division 4 Trip Unit Inverter Power Failure, IR 686796;
- B Control Room Emergency Fresh Air System (CREFAS) Trouble Alarm, IR 698223;
- D1 Diesel Generator Starting Air Solenoid Valve Porting Air Continuously, IR 703874; and
- Unit 1 and Unit 2 Maintenance Risk Assessments for Work Week 0751.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 7 samples)

a. Inspection Scope

For the seven operability evaluations described below, the inspectors assessed the technical adequacy of the 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 issue reports (IRs) to verify that Exelon identified and corrected deficiencies associated with operability evaluations. The documents reviewed are listed in the Attachment. The inspectors performed the following assessments:

- Standby Liquid Control Setpoint Margin Enhancement, IR 693501;
- Control Rods 02-19 and 06-47 High Temperatures >350° Fahrenheit, IR 684550;
- 1B Core Spray Surge Chamber Low Level Alarm, IR 674173;
- Unit 2 Main Stop Valve #2 Pilot Valve has Wrong Component Installed, IR 694712;
- Unit 2 Drywell Air Cooler Drain Flow Monitor, IR 683532;
- 1GTB-CG501 M1 Relay Damaged for D13 Diesel Generator, IR 690634; and
- Vendor Supplied HV-052-1 (2) 08-OP Actuator, IR 509511.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 – 4 samples)

a. Inspection Scope

The inspectors reviewed the four post maintenance tests (PMTs) listed below 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 applicable 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 performed the following samples:

- 1B RHR Pump, Valve, and Flow Test following a planned system maintenance period;
- D12 Diesel Generator Fast Start Operability Test Run following replacement of relays on D12 Emergency Diesel Generator;
- D11 Diesel Generator Test Run following air valve replacement; and
- 1B Core Spray Pump, Valve, and Flow Test following a planned system maintenance period.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 5 samples)

a. Inspection Scope

The inspectors witnessed the performance and reviewed test data for five STs that are associated with risk-significant SSCs. The review 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 had been met. The documents reviewed are listed in the Attachment. The inspectors reviewed STs for the following systems and components:

- ST-6-051-233-2, 2C RHR Pump, Valve, and Flow Test;
- ST-6-051-234-2, 2D RHR Pump, Valve, and Flow Test;
- Units 1 and 2 Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log/OPCON 1, 2, 3;
- ST-6-092-311-2, D21 Diesel Generator Slow Start Operability Test Run; and
- ST-6-055-230-1, Unit 1 HPCI Pump, Valve, and Flow Test.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 – 1 sample)

a. Inspection Scope

The inspectors reviewed the temporary modification listed below to ensure that installation of the test equipment did not adversely affect systems important to safety. The inspectors compared the temporary modification with the UFSAR and TSs to verify that the modification did not affect system operability or availability. The inspectors ensured that station personnel implemented the modification in accordance with the applicable temporary configuration change process. The inspectors also reviewed the impact on existing procedures to verify Exelon made appropriate revisions to reflect the

temporary configuration change. The documents reviewed are listed in the Attachment. The inspectors reviewed the following:

- Installation of Test Equipment on Unit 1 Main Generator Voltage Regulator.

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

**Cornerstone: Public Radiation Safety**

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems (71122.01-11 samples)

a. Inspection Scope

During the period December 17 thru 21, 2007, the inspector conducted the following activities to verify Exelon was properly maintaining the gaseous and liquid effluent processing systems to ensure that radiological releases were properly mitigated, monitored, and evaluated with respect to public exposure. The inspector reviewed implementation of these controls against the criteria contained in 10 CFR Part 20 and Part 50, Exelon's Offsite Dose Calculation Manual (ODCM), and Exelon's procedures. This inspection activity represents completion of eleven samples relative to this inspection area. The documents reviewed are listed in the Attachment. The inspector performed the following samples:

- The inspector reviewed the 2005 and the 2006 Annual Radiological Effluent Release Reports to verify that Exelon implemented the effluents program as required by Revision 23 of the ODCM. As part of this review, the inspector evaluated changes made to the ODCM in 2005 and 2006 to determine if the changes affected Exelon's ability to maintain doses as low as is reasonably achievable;
- The inspector walked down the major components of the Unit 1 and Unit 2 gaseous and liquid release monitoring systems, to verify that the system configurations complied with the UFSAR descriptions, and to evaluate equipment material condition. The inspector also reviewed the completed ST procedure associated with each monitor to demonstrate instrument operability.
- The inspector reviewed the relevant ST procedures and observed technicians collecting weekly air particulate filter and iodine cartridge samples. Airborne particulate and iodine samples were taken from the North Stack monitors (ST-5-076-815-0) and South Stack monitors (ST-5-076-815-1&2);
- The inspector reviewed the air cleaning system ST results for the High Efficiency Particulate-Absolute (HEPA) and charcoal filtration systems installed in Unit 1 and Unit 2 to ensure the components met their acceptance criteria, and discussed the results with the cognizant system manager. The inspector confirmed that the air flow rates were consistent with the UFSAR values. Systems reviewed included the 'A' and 'B' Standby Gas Treatment Systems, and the 'A' and 'B' Reactor Enclosure Recirculation Systems;

- The inspector reviewed the most current liquid and gaseous effluent monitor functional test results and calibration records to verify that the associated isolation functions and alarms were operable. The inspector evaluated the effluent radiation monitor setpoints for agreement with the ODCM requirements. Monitors reviewed included the North and South Stack monitors and the Liquid Radwaste Effluent monitor;
- The inspector reviewed liquid effluent discharge permits for the period of October 2005 through November 2007, and the associated ST procedure, Radwaste Discharge Permit (ST-5-061-570-0), for accuracy and completeness;
- The inspector reviewed liquid and gaseous effluent monthly, quarterly, and annual dose calculations for the period October 2005 through November 2007 to ensure that Exelon properly calculated the offsite dose from effluent releases, in accordance with the ODCM, and to determine if Exelon exceeded any performance indicator (PI) criteria contained in Appendix I of 10 CFR 50;
- The inspector reviewed the calibration records and quality control records for laboratory counting instrumentation (gamma detectors 1, 2, 3, and 4, and a liquid scintillation detector) used to characterize and quantify effluent samples. The inspector reviewed the results of Exelon's quarterly inter-laboratory (cross checks from the first quarter 2006 through the first quarter 2007) comparison program to verify the accuracy of effluent sample analyses performed by Exelon and to ensure that discrepancies were appropriately resolved;
- The inspector reviewed and discussed with station personnel the validation and verification results for the effluent software to ensure the software in use provides accurate dose calculations;
- The inspector reviewed relevant IRs, an Effluents Control Program self-assessment, an effluents program audit, and Nuclear Oversight Objective Evidence reports to evaluate Exelon's effectiveness for identifying, evaluating, and resolving effluent control issues. The inspector conducted this review against the criteria contained in 10 CFR 20, TSs, and Exelon's procedures; and
- The inspector reviewed Exelon's actions to evaluate and monitor potential ground water pathways that may contain radioactive materials from past spills and leaks. Included in this review were the Radiological Groundwater Protection Program procedure (CY-AA-171-400) and implementing procedures, the hydrogeologic investigative report, the monitoring well site map, recent sampling results, and the site 10 CFR 50.75(g) decommissioning records.

b. Findings

No findings of significance were identified.

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program (71122.03 – 11 samples)

a. Inspection Scope

The inspector conducted the following activities to verify that Exelon implemented the radiological environmental monitoring program (REMP) consistent with the site TSs and the Off-Site Dose Calculation Manual (ODCM) to validate that radioactive effluent releases met the design objectives of Appendix I to 10 CFR 50.

Additionally, the inspector verified that radiological surveys and controls were adequate to prevent the inadvertent release of radioactive material into the public domain. The inspector reviewed implementation of these controls against the criteria contained in 10 CFR 20 and 50, relevant TSs, and Exelon procedures.

The documents reviewed are listed in the Attachment. The inspector reviewed the following samples:

REMP Inspections (November 13 – 16, 2007)

- The inspector reviewed the 2005 and 2006 Annual Radiological Environmental Operating Reports and the 2006 Land Use Census Report to verify that the environmental monitoring programs were implemented as required by the ODCM (Revision 23);
- The inspector walked down four of six air sampling stations (Nos. 10S3, 11S1, 13C1, 14S1), five of five cow's milk sampling stations (Nos. 10F4, 18E1, 19B1, 23F1, 25C1), one of three vegetation sampling stations (No. 13S3), four of four drinking water stations (Nos. 15F4, 15F7, 16C2, 28F3), one of three river sediment sampling locations (No. 16B2), two of two surface water sampling stations, and 16 of 40 thermoluminescent (TLD) monitoring stations. The inspector determined if sampling locations were as described in the ODCM, and evaluated the sampling equipment material condition;
- As part of the walk down, the inspector observed the technician collect and prepare cow's milk samples for analysis, demonstrate water sample collection techniques, and verified that sampling techniques were performed in accordance with procedures;
- Based on direct observation and review of records, the inspector verified that the meteorological instrumentation was operable, calibrated, and maintained in accordance with the guidance contained in the UFSAR, NRC Safety Guide 23, and Exelon procedures. The inspector verified that the meteorological data readout and recording instruments in the control room and primary and backup towers were operable for wind direction, wind speed, temperature, and temperature difference. The inspector confirmed that redundant instrumentation was operable and that the annualized recovery rate for meteorological data was greater than 90 percent.
- During walkdowns, the inspector had technicians demonstrate the air and water sampling equipment was properly operating;
- The inspector reviewed IRs, Nuclear Oversight Audit and Objective Evidence Reports, management evaluations of sample collection, REMP contractor audits, and departmental self-assessment reports relevant to the ODCM requirements, to evaluate the threshold for which issues are entered into the corrective action program, the adequacy of subsequent evaluations, and the effectiveness of the resolution. The inspector also reviewed monthly RETS/ODCM effluent occurrence reports to evaluate the adequacy and timeliness of PI information;
- The inspector reviewed the results of Exelon's quarterly laboratory cross-check program to verify the accuracy of Exelon's environmental air filter, charcoal cartridge, water, biota, and milk sample analyses; and
- The inspector reviewed any significant changes made by Exelon to the ODCM as a result of changes to the land use census or sampler station modifications since the last inspection. The inspector also reviewed technical justifications for any change in

sampling location or frequency and verified Exelon performed the reviews required to ensure that the changes did not affect its ability to monitor the radiological condition of the environment.

#### REMP Inspections (December 17 - 21, 2007)

- The inspector reviewed the REMP contractor's procedure and observed the technician collecting environmental air particulate and air iodine samples at four locations (Nos. 10S3, 11S1, 13C1, 14S1) as specified in the ODCM. The inspector evaluated the material condition and the operability of the air sampling equipment, and confirmed that the technician complied with the sampling procedure.

#### Unrestricted Release of Material from the Radiologically Controlled Area (RCA)

- The inspector reviewed the contamination control procedures and guidance provided to personnel for monitoring potentially contaminated material leaving the RCA for unrestricted use; and
- The inspector inspected the radiation monitoring instrumentation (SAM-9, SAM-11, Frisker) to ensure it was appropriate for the radiation types potentially present, and to ensure that it was calibrated with appropriate radiation sources. The inspector reviewed Exelon's criteria for the survey and release of potentially contaminated material, verified that there was guidance on how to respond to an alarm which indicates the presence of contamination, and reviewed instrument alarm set points to ensure that radiation detection sensitivities are consistent with the NRC guidance contained in IE Circular 81-07 and IE Information Notice 85-92 for surface contamination, and HPPOS-221 for volumetrically contaminated material. The inspector also reviewed Exelon's procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters. The inspectors verified that Exelon has not established a release limit by altering the instruments sensitivity through such methods as raising the energy discrimination level or locating the instrument in a high radiation background area.

#### b. Findings

No findings of significance were identified.

### **4. OTHER ACTIVITIES**

#### 4OA1 Performance Indicator (PI) Verification (71151 – 19 samples)

##### a. Inspection Scope

The inspector sampled Exelon's submittal of the initiating events, mitigating systems, and barrier integrity performance indicators listed below to verify the accuracy of the data recorded from the third quarter of 2006 through the third quarter of 2007. The inspectors utilized performance indicator definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, to verify the basis in reporting for each data element. The inspectors reviewed various documents, including portions of main control room logs, issue reports, power history curves, work orders, and Mitigating System Performance Index (MSPI)

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. The inspectors performed the following samples:

Cornerstone: Initiating Events

- Unit 1 Unplanned Scrams per 7000 Critical Hours;
- Unit 2 Unplanned Scrams per 7000 Critical Hours;
- Unit 1 Unplanned Scrams with Complications; and
- Unit 2 Unplanned Scrams with Complications.

Cornerstone: Mitigating Systems

- Unit 1 Residual Heat Removal MSPI;
- Unit 2 Residual Heat Removal MSPI;
- Unit 1 Cooling Water Systems MSPI;
- Unit 2 Cooling Water Systems MSPI;
- Unit 1 Safety System Functional Failures; and
- Unit 2 Safety System Functional Failures.

Cornerstone: Barrier Integrity

- Unit 1 Reactor Coolant System Leak Rate;
- Unit 2 Reactor Coolant System Leak Rate;
- Unit 1 Reactor Coolant System Activity; and
- Unit 2 Reactor Coolant System Activity.

Cornerstone: Occupational Radiation Safety

- Occupational Exposure Control Effectiveness

The inspector reviewed implementation of Exelon's Occupational Exposure Control Effectiveness Performance Indicator Program. Specifically, the inspector reviewed IRs and associated documents for occurrences involving locked high radiation areas, very high radiation areas, and unplanned exposures against the criteria specified in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, to verify that Exelon identified and reported all occurrences that met the NEI criteria as performance indicators.

Cornerstone: Public Radiation Safety

- RETS/ODCM Radiological Effluent Occurrences

The inspector reviewed relevant effluent release condition reports for the period October 1, 2006 through September 30, 2007, for issues related to the public radiation safety performance indicator, which measures radiological effluent release occurrences that exceed 1.5 mrem/qtr whole body or 5.0 mrem/qtr organ dose for liquid effluents; 5mrad/qtr gamma air dose, 10 mrad/qtr beta air dose, and 7.5 mrad/qtr for organ dose

for gaseous effluents. This review included monthly and quarterly projected dose assessment results due to radioactive liquid and gaseous effluent releases, and dose assessment procedures to ensure Exelon met all the requirements of the performance indicator from the fourth quarter 2006 through the third quarter 2007.

Cornerstone: Physical Protection

- Fitness for Duty;
- Personnel Screening; and
- Protected Area Security Equipment.

The inspector reviewed Exelon's programs for gathering, processing, evaluating, and submitting data for the fitness-for duty, personnel screening, and protected area security equipment PIs. The inspector verified that the PIs had been properly reported as specified in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5. The review included Exelon's tracking and trending reports, personnel interviews, and security event reports for the PI data collected since the last security baseline inspection. The inspector noted from Exelon's submittal that there were no reported failures to properly implement the requirements of 10 CFR 73 and 10 CFR 26 during the reporting period.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 – 4 samples)

.1 Review of Items Entered into the Corrective Action Program (CAP)

a. Inspection Scope

As required by inspection procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed screening of 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. Assessment and Observations

No findings of significance were identified. The inspectors observed that issues selected for review were appropriately categorized and prioritized in accordance with Exelon's corrective action process.

.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 trends that could indicate the existence of a more significant safety issue. The

inspectors' review was focused on corrective maintenance issues identified within the CAP. The review also included a sample of system health reports and System Health Indicator Program (SHIP) Chronic Problem reports from June and September 2007.

b. Assessment and Observations

No findings of significance were identified. The inspectors observed that issues selected for review were appropriately categorized and prioritized in accordance with Exelon's corrective action process.

.3 Annual Sample: Emergency Service Water (ESW) Alarms

a. Inspection Scope

The inspector reviewed IRs associated with alarms on the ESW system to verify that prioritization of the resolution of the issue was commensurate with the issue's safety significance. The inspector reviewed the Issue Identification and Screening Procedure to verify that the significance classification of the issues was in accordance with Exelon's procedures. The inspector interviewed the system manager and reviewed work orders and procedures to verify corrective actions taken were appropriate.

b. Assessments and Observations

No findings of significance were identified.

The inspectors noted observations regarding timeliness of maintenance and nuisance alarms. With respect to the timeliness of maintenance, there have been nine IRs written on flow instrument FI-011-012B, "B ESW Differential Flow," since 1998 for high differential flow alarms. In August 2004, it was recommended that the instrument be replaced at the next scheduled opportunity. The work has been rescheduled eight times since then, and has most recently been rescheduled to week 23 of 2008.

With respect to nuisance alarms, annunciator "Service Water ESW Auto Initiated Valve Not Fully Open/Closed" will alarm when an ESW pump starts and one of the six automatically repositioning MOVs does not complete its stroke in 10 seconds. The alarm occurs each time an ESW pump is started because the slowest valve can take up to 48 seconds to reposition. According to the system manager, the system has been this way since plant startup, and the alarm is expected. Additionally, a review of two procedures, ST-6-011-231-0, "A Loop ESW Pump, Valve, and Flow Test," and RT-2-011-251-0, "ESW Loop A Flow Balance," does not indicate that the alarm is expected when starting an ESW pump. Though these items impact the quantity of nuisance alarms received in the Main Control Room, the inspectors verified that neither of these issues affect the operability of the ESW system.

.4 Annual Sample: Unit 1 and Unit 2 Recirculation Pump Seal Failures

a. Inspection Scope

The inspectors reviewed Exelon's corrective actions associated with IRs 489517 and 613865, regarding the failures of the 1A and 2A reactor recirculation pump (RRP) seals, respectively. The inspectors reviewed the apparent cause evaluation of the May 2006

1A RRP seal failure and the root cause investigation report of the April 2007 2A RRP seal failure. Both seal failures followed outages in which a piping modification had been installed to apply a differential pressure to the RHR shutdown cooling injection check valve by routing fluid from the back of the valve disc to the suction valve of the associated recirculation pump. The inspectors also reviewed the modification packages, piping and instrument drawings (P&IDs) for the RHR and reactor recirculation systems, venting procedures, vendor manuals for the pump seals, and interviewed the system manager for these systems.

b. Assessments and Observations

No findings of significance were identified.

In the apparent cause evaluation of the 1A RRP seal, examination of the degraded seal faces established that severe pitting, blistering, and erosion existed and had likely been the result of air intrusion following the piping modification and subsequent venting which had been inadequate. Exelon improved the venting procedure as a corrective action. The piping modification had also been installed in piping associated with the 1B RRP seal during the same outage, and the 1B RRP seal performed acceptably.

In the root cause investigation report of the 2A RRP seal, Exelon noted that the prior evaluation of the 1A RRP seal “did not identify how the air initially entered the [RHR] system or how the air migrated through the system.” The root cause investigation reached similar conclusions that air had entered the RHR system during the modification and had not been completely vented prior to operation of the pump, and was unable to be specific about air intrusion and migration. The corrective actions included additional improvements to the venting procedure, ultrasonic examinations to confirm the effectiveness of the revised venting process, and operational procedure changes to isolate the check valve differential pressure line prior to implementing shutdown cooling.

The inspectors determined that the root cause investigation was thorough, detailed, and reasonable, and that the corrective actions were appropriate and likely to address the root cause and causal factors. However, the inspectors noted that Exelon remained unable to explain how the 1A and 2A RRP seals had been degraded by the same circumstances and factors under which the 1B RRP had been unaffected and continued to perform acceptably. Combined with the inability to specifically determine the air intrusion and migration, this provides the possibility that planned corrective actions have overlooked a factor which could again cause seal degradation.

.5 Annual Sample: HPCI and RCIC Gross Fail Alarms

a. Inspection Scope

The inspectors reviewed Exelon’s corrective actions associated with IR 227455 regarding gross fail alarms associated with RCIC trip units FIS-049-\*N651 and FS-049-\*N659. The alarms were received during various HPCI and RCIC system testing. These trip units supply an input signal to the control logic for the RCIC minimum flow valves. The inspectors reviewed corrective actions for similar issue reports, the IR history of the numerous alarms, applicable test and venting procedures, preventative maintenance documentation, system flow diagrams, and interviewed the system manager for the HPCI and RCIC systems regarding the expected system response to

the instrument gross fail alarms. The inspectors also evaluated Exelon's actions against the requirements of the corrective action program.

b. Assessments and Observations

No findings of significance were identified.

In IR 227455, which was written on June 10, 2004, Exelon identified that numerous RCIC trip unit gross fail status lights and "RCIC Out-of-Service" alarms were received during performance of various HPCI and RCIC STs on both Unit 1 and Unit 2. At that time, Exelon suspected that air in the instrument lines of the flow transmitters that supply the trip units with a signal to be the cause of the gross fail alarms. Exelon created preventative maintenance (PM) tasks 385032 and 385033 to vent the instrument lines on a yearly basis. The station performed these PMs in September 2005, 2006, and 2007 for Unit 1 and September 2005 and August 2006 for Unit 2.

Since the PMs were initially performed, Exelon identified two instances of the gross fail alarms on September 6, 2006, and December 21, 2006 on Unit 1, and one instance on June 20, 2006 on Unit 2. Exelon attributed one of the two instances on Unit 1 to unacceptable venting during system performance. Following these additional occurrences, the station generated additional IRs (579970, 579917, and 579921) to decrease the gross fail setpoints of the instruments to lower their sensitivity to hydraulic perturbations in the systems. No additional instances of gross fail alarms were noted following this corrective action. Exelon determined and the inspectors confirmed that the gross fail alarms would not prevent the HPCI and RCIC systems from performing their safety functions.

40A6 Meetings, Including Exit

Exit Meeting Summary

On January 18, 2007, 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.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Exelon Generation Company

C. Mudrick, Site Vice President  
E. Callan, Plant Manager  
D. DiCello, Radiation Protection Manager  
R. Dickinson, Director Engineering  
R. Kreider, Manager, Regulatory Assurance  
J. Berg, System Manager, HPCI  
J. George, System Manager, RHR  
M. Gift, System Manager, Radiation Monitoring Systems  
R. Gosby, Radiation Protection Technician, Instrumentation  
R. Harding, Engineer, Regulatory Assurance  
L. Lail, System Manager, EDG  
D. Malinowski, Simulator Instructor  
J. Quinn, NSSS Systems Manager  
P. Supplee, Security Manager  
G. Weiss, System Manager, ESW  
B. Whitman, Security Operations Coordinator

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened

None

Closed

None

Discussed

None

## LIST OF DOCUMENTS REVIEWED

### **Section 1R04: Equipment Alignment**

#### Procedures

2S55.1A (COL); Equipment Alignment for Automatic Operation of HPCI System, Revision 16  
S40.1.A (COL), Valve Alignment to Assure Availability of the RCIC System, Revision 16  
S40.1.A, Normal RCIC Line-up for Automatic Operation, Revision 22

#### Drawings

8031-M-52, Sheet 1, Core Spray (Unit 1), Revision 47  
8031-M-52, Sheet 2, Core Spray (Unit 1), Revision 42  
8031-M-55, High Pressure Coolant Injection (Unit 2), Revision 49

### **Section 1R05: Fire Protection**

#### Procedures

2F-R-180, Unit 2 HPCI Pump Room 180, Elevation 177, Fire Area 57, Revision 5  
2F-R-370, Unit 2 Safeguards System Access Area Room 340, Elevation 217, Fire Area 67,  
Revision 7  
F-A-427, Unit 2 Class 1E Battery Room 427 (EL. 239) Fire Area 11, Revision 7  
F-A-542, Auxiliary Equipment Room 542, Fire Area 25, Revision 10  
F-D-311B, D12 Diesel Generator Room and Fuel Oil and Lube Oil Tank Room Rooms 311B  
and 312B (EL. 217) Fire Area 81, Revision 4  
F-R-102, Unit 1 A&C RHR Heat Exchanger and Pump Rooms 102 & 103 (EL. 177 & 201) Fire  
Area 32, Revision 5  
F-R-108, Unit 1 RCIC Pump Room 108 (EL. 177) Fire Area 33, Revision 7  
F-R-110, Unit 1 Core Spray Pump Room A, Elevation 177, Fire Area 35, Revision 5  
F-R-113, Unit 1 Core Spray Pump Room C, Elevation 177, Fire Area 36, Revision 5  
F-R-500, Unit 1 Standby Liquid Control and General equipment Areas, RWCU Components,  
FPCN Area, and Main Steam tunnel, Rooms 500 through 511, 519 and 523, Elevation  
283, 295, Fire Area 47, Revision 11

#### Miscellaneous

Limerick Generating Station Updated Final Safety Analysis Report, Chapter 9A

### **Section 1R07: Heat Sink Performance**

#### Procedures

M-051-011, RHR Pump Motor Partial Disassembly and Examination, Revision 3  
RT-2-011-398, Unit 1C RHR Motor Oil Cooler Heat Transfer Test, completed 10/05/2006  
RT-2-011-398, Unit 1C RHR Motor Oil Cooler Heat Transfer Test, completed 12/12/2006

#### Issue Reports and Action Requests

IR 568648, Evaluate RHR MOC Cleaning Frequency

#### Work Orders

R1044112  
R1055924  
R1552630

Drawings

115D8700, Cooling Coil (7/8" O.D. Tube), dated 03/29/1982

Calculations

LM-037, Evaluation of Heat Transfer Data for the Unit 1&2 RHR Motor Oil Coolers as Required by GL 89-13, Revision 0

Miscellaneous

E-11-C002-K3, Instruction Manual: Motor, Vertical RHR Pump Motor  
PECO Letter: Response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment", dated 01/29/1990  
PECO Letter: Response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment", dated 01/09/1991  
PECO Letter: Response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment", dated 08/05/1991  
PECO Letter: Response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment", dated 01/14/1992  
PECO Letter: Response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety Related Equipment", dated 10/19/1992  
System Health Overview Report: Emergency Service Water, dated June 2007  
System Health Overview Report: Emergency Service Water, dated September 2007  
UFSAR Table 9.2-3, Emergency Service Water System Design Flows and Heat Transfer Rates, Revision 13

**Section 1R11: Licensed Operator Regualification Program**

Procedures

EOP T-101, RPV Control, Revision 20  
EOP T-103, Secondary Containment Control, Revision 17  
EOP T-111, Level Restoration/Steam Cooling, Revision 13  
EOP T-112, Emergency Blowdown, Revision 12  
EOP T-117, Level/Power Control, Revision 15  
EP-AA-1008, Limerick Generating Station Emergency Action Level Matrix, Revision 8

Miscellaneous

LSES-0071, Licensed Operator Training Simulator Evaluation Scenario, Revision 0  
LSES-5010, Licensed Operator Training Simulator Evaluation Scenario, Revision 0

**Section 1R12: Maintenance Effectiveness**

Procedures

ER-AA-310, Implementation of the Maintenance Rule, Revision 6  
ER-AA-310-1003, Maintenance Rule - Performance Criteria Selection, Revision 3  
ER-AA-310-1004, Maintenance Rule - Performance Monitoring, Revision 5  
ER-AA-310-1005, Maintenance Rule - Dispositioning Between (a)(1) and (a)(2), Revision 5  
ER-LG-310-1010, Maintenance Rule Implementation, Revision 7

Issue Reports and Action Requests

IR 192497, New Toxic Gas Analyzers Blowing Fuses/Multiple Problems  
IR 466327, A Toxic Gas Analyzer Inop System Down Message  
IR 603701, Broken Electrical Connection on Covered Valve Position Indicator

IR 616714, System 078G-TGA Train Unavailability Exceeded MR (a)(1) Limit  
IR 622127, RCIC Vacuum Breaker Line High Temperature Alarm While Performing S49  
IR 622321, RCIC Vacuum Pump will not Run  
IR 628573, RCIC MOV OVLD OR PNR Loss DS14  
IR 628600, 2DA-09 Tripped on Thermals  
IR 641184, MCR Alarm 002-E2, Toxic Chemical Analyzer Trouble

Miscellaneous

E51-C001K-00002, RCIC Pump Vendor Manual  
E51-C002K-1, RCIC Turbine Vendor Manual  
Maintenance Rule Expert Panel Meeting Minutes from 05/01/2007, 05/22/2007, and 06/19/2007

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

ST-4-055-953-1, HPCI Vacuum Breaker Test, Revision 7  
ST-4-055-953-2, HPCI Vacuum Breaker Test, Revision 7  
ST-6-055-200-1, HPCI Valve Test, Revision 59

Issue Reports and Action Requests

IR 698223, B CREFAS Trouble Alarm Locked In  
IR 703874, D11 D/G Starting Air Solenoid Valve Porting Air Continuously  
IR 711282, HPCI Paragon Tests Schedule Conflict with D24

Work Orders

C0223135  
C0223196

Drawings

8031-M-20, Sheet 6, Fuel and Diesel Oil Storage and Transfer (Starting Air System Unit 1),  
Revision 46

Miscellaneous

Main Control Room Operator Logs dated 12/16/2007 – 12/23/2007  
Online Daily Plan for Work Week 0751  
Paragon Risk Assessment for 11/27/2007  
Paragon Risk Assessment for 12/16/2007 – 12/23/2007  
Work Status and Coordination Meeting Agenda, 11/15/2007

**Section 1R15: Operability**

Procedures

ST-6-052-760-1, Safeguard Piping Fill Quarterly Valve Test, Revision 14

Issue Reports and Action Requests

A1589343, Received MCR Alarms for '1B' CS Discharge Low Pressure  
A1612284, U2 DW Air Cooler Drain Flow Indication Has Risen  
A1616510, Table 1 EJ-7 in ST-2-087-600-2 Out of Acceptance Limits  
IR 338207, COND XFER to '2A' CS HDR VLV(S) Sticking  
IR 503311, Unexpected Alarm during ST-6-052-760-1  
IR 508141, Surge Chamber Low Level Alarm

IR 509511, Vendor Supplied HV-052-1(2)08-Op Actuator, Not Q  
IR 537663, Received MCR Alarms for '1B' CS Discharge Low Pressure  
IR 605723, MCR Received Loop 'A' Core Spray Surge Chamber Alarm  
IR 610078, Unit 2 'A' CS Line Surge Chamber Low Level  
IR 674173, 1B CS Surge Chamber Low Level Alarm Received During ST  
IR 683532, Transcription Error  
IR 684550, 02-19 CRD Drive Temperature >350 Degrees and Rising  
IR 684574, 06-47 HCU Drive Temperature >350 DEGF  
IR 690634, 1GTB-CG501 M1 Relay Damaged for D13 Diesel Generator  
IR 693501, SLCS PSV Setpoint Margin Enhancement  
IR 694712, Correct CRL Error and Replace Incorrect LVDT IN ZT-001-201D

Work Orders

R1055924

Drawings

8031-M-52, Sheet 1, Core Spray (Unit 1), Revision 47  
8031-M-52, Sheet 2, Core Spray (Unit 1), Revision 42

Miscellaneous

Limerick Generating Station Unit 2 Technical Specifications  
UFSAR Sec 5.2.5, Reactor Coolant Pressure Boundary Leak Detection System, Revision 13

**Section 1R19: Post Maintenance Testing**

Procedures

MA-AA-716-012, Post Maintenance Testing, Revision 10  
S92.1.O, Local and Remote Manual Startup of a Diesel Generator, Revision 47  
ST-6-051-232-1, B RHR Pump Valve and Flow Test, Revision 62, completed 11/05/2007  
ST-6-092-316-1, D12 Diesel Generator Fast Start Operability Test Run, Revision 34  
ST-6-107-200-0, IST Valve Stroke Surveillance Log, Revision 21, performed 12/08/2007

Issue Reports and Action Requests

A1639514, Regulator Fails to Bleed Off Air  
IR 700167, Regulator Fails to Bleed Off Air  
IR 706076, HV-011-201B Failed to Open During Throttle Valve Test  
IR 706078, HV-011-103B Failed to Open During Throttle Valve Test  
IR 706080, HV-011-104B Failed to Open During Throttle Valve Test

Work Orders

R0759625  
R0930058  
R1055924

Miscellaneous

Main Control Room Operator Logs dated 11/27/2007 – 12/03/2007

**Section 1R22: Surveillance Testing**

Procedures

ARC-MCR-001, D1, Condensate Transfer Pumps Trouble, Revision 0

ARC-MCR-210 D5, 2B/2D Core Spray RHR Pump Running, Revision 0  
ARC-MCR-213 I3, 2C RHR Pump Discharge Hi/Lo Pressure, Revision 0  
ARC-MCR-213 I5, Div 3 LPCI Line High Point Vent Low Level, Revision 0  
S51.1.A, Set up of RHR System for Automatic Operation in LPCI Mode, Revision 38  
S92.6.A, Transfer of a 4KV Safeguard Bus from 101 Safeguard Feed to 201 Safeguard Feed  
and Vice Versa, Revision 15  
ST-5-055-230-2, HPCI Pump, Valve, and Flow Test, Revision 58  
ST-5-107-596-2, Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log/OPCON  
1,2,3, performed 11/03/2007  
ST-6-051-233-2, C RHR Pump, Valve and Flow Test, Revision 44  
ST-6-051-234-2, D RHR Pump, Valve and Flow Test, completed 11/15/07  
ST-6-055-230-1, HPCI Pump, Valve, and Flow Test, Revision 67, performed 12/19/2007  
ST-6-092-311-2, D21 Diesel Generator Slow Start Operability Test Run, Revision 58, performed  
11/19/2007  
ST-6-107-596-1, Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log/OPCON  
1,2,3, performed 11/03/2007

Issue Reports and Action Requests

IR 309726, Div. 2 LPCI Line High Point Vent Low Level Alarm Not Clear  
IR 606767, 2A RHR Pump Discharge Hi/Lo Press Received during S51.6.B

Drawings

8031-M-51, Sheet 5, Residual Heat Removal (Unit 2), Revision 24  
8031-M-51, Sheet 7, Residual Heat Removal (Unit 2), Revision 17

Miscellaneous

Main Control Room Operator Logs dated 10/10/07

**Section 1R23: Temporary Plant Modifications**

Procedures

CC-AA-112, Temporary Configuration Changes, Revision 12  
MA-AA-716-010, Maintenance Planning, Revision 9

Issue Reports and Action Requests

A1637803, Unit 1 MVAR Step Change of 160 MVARs  
IR 690579, Instant MVAR Rise on U1  
IR 693158, Unit 1 MVAR Step Change of 160 MVARs

Work Orders

C0223108

**Section 2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems**

Procedures

ST-2-012-404-0, Radiation Monitoring – RHR Service Water Radiation Monitor; Division 1,  
Channel A Calibration/Functional Test, Revision 22  
ST-2-026-400-1, Radioactive Gaseous Effluent Monitoring – South Stack Effluent Monitor  
Channel A Calibration/Functional Test, Revision 17

- ST-2-026-400-2, Radioactive Gaseous Effluent Monitoring – South Stack Effluent Monitor Channel A Calibration/Functional Test, Revision 14
- ST-2-026-414-0, Radioactive Gaseous Effluent Monitoring – North Stack Effluent Monitor Channel A Calibration/Functional Test, Revision 21
- ST-2-063-400-0, Radioactive Liquid Effluent Monitoring – Liquid Radwaste Effluent Line Calibration/Functional Test, Revision 16

**Section 2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program**

Procedures

- CY-AA-170-000, Radioactive Effluent and Environmental Monitoring Programs, Revision 3
- CY-AA-170-100, Radiological Environmental Monitoring Program, Revision 2
- CY-AA-170-1000, Radiological Environmental Monitoring Program and Meteorological Program Implementation, Revision 2
- CY-AA-170-1100, Quality Assurance for Radiological Monitoring Programs, Revision 0
- CY-AA-170-210, Potentially Contaminated System Controls Program, Revision 0
- CY-AA-170-400, Radiological Groundwater Protection Program, Revision 1
- No. ER 10, Collection of Milk Samples for Radiological Analysis, Revision 8
- No. ER 5, Collection of Water Samples for Radiological Analysis, Revision 11
- No. ER 8, Collection of Air Particulate and Air Iodine samples for Radiological Analysis, Revision 8
- RP-AA-503, Unconditional Release Survey Method, Revision 1
- RP-LG-700-1001, Radiation Protection Instrumentation Operations Guidelines, Revision 2
- RP-LG-720, Calibration of on NE Technology Model SAM-9, Small Article Monitor, Revision 1
- RP-LG-750, Calibration of Thermo Scientific Small Article Monitor, Model SAM-11, Revision 0

Sampling Sites

- Air Particulate/Iodine: 10S3, 11S1, 13C1, 14S1
- Cow's Milk: 10F4, 18E1, 19B1, 23F1, 25C1
- Drinking Water: 15F4, 15F7, 16C2, 28F3
- Leafy Vegetation: 13S3
- River Sediment: 16B2
- Surface Water: 13B1, 24S1
- Thermoluminescent Dosimeters: 3S1, 5S1, 7S1, 10S3, 11S1, 14S1, 18S2, 21S2, 23S2, 25S2, 26S3, 29S1, 16F1, 29E1, 6C1, 17B1

Nuclear Oversight/Self-Assessment Reports

- ASSA No. 567516-04, REMP, Radioactive Material Control, Radioactive Effluents Programs
- LS-AA-126-1005, Radiological Liquid & Gaseous Effluents
- Audit Report No. 06-01-04-01, Air, Water, and Milk Sampling
- Audit Report No. 08-30-05-01, REMP Assessment
- NOSA-LIM-05-08, ODCM, REMP, and Environmental Monitoring Audit Report
- NOSPA-LG-07-3Q, Gaseous Rad Waste Program Controls

Issue Reports

484101	612355	658327	663786
518312	648857	660142	663892
523518	650812	663752	681718
544615	654269	663752	686815

Calibration Records

SAM Numbers 332528, 332530, 332531, 332532, 332533, 334210, 334211, 334212, 334213, 334214, 334219, 334220, 334827, 334828, 334829

Miscellaneous Reports

2005 and 2006 Annual Radioactive Effluent Release Reports  
Hydrogeologic Investigation Report Number 045136  
On-site Ground Water Monitoring Report, 2nd Quarter 2007

**Section 40A1: Performance Indicator (PI) Verification**

Procedures

CY-LG-120-105; Obtaining Samples from and Operation of the Reactor Enclosure Sample Station, Revision 5  
ER-AB-331-1006, BWR RCS Leakage Monitoring and Action Plan, Revision 0  
LS-AA-2100, Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage, Revision 5  
S51.5.A, Flushing of the RHR System Heat Exchanger Tube Side with Demineralized Water, Revision 17  
ST-5-041-885-1; Dose Equivalent I-131 Determination, Revision 15  
ST-5-041-885-2; Dose Equivalent I-131 Determination, Revision 11  
ST-6-107-596-1, Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log/OPCON 1,2,3, Revision 19, Performed October 2006 – November 2007  
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LER 1-06-004, Both Offsite Circuits Inoperable  
LER 2-06-001, HPCI Speed Control Failure  
LER 2-07-001, Scram Discharge Volume Vent and Drain Valves Failed Open Due to Clearance Planning Error  
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MSPI Derivation Report, Unit 1 RHR System Unreliability Index, September 2007  
MSPI Derivation Report, Unit 2 Cooling Water System Unavailability Index, September 2007  
MSPI Derivation Report, Unit 2 Cooling Water System Unreliability Index, September 2007  
MSPI Derivation Report, Unit 2 RHR System Unavailability Index, September 2007  
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NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 5  
Trend Plot of Reactor Water Level on April 24, 2007

### **Section 40A2: Identification and Resolution of Problems**

#### Procedures

LS-AA-120, Issue Identification and Screening Process, Revision 7  
RT-2-011-251-0, ESW Loop "A" Flow Balance, Revision 14  
S49.3.A, RCIC Fill and Vent, Revision 17  
S55.3.A, HPCI Fill and Vent, Revision 16  
ST-6-011-231-0, A Loop ESW Pump Valve and Flow Test, Revision 57  
ST-6-049-230-1, RCIC Pump, Valve and Flow Test, Revision 64  
ST-6-049-230-2, RCIC Pump, Valve and Flow Test, Revision 58  
ST-6-055-230-1, HPCI Pump, Valve and Flow Test, Revision 66  
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LG 00-01118, Replace HV-051-2F050B without Disc Position Ind., Rev 3 (DCP)  
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#### Issue Reports and Action Requests

A1050912, FDI-011-012B Fluctuating Indication  
A1156573, FDI-011-012B Spiking Flow  
A1166985, ESW Loop B Hi Diff Flow Alarm Won't Clear  
A1366023, B ESW Loop Diff Flow Indication Is Fluctuating  
A1383328, Flow Indicator Failed Upscale  
A1440816, Abnormal Flow Indication of 400 gpm Leakage from B ESW Loop  
A1477889, B ESW Loop Hi Diff Flow Indicator Reads Erroneously  
A1478957, Replace FDI-011-12B Due to Negative History  
A1580771, D ESW Pump Low Pressure Alarm  
A1590868, PSL-011-002B 'B' ESW Pump Disch. Lo Pressure Alarm  
A1610688, 2C-P501 Packing Leakoff Excessive (Complete)  
A1615940, 2C Circ Pump Step Change in Vibration  
A1620985, Spray Pond Level/Temp Alarming Before Setpoints Reached  
A1621992, 2C-P501 Excessive Packing Leakage (Complete)  
A1622672, Control Rod 22-35 Temp at 305 Deg F  
A1628676, Spray Pond Hi Temp Alarms Early  
IR 220816, Root Cause for RCIC Trip during HPCI Suction Swapover ST  
IR 225540, Unplanned LCO for RCIC Gross Fail  
IR 227455, RCIC Receives Gross Fail Status Lights during Various Tests  
IR 252784, U/2 RCIC Interrelationship with HPCI during PV&F Run  
IR 489517, 1A Recirc Pump Seal Investigation  
IR 496407, ESW Loop 'A' Hi Differential Flow Alarm  
IR 497092, A Loop ESW Hi Diff Flow  
IR 497757, HPCI HI Point Vent LO Lvl Alarm Came in During RCIC PV&F  
IR 501810, RCIC Gross Fails During HPCI PV&F  
IR 507065, Unexpected Alarm 010 C1  
IR 509293, Annunciator Alarms When it is Not Appropriate

IR 509297, Annunciator Alarms When It is Not Appropriate  
 IR 509298, Annunciator Alarms When it is Not Appropriate  
 IR 509301, Annunciator Alarms When It is Not Appropriate  
 IR 509459, A ESW Differential Flow Alarm Apparent Cause (65A)  
 IR 509471, A ESW Differential Flow Alarm Apparent Cause (64A)  
 IR 520361, FI-011-013B 'B' Loop ESW Flow Reads Low  
 IR 520653, D ESW Pump Discharge Low Pressure Alarm  
 IR 521642, D ESW PP Discharge LO Pressure" MCR Alarm Won't Reset  
 IR 527919, RCIC Gross Fail Alarm from FS-049-1N659  
 IR 528033, RCIC PV&F Test Revision Required  
 IR 528068, Received RCIC Gross Failure during RCIC P, V and F ST  
 IR 550856, PSL-011-002B 'B' ESW Pump Disch. LO Pressure Alarm  
 IR 566852, HPCI HI Point Vent LO Lvl Alarm Came in During RCIC P, V & F  
 IR 572291, Unit 1 RCIC Gross Fail during HPCI Pump, Valve and Flow ST  
 IR 579910, Lower U1 HPCI Gross Fail Setpoints  
 IR 579917, Lower U2 RCIC Gross Fail Setpoints to Prevent Spurious Alarm  
 IR 579921, Lower U2 HPCI Gross Fail Setpoints to Prevent Spurious Alarm  
 IR 582056, Received MCR Alarm ESW Loop B Hi Diff Flow  
 IR 606532, ESW Loop B Hi Diff Flow Alarm  
 IR 612083, 2C-P501 Packing Leakoff Excessive  
 IR 612647, Drive Mechanism Temperature for HCU 30-35 is @429 Degrees F  
 IR 613865, Unidentified Drywell Leakage Post 2R09  
 IR 627595, 2C Circ Pump Surge Capacitor Damaged  
 IR 628965, 2C Circ Pump Step Change in Vibration  
 IR 639934, Spray Pond Lo Level/Hi Temp Alarm Locked In  
 IR 642442, NOS ID'd Procedure Deficiency (S49.3.A)  
 IR 643596, Spray Pond Level/Temp Alarming Before Setpoints Reached  
 IR 645466, 2C-P501 Excessive Packing Leakage  
 IR 648107, Control Rod 22-35 Temp at 305 Deg F (Completed)  
 IR 649388, Hairline Crack Identified on Yoke  
 IR 649806, 2C-P501-DR Temp Cooling  
 IR 654068, Hairline Crack Identified on Yoke  
 IR 654070, Hairline Crack Identified on Yoke  
 IR 662003, ESW Loop Comparison > 10% (Repeat Issue)  
 IR 665262, Spray Pond Hi Temp Alarms Early  
 IR 668592, WW0736 Unit 1 RCIC SOW Operations Lessons Learned  
 IR 672315, 2C-P501 High Packing Leak Off

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8031-M-11, Emergency Service Water (Unit1, Unit 2, and Common), Revision 68  
 8031-M-49, Reactor Core Isolation Cooling (Unit 1), Revision 51  
 8031-M-49, Reactor Core Isolation Cooling (Unit 2), Revision 47  
 8031-M-50, RCIC Pump Turbine (Unit 1), Revision 35

8031-M-50, RCIC Pump Turbine (Unit 2), Revision 10  
8031-M-55, High Pressure Coolant Injection (Unit 1), Revision 53  
8031-M-55, High Pressure Coolant Injection (Unit 2), Revision 49  
8031-M-56, HPCI Pump/Turbine (Unit 1), Revision 39  
8031-M-56, HPCI Pump/Turbine (Unit 2), Revision 11

Miscellaneous

FIS-049-1N651, Instrument Calibration Sheet  
FIS-049-2N651, Instrument Calibration Sheet  
FS-049-1N659, Instrument Calibration Sheet  
FS-049-2N659, Instrument Calibration Sheet  
FT-049-1N003, Instrument Calibration Sheet  
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System Health Overview Report: RHRSW, September 2007

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access Management System
AR	action request
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CNO	Chief Nuclear Officer
CREFAS	control room emergency fresh air system
CS	core spray
EDG	emergency diesel generator
ESW	emergency service water
GL	Generic Letter
HEPA	high efficiency particulate absolute
HPCI	high pressure coolant injection
IMC	Inspection Manual Chapter
IR	issue report
JPM	job performance measures
LER	Licensee Event Report
MSPI	mitigating system performance index
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OA	other activities
ODCM	Off-Site Dose Calculation Manual
P&ID	pipng and instrumentation drawing
PARS	Publicly Available Records
PI	performance indicator
PM	preventive maintenance
PMT	post-maintenance test
RCA	radiologically controlled area
RCIC	reactor core isolation cooling
REMP	Radiological Environmental Monitoring Program
RHR	residual heat removal
RRP	reactor recirculation pump
RTP	rated thermal power
SDP	significance determination process
SHIP	system health indicator program
SSC	structure, system, component
ST	surveillance test
TS	technical specification
UFSAR	updated final safety analysis report