

February 1, 2007

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

SUBJECT: LIMERICK GENERATING STATION - NRC INTEGRATED INSPECTION
REPORT 05000352/2006005 AND 05000353/2006005

Dear Mr. Crane:

On December 31, 2006, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Limerick Generating Station Units 1 and 2. The enclosed inspection report documents the inspection results which were discussed on January 9, 2007, with Mr. R. DeGregorio and other members of your staff.

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

This report documents one NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of an NRC requirement. However, because of the very low safety significance and because it is entered into your corrective action program, the NRC is treating this violation as a non-cited violation (NCV), consistent with Section VI.A.1 of the NRC's Enforcement Policy. If you contest the 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, Washington, D.C. 20555-0001; with copies to the Regional Administrator 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.

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

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Sincerely,

/RA/

Mel Gray, Chief
Projects Branch 4
Division of Reactor Projects

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

Enclosure: Inspection Report 05000352/2006005 and 05000353/2006005
w/Attachment: Supplemental Information

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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: 05000352/2006005 and 05000353/2006005

Licensee: Exelon Generation Company, LLC

Facility: Limerick Generating Station, Units 1 & 2

Location: Sanatoga, PA 19464

Dates: October 1, 2006 through December 31, 2006

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SUMMARY OF FINDINGS

IR 05000352/2006-005, 05000353/2006-005; 10/01/2006 - 12/31/2006; Limerick Generating Station, Units 1 and 2; Followup of Events and Notices of Enforcement Discretion.

The report covered a 3-month period of inspection by resident inspectors and announced inspections by regional reactor inspectors. Inspectors identified one green non-cited violation (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be green or 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.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

Green. The inspectors identified a Green non-cited violation (NCV) of 10 CFR 50 Appendix B Criterion XVI, "Corrective Actions," because a condition adverse to quality related to a non-conservative offsite electrical voltage calculation was identified by Exelon in March 2005, but was not promptly corrected. The untimely corrective actions contributed to a missed Technical Specification limiting condition for operation for the required offsite electrical power supplies for Units 1 and 2 for a two day period in July 2006. Exelon completed a revision to the electrical grid voltage calculation, in September 2006, and adjusted the safeguards transformer tap changer settings to prevent a potential loss of offsite electrical power for a single Unit trip in conjunction with a postulated loss of coolant accident event. Exelon has entered this issue into their corrective action program for resolution.

The Region I Senior Risk Analyst (SRA) determined that this issue is of very low safety significance (Green) based on a Phase 3 risk evaluation. The Phase 3 analysis used the Limerick SPAR model, assuming that, for a two day period, any loss-of-coolant accident (LOCA) initiating event would also cause a loss of offsite power. The SPAR model identified a core damage increase that was several orders of magnitude below the 1 in 10,000,000 year range (E-7). This very small increase was driven by the low frequency of LOCA initiating events and the short exposure time. The dominate core damage sequence, given a LOCA without offsite power, was a failure of all EDGs due to a common cause.

This issue has a cross-cutting aspect in the area of problem identification and resolution because Exelon personnel did not take corrective action to revise the voltage regulation calculation and modify tap changer settings in a timely manner commensurate with the safety significance and complexity of the problem. Specifically, the voltage regulation study calculation was not revised in a timely manner such that the operability of the offsite power sources was impacted in July 2006. (Section 4OA3)

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 began this inspection period operating at full rated thermal power 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 rated thermal power 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

1R02 Evaluations of Changes, Tests, or Experiments (IP 71111.02)
(22 samples: 7 Safety Evaluations; 15 Screened-out Evaluations)

a. Inspection Scope

The inspectors reviewed seven Safety Evaluations (SE). The selected SE were reviewed to verify that Exelon reviewed and documented changes to the facility or procedures as described in the Updated Final Safety Analysis Reports (UFSAR) in accordance with 10 CFR 50.59, and that the safety issues pertinent to the changes were properly resolved or adequately addressed. The reviews also included the verification that Exelon had appropriately concluded that the changes and tests could be accomplished without obtaining license amendments. The SEs reviewed are listed in the supplemental information attachment.

The inspectors also reviewed 15 screened-out evaluations for changes, tests and experiments for which Exelon determined that SEs were not required. Inspectors performed this review to verify that Exelon's threshold for performing SEs was consistent with 10 CFR 50.59. The listing of the screened-out evaluations reviewed are listed in the supplemental information attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdown (71111.04Q - 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of plant systems to verify the operability of redundant or diverse trains and components when safety equipment in the opposite train was either inoperable, undergoing surveillance testing, or potentially degraded. The inspectors used plant Technical Specifications (TS), Exelon operating procedures, plant piping and instrumentation drawings (P&IDs), and the 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 conditions and general housekeeping of the system and adjacent spaces. The inspectors reviewed the following plant system alignments:

- Unit 2 'C' Residual Heat Removal System (RHR) during 'A' RHR System Maintenance
- Unit 2 High Pressure Coolant Injection System (HPCI) During Increased Risk for Planned Work on the Unit 2 Offsite Power Electrical Source
- Unit 2 'D' Core Spray Room Cooler 2H-V211 with the 2D-V211 Inoperable due to an Emergency Service Water Leak
- Emergency Diesel Generator (EDG) and 4 kilovolt (kV) Switchgear Rooms Following Restoration of the 201 Safeguard Transformer and Realignment of 4kV Emergency Bus Feed Breakers

b. Findings

No findings of significance were identified.

1R05 Fire Protection

Fire Protection - Tours (71111.05Q - 9 samples)

a. Inspection Scope

The inspectors conducted a tour of the nine 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 compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with Exelon's fire plan.

- Unit 1 Reactor Core Isolation Cooling Room
- Unit 2 Reactor Core Isolation Cooling Room
- Unit 1 High Pressure Coolant Injection Room
- Unit 2 High Pressure Coolant Injection Room
- Unit 2 Start-up Bus 20 Room
- Unit 2 283' Elevation
- Main Control Room Following Security Modifications
- 'A' Main Control Room Chilled Water Room
- Unit 1 Turbine Enclosure Heating, Ventilation and Air Conditioning Area 304' Elevation

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 - 1 sample).1 Internal Floodinga. Inspection Scope

The inspectors reviewed documents and inspected structures, systems, and components (SSC) relative to the adequacy of internal flood protection measures for safety related and risk significant systems and structures. The inspectors interviewed plant personnel, performed walkdowns of the relevant areas to verify the adequacy of water tight doors, flood mitigation doors, and other flood protection features. The inspectors verified that adequate procedures were in place to identify and respond to floods. The inspectors verified the adequacy of flood protection measures for:

- Unit 1 and Unit 2 High Pressure Coolant Injection Rooms

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11 - 2 samples)Annual Requalification Review (71111.11 - 1 sample)a. Inspection Scope

On November 2, 2006, the inspectors conducted an in-office review of licensee annual operating test results for 2006. (Limerick training staff did not administer a comprehensive written exam because their two year requalification cycle will not conclude until December 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 the:

- Crew failure rate was less than 20 percent (crew failure rate was 9 percent)
- Individual failure rate on the dynamic simulator test was less than or equal to 20 percent (individual failure rate was 9 percent)
- Individual failure rate on the walk-through test was less than or equal to 20 percent. (individual failure rate was 2 percent)
- Overall pass rate among individuals for all portions of the exam was greater than or equal to 75 percent. (overall pass rate was 91 percent)

b. Findings

No findings of significance were identified.

Resident Inspector Quarterly Review (1 sample)

a. Inspection Scope

On October 4, 2006, the inspectors observed a licensed operator requalification simulator scenario. The inspectors assessed the licensed operator performance and the training evaluator's critique. The review included the satisfactory completion of all critical tasks that measure operator actions required to ensure the safe operation of the reactor and the protection of the nuclear fuel and primary containment barriers. The inspectors discussed the results with operators, operations management, and training instructors.

- LSES-5001, Loss Of Offsite Power (LOOP) with a Loss of Coolant Accident (LOCA)

1R12 Maintenance Effectiveness (71111.12Q - 1 sample)

a. Inspection Scope

The inspectors evaluated Exelon's work practices and follow-up corrective actions for 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 Exelon'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 classification, performance criteria and goals, and Exelon's corrective actions that were taken or planned, to verify whether the actions were reasonable and appropriate. The inspectors reviewed the following issues:

- Review of Maintenance Rule Determination for Multiple Motor Operator Valves that did not Stroke Open or Closed when Actuated

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors evaluated the effectiveness of Exelon's maintenance risk assessments required by paragraph a(4) of 10 CFR 50.65. This inspection included discussion with control room operators and risk analysis personnel regarding the use of Exelon's online risk monitoring software. The inspectors reviewed equipment tracking documentation, daily work schedules, and performed plant tours to gain reasonable assurance that the

actual plant configuration matched the assessed configuration. Additionally, the inspectors verified that Exelon's risk management actions, for both planned and/or emergent work, were consistent with those described in ER-AA-600-1042, "On-line Risk Management." Risk assessments were reviewed for the following out-of-service or degraded systems, structures, and/or components:

- HV-011-046 Emergency Service Water Return Valve to Spray Pond, Open Stroke Time in 'Alert', IR 541499
- HV-051 2F027A; "Unit 2 'A' Residual Heat Removal Suppression Chamber Spray Valve". did not Open During Stroke Time Test, IR 548957
- Unit 2 Division 2 NUMAC Steam Line Detection Module failure, resulted in the isolation of Unit 2 High Pressure Coolant Injection, IR 541155
- Unit 2 High Pressure Coolant Injection Ramp Generator Replacement, A1588709
- '2D' Residual Heat Removal Unit Cooler Valve Did Not Stroke Full Open During a Surveillance Test, IR 549672
- 'A' Main Control Room Chiller Leak on the Emergency Service Water Drain Line, IR 561897

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 5 samples)

a. Inspection Scope

For the five operability evaluations described in the issue reports (IRs) listed below, the inspectors evaluated the technical adequacy of the evaluations to ensure that Exelon properly justified TS operability and verify 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 controlled adequately. The inspectors also reviewed a sample of issue reports to verify that Exelon identified and corrected deficiencies associated with operability evaluations.

- Implementation of In-Service Test Programmatic Controls for HV-011-096 in 'Alert' Range, IR 541499
- Unit 2 Control Rod #54-47 Position Indication Failed, IR 551771
- Unexpected D12 Emergency Diesel Generator Out of Service Alarms, IR 556759
- Unit 2 Jet Pump Differential Pressure Outside Normal Band, IR 561890
- Changes to the Offsite Electrical Power Voltage Regulation Calculation, IR 528308

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

.1 Annual Review (IP 71111.17A - 1 sample)

The inspectors reviewed the proposed modification to change the location for injecting noble metals into the Unit 2 reactor coolant system. In addition, the inspectors performed a walkdown of the modification in the reactor building. Exelon plans to change the location of the noble metals injection point to allow easier access and without the need for scaffolding.

- Change to the Noble Metals Injection Location for the Unit 2 Reactor, IR 560628

.2 Biennial Review (IP 71111.17B - 8 samples)

a. Inspection Scope

The inspectors reviewed eight risk-significant plant modification packages selected from the design changes that were completed within the past two years. The inspectors performed the review to verify that the design bases, licensing bases, and performance capability of risk significant SSCs had not been degraded through the modifications.

For the accessible components associated with the modifications, the inspectors also walked down the systems to detect possible abnormal installation conditions. The inspectors reviewed the design inputs, assumptions, and design calculations of the selected modifications to determine the design adequacy. For the replacement components, the inspectors verified material compatibility and seismic qualification. Response time for SSCs was verified to be within the limits assumed by design analysis. The inspectors reviewed the post-modification testing to verify that it was adequate to ensure the SSC would function in accordance with its design. Inspectors reviewed the 10 CFR 50.59 screens or evaluations for the modifications to verify that Exelon personnel reviewed and documented the plant changes in accordance with 10 CFR 50.59. The inspectors reviewed the affected procedures, drawings, and UFSAR sections to verify that the affected documents were appropriately updated. The modifications reviewed are listed in the supplemental information attachment.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed the six 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 basis and design basis documents. The inspectors also

witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- Unit 2 High Pressure Coolant Injection System Full Flow Test Following Ramp Generator Replacement, IR 544200
- Manual Ultra Sonic Testing of an Emergency Service Water Leak at the Unit 2 2D-V211 Core Spray Room Cooler to Determine System Operability
- D12 Emergency Diesel Generator Relay Replacement and PMT to Determine Operability, C0219386
- Unit 1 Drywell Chiller Bearing Oil Temperature Switch Replacement and PMT, A1594841
- Retest for 'A' LOOP Emergency Service Water Valve 11-0063, ST-06-011-231-0
- Unit 2 Reactor Core Isolation Cooling Pump Valve and Flow Test After Trip Unit Replacement, ST-6-049-230-2

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 5 samples)

a. Inspection Scope

The inspectors witnessed the performance and/or reviewed test data for the following five surveillance tests that are associated with selected 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.

- RT-2-050-408-1, Reactor Core Isolation Cooling - Pump Suction Pressure - Low Calibration/Functional Test
- ST-2-088-321-1, Remote Shutdown System Division 1 Residual Heat Removal Operability Test
- ST-2-088-414-1, Remote Shutdown System - Reactor Core Isolation Cooling Turbine Trip Indication Calibration
- D13 Emergency Diesel Generator 24 Hour Endurance Test
- Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log/OPCON 1,2,3

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness1EP4 Emergency Action Level (EAL) and Emergency Plan Changes (7114.04 - 1 sample)a. Inspection Scope

During this quarter, a NRC senior emergency preparedness specialist performed an in-office review of recent changes made to the Limerick EAL, the emergency plan, and its implementing procedures. These changes were made in accordance with 10 CFR 50.54(q), which the licensee determined did not result in a decrease in effectiveness to the emergency plan and concluded that the changes continued to meet the requirements of 10 CFR 50.47(b) and Appendix "E" to 10 CFR 50. During this in-office inspection, the inspector conducted a sampling review of the changes that could potentially result in a decrease in effectiveness. This review does not constitute an approval of the changes and, as such, the changes are subject to future NRC inspection. The inspector sampled associated 10 CFR 50.54(q) reviews for recent changes that were made. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 4. The requirements in 10 CFR 50.54(q) were used as reference criteria.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06 - 2 samples)a. Inspection Scope

The inspectors evaluated two licensed operator requalification simulator exercise evaluations to identify the timing and adequacy of classification, notification and protective action recommendation (PAR) development activities. During the simulator evaluations, the inspectors reviewed checklists and forms used for classification and notification activities, and compared them to the criteria in Exelon's Emergency Plan, EP-MA-114-100-F-01, "State/Local Event Notification Form," and supporting procedures.

- Simulator Exercise Evaluation: General Emergency Classification due to a Simulated Failure to Scram with a Loss of the Main Turbine on October 26, 2006
- Simulator Exercise Evaluation: General Emergency Classification due to a Simulated Loss of Coolant Accident with no Low Pressure Emergency Core Cooling Pumps Available to Inject Water into the Reactor Vessel on November 14, 2006

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151 - 9 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittals for the performance indicators listed below to verify the accuracy of the data recorded from the fourth quarter of 2004 through the third quarter of 2006 (unless otherwise noted). The inspectors utilized performance indicator definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 4 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 licensee event reports (LERs). When appropriate, the inspectors observed the performance of various plant evolutions, including reactor coolant chemistry sampling. 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.

Cornerstone: Initiating Events (1 sample)

- Unit 2 Unplanned Transients per 7000 Critical Hours

Cornerstone: Mitigating Systems (2 samples)

- Unit 1 Safety System Functional Failures
- Unit 2 Safety System Functional Failures

Cornerstone: Barrier Integrity (4 samples)

- Unit 1 Reactor Coolant System Leakage
- Unit 2 Reactor Coolant System Leakage
- Unit 1 Reactor Coolant System Activity
- Unit 2 Reactor Coolant System Activity

Cornerstone: Occupational Radiation Safety (1 sample)

- Occupational Exposure Control Effectiveness

The inspectors reviewed implementation of Exelon's Occupational Exposure Control Effectiveness Performance Indicator Program. Specifically, the inspectors reviewed issue reports and associated documents for occurrences involving locked high radiation areas, very high radiation areas, and unplanned exposures for the fourth quarter of 2005 through the third quarter of 2006 to verify that Exelon personnel identified and reported all occurrences that met the NEI criteria as performance indicators.

Cornerstone: Public Radiation Safety (1 sample)

- RETS/ODCM Radiological Effluent Occurrences

The inspectors reviewed effluent release reports for the period of October 1, 2005, through September 30, 2006, for issues related to the public radiation safety performance indicator. The indicator measures radiological effluent release occurrences that exceed 1.5 mrem/qtr whole body or 5.0 mrem/qtr organ dose for liquid effluents; 5 mrad/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 projected dose assessment results due to radioactive liquid and gaseous effluent releases, quarterly projected dose assessment results due to radioactive liquid and gaseous effluent releases, and dose assessment procedures to ensure that Exelon met all requirements of the performance indicator from the fourth quarter 2005 through the third quarter of 2006.

- b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

- .1 Review of Items Entered into the Corrective Action Program

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 Exelon's corrective action program (CAP). The inspectors accomplished this by reviewing the description of each new issue report, attending management review committee meetings, and accessing Exelon's computerized database.

- .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 corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on completed maintenance department issues that were captured in the corrective action program. The inspectors reviewed maintenance department Level 3 condition reports (CR) that remained open as of October 2006. The inspectors reviewed and evaluated completed actions against the guidance in LS-AA-125, "Corrective Action Program (CAP) Procedure."

- 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. Additionally, the maintenance department was

identifying, trending, and developing appropriate actions with regard to motor operated valve problems.

The inspectors noted an increased trend related to valves not stroking from open to close and from close to open when operated from the main control room and remote shutdown panel. In 2006, there were twelve valves that did not operate properly when manipulated by the control room operators. In 2005, there were four valve problems. Most of the valve problems were the result of the 480 volt alternating current (VAC) breaker open or closed contactors not providing a permissive signal for the motor operated valve logic to result in valve movement.

Exelon personnel were aware of the valve problems and the twelve failures were entered into the corrective action program. In addition, due to the higher failure rate in 2006, Exelon personnel were performing a detailed root cause review to determine the potential common causes of the valve problems.

.3 Permanent Plant Modifications Biennial Inspection

a. Inspection Scope

The inspectors reviewed issue reports associated with 10 CFR 50.59 issues and plant modification issues to ensure that Exelon was identifying, evaluating, and correcting problems associated with these areas and that the planned or completed corrective actions for the issues were appropriate.

b. Assessment and Observations

No findings of significance were identified.

4OA3 Event Followup (71153)

.1 (Closed) LER 05000352/01-06-003, Accident Monitoring Channel Inoperable for Longer than Technical Specification Allowed Outage Time

On April 22, 2006, Unit 1 was operating at 100 percent power when the reactor operator identified that the suppression chamber air temperature recorder indication pen failed downscale. Exelon personnel identified that the temperature recorder cable connector was disconnected. The recorder connector was re-connected and the temperature indication returned to normal. Exelon personnel determined that the indication failed downscale on April 9, 2006, during the replacement of the temperature recorder strip chart paper. TS 3.3.7.5, "Accident Monitoring Instrumentation," requires one channel of suppression chamber air temperature to be operable. If the temperature recorder is inoperable, the TS requires the channel to be restored within 48 hours or place the plant in a hot shutdown condition within the next 12 hours. Exelon personnel determined that TS 3.3.7.5 was exceeded on April 11, 2006. Therefore, the station operated in a condition that was prohibited by TSs for the Accident Monitoring Instrumentation.

There were no safety consequences associated with this event. The suppression chamber air temperature recorder is used for indication only and is not used by the operators for emergency operating procedure (EOP) implementation. Drywell air

temperature is used for EOP operator actions and to identify problems with the primary containment barrier. The drywell air temperature was operable the entire period. In addition to repairing the recorder cable connector, operators increased periodic monitoring of the recorder. This finding constitutes a licensee identified violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. Exelon documented this issue and its associated corrective actions in issue reports 482059 and 499975. This LER is closed.

.2 (Closed) LER 05000352/01-06-004, Both Offsite Power Circuits Inoperable

Introduction. The inspectors identified a Green, NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because a condition adverse to quality related to a non-conservative offsite electrical voltage calculation identified by Exelon in March 2005, was not promptly corrected. The untimely corrective actions contributed to a missed TS limiting condition for operation for the required offsite electrical power supplies for Units 1 and 2 in July 2006.

Description. In March 2005, CR 314577 was written to address a Limerick voltage regulation study calculation that was determined to be non-conservative. The calculation incorrectly assumed a 1.7 percent grid voltage drop upon a trip of an operating unit. This value is non-conservative in that the Transmission System Operator (TSO) can, under unusual grid conditions, operate the grid to a post trip contingency voltage drop of 7 percent. The 7 percent voltage drop limit is defined in the transmission system operator, Pennsylvania/New Jersey/Maryland (PJM), Manual 03, "Transmission Operations."

The Limerick Offsite Power System design consists of one 13kV circuit from the 220 kV substation and one 13 kV circuit from the transformer that connects the 220 kV and 500 kV substations. The circuit from the 220 kV substation supplies the 10 station auxiliary transformer and the 101 safeguard transformer to feed four safeguard 4 kV busses. The circuit from the 220/500 kV cross-tie transformer supplies the 20 regulating transformer and the 201 Safeguard Transformer to feed four safeguard 4 kV busses. Each unit has four 4kV safeguard buses. Two 4kV safeguard buses on each unit are normally energized from the 101 safeguard bus and two buses on each unit are normally energized from the 201 safeguard bus. Limerick has eight onsite EDGs to provide power to the eight 4 kV safeguard buses if offsite power sources are lost.

Exelon personnel revised the offsite electrical voltage calculation on September 7, 2006, to assume a 7 percent drop in the offsite electrical grid post trip voltage. Exelon personnel reviewed three years of operating history and identified several occasions when calculated post trip contingency voltages could have resulted in actuation of the 4 kV safeguard bus degraded voltage relays. Actuation of the 4 kV bus degraded voltage relays would result in a loss of offsite power to the associated 4kV busses. A review of actual selected grid configurations during a two-week period in July 2006 identified two occasions when a postulated LOCA on an operating unit could have resulted in the actuation of the 4 kV bus degraded voltage relays and loss of both offsite electrical power supplies to the Unit 1 and 2 vital busses.

Each 4 kV safeguard bus voltage is monitored by a set of degraded voltage relays. These relays open the electrical breaker supplying the 4kV bus when the bus voltage

remains below the setpoint for a period that exceeds the time delay. The 4 kV safeguard bus degraded voltage relay time delays vary with bus voltage as follows: 1) 3910 volts 61 second delay, 2) 3640 volts 52 second delay, and 3) 2905 volts 1 second delay. The 3910 volts delay is reduced from 61 seconds to 10 seconds during a postulated LOCA. The reduced time delay during a LOCA would result in actuation of the degraded bus voltage relays prior to the offsite circuit transformers automatic voltage regulators capability to raise voltage above the relay setpoint. This would result in a loss of offsite electrical power to the 4 kV busses. The longer time delay for non-LOCA conditions allows the transformer automatic voltage regulators to increase voltage and prevent a relay actuation.

The safeguard transformer load tap changers have time delays that restrict the tap changer from moving to raise bus voltage to prevent repetitive voltage increases and decreases. Prior to the offsite electrical voltage calculation revision in September 2006, the tap changer delays were greater than the 10 second degraded voltage relay time delay. Exelon personnel reduced the safeguard transformer load tap changer time delays to less than 10 seconds to allow an increase in bus voltage before the actuation of the degraded bus voltage relays. This change will prevent the loss of offsite power to the 4kV safeguards busses on a postulated LOCA on a single unit.

The inspectors concluded this LER addresses a condition that could have prevented fulfillment of a safety function and a condition prohibited by TSs. In addition, one or both offsite circuits may have been inoperable for periods that exceeded the TS 3.8.1.1 Action "g" allowable outage time of 24 hours. There were no actual safety consequences associated with this event. The potential safety consequences of this event were minimal because the units did not experience a loss of coolant accident during the period of the non-conservative voltage calculation.

The inspectors reviewed CR 314577, describing the issue and the multiple delays related to the completion of the known non-conservative voltage calculation. The CR was assigned a due date of December 1, 2005, to complete the voltage calculation revision. On October 28, 2005, the original due date was initially extended to June 30, 2006, due to "resource limitations at the Exelon Kennett Square office" and extensive computer modeling requirements. The due date was changed a second time to October 27, 2006, "to allow time to re-perform and make corrections to calculations." The revision to the Limerick Offsite Power Voltage Regulation Calculation, No. 6300.E20, was completed on September 7, 2006. These delays resulted in the offsite power source being inoperable on two occasions in July 2006.

The inspectors concluded that the extensions to the original calculation revision due date were untimely considering the potential to affect the operability of both offsite power sources and the short allowed outage time for these circuits in TS requirements. These issues were entered into Exelon's corrective action program as IRs 301119, 314577, 385631, 528308, and 575420.

Analysis. Exelon's untimely action to revise the non-conservative Limerick Offsite Power Voltage Regulation Calculation, and ultimately correction of the safeguards transformer tap changer time delay relay settings was a performance deficiency. 10 CFR 50 Appendix B Criterion XVI, "Corrective Actions," requires that conditions adverse to quality are promptly identified and corrected. These untimely actions

resulted in an approximately 2 day period of time in July 2006 when the offsite power system would not have responded properly to a LOCA initiating event. Specifically, given the time delay relay settings, a postulated LOCA initiating event would have caused a concurrent loss of offsite power.

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.

This finding is more than minor because it is similar to NRC manual chapter 0612 Appendix E, "More than Minor Examples," 3.j. and 3.k. The examples describe non-conservative values used in engineering calculations and were considered more than minor "if the engineering calculation error results in a condition where there is a reasonable doubt on the operability of a system or component." In this case, the offsite electrical power sources were considered inoperable for approximately 2 days in July 2006. The finding is associated with the configuration control attribute of the Mitigating Systems Cornerstone because the delay in completing the electrical grid voltage calculation revision also delayed the corrective action to adjust the safeguards transformer tap changer settings. The tap changer time delays were set too long and would not have prevented a potential loss of offsite electrical power for a single unit trip due to a postulated loss of coolant accident event. The issue affected the Mitigating Systems cornerstone objective of ensuring operability and reliability of offsite power.

The SRA determined that this issue was of very low safety significance (green) based on a Phase 3 risk evaluation, conducted after determining that a Phase 2 analysis was not appropriate for this issue. Phase 1 of the SDP screened the issue as needing further evaluation because the finding results in the offsite power safety function being inoperable for longer than its TS limiting condition of operation. The Phase 3 analysis used the Limerick SPAR model, assuming that, for a two day period, any LOCA initiating event would also cause a loss of offsite power. The SPAR model identified a core damage increase that was several orders of magnitude below the 1 in 10,000,000 year range (E-7). This very small increase was driven by the low frequency of LOCA initiating events and the short exposure time. The dominate core damage sequence, given a LOCA without offsite power, was a failure of all EDGs due to a common cause.

This issue has a cross-cutting aspect in the area of problem identification and resolution because Exelon personnel did not take corrective action to revise the voltage regulation calculation and modify tap changer settings in a timely manner commensurate with the safety significance and complexity of the problem. Specifically, the voltage regulation study calculation was not revised in a timely manner such that the operability of the offsite power sources was impacted in July 2006.

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 non-conformances are promptly identified and corrected. Contrary to the above, Exelon personnel did not take prompt action to correct a non-conservative value in the Limerick Offsite Power Voltage Regulation Calculation, No. 6300.E20. Exelon extended the due date of the calculation revision from December 1, 2005, to June 30, 2006, and then again to October 25, 2006. Because this issue is of very low safety significance, and

has been entered into Exelon's corrective action program (IRs 301119, 314577, 385631, 528308, and 575420), this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000352/353/2006005-01, Failure to Perform Timely Corrective Actions for a Revision to an Offsite Electrical Power Voltage Calculation)**

4OA5 Other Activities

.1 Temporary Instruction 2515/169 - Mitigating Systems Performance Index Verification

a. Inspection Scope

The purpose of Temporary Instruction (TI) 2515/169 was to verify that Exelon personnel correctly implemented the Mitigating Systems Performance Index (MSPI) guidance for voluntarily reporting unavailability and unreliability of the monitored safety systems. On a sampling basis, the inspectors validated the accuracy of the unavailability and unreliability input data used for both the 12-quarter period of baseline performance and for the first-reported results (second calendar quarter of 2006). Specific attributes examined by the inspectors as required per this TI included surveillance activities which, when performed, do not render the train unavailable for greater than 15 minutes, and surveillance activities which, when performed, do not render the train unavailable due to credit for prompt operator recovery actions. For each MSPI system, on a sampling basis, the inspectors also independently confirmed the accuracy of baseline planned unavailability, actual planned and unplanned unavailability, and the accuracy of the failure data (demand, run, and load, as appropriate) for the monitored components.

b. Findings and Observations

No findings of significance were identified. In accordance with the reporting requirements of TI 2515/169, the following are the observed results of five areas specifically reviewed by the inspectors to verify the accuracy of MSPI data for the Limerick Generating Station:

- (1) The inspectors reviewed calculations of baseline planned unavailability hours to ensure that Exelon correctly determined baseline data for the MSPI indices. The inspector noted that the station utilized incorrect critical hour data for some segments of the Unit 1 RHR system. This error does not have a significant impact on MSPI calculations for the Unit 1 RHR system. Exelon personnel documented this discrepancy in IR 558873.

The inspector also reviewed MSPI monitoring of the cooling water systems (emergency service water and residual heat removal service water) to determine if Exelon personnel correctly accounted for planned and unplanned unavailability resulting from cascading support system inoperability. The inspectors did not identify any issues in this area.

- (2) The inspectors reviewed multiple documents, including main control room logs, issue reports, action requests, work orders, and completed surveillance tests to verify the accuracy and completeness of the reported actual unavailability data for the MSPI systems. The inspector did not identify any errors in this data.

- (3) The inspectors reviewed a sample of Limerick's unreliability data to confirm that Exelon personnel accurately classified valve and breaker demand failures, emergency diesel generator failures to start, load, or run, and pump demand failures and failures to run. The inspectors did not identify any errors in the reported unreliability data.
- (4) The inspectors reviewed the reported MSPI data to verify that the data was accurate. The inspectors did not identify any significant errors which would have resulted in a change to the indicated index colors.
- (5) The inspectors reviewed Limerick Generating Station's MSPI basis document and associated appendices. The inspectors noted minor discrepancies with information presented in the basis document which Exelon personnel documented in IR 563604. The inspectors did not identify any significant errors that would result in a change to MSPI system boundaries, an addition of a monitored component, or a change in the reported index color.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 9, 2007, the resident inspectors presented the inspection results to Mr. R. DeGregorio 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

R. DeGregorio, Site Vice President
C. Mudrick, Plant Manager
R. Harding, Regulatory Assurance
D. Hart, Radiation Protection Supervisor
E. Purdy, System Manager
B. Sauers, System Manager
D. Malinowski, LOR Program Administrator

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Open

05000353/02-06-001	LER	“High Pressure Coolant Injection (HPCI) Ramp Generator Signal Converter.”
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Opened and Closed

05000352/01-06-003	LER	“Accident Monitoring Channel Inoperable for Longer than Technical Specification Allowed Outage Time.”
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05000352/01-06-004	LER	“Both Offsite Circuits Inoperable.”
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LIST OF DOCUMENTS REVIEWED

Section 1R02: Evaluations of Changes, Tests or Experiments

10CFR 50.59 Safety Evaluations

- LG2001E005, Removal of Unit 1 Lower Layer Reactor Well Shield Plugs During Hot Shutdown, Rev. 0
- LG2003E001, Unit 2 B Reactor Recirculation Pump RECW Leakage, Rev. 1
- LG2003E002, 2B Residual Heat Removal Heat Exchanger Nonconformance - Tube Pitting, Rev. 0
- LG2004E002, Use of The Spray Pond Spray Networks and RHRSW For Cooling and Chemistry Control, Rev. 0
- LG2005E001, D12 EDG Jacket Water Coolant System Permanent Sight Glass Installation, Rev. 0
- LG2005E002, New Reactor Cavity Work Platform ("AREVA Platform") and Associated Procedures, Rev. 0
- LG2005E003, Installation of Permanent Drywell Lead Blanket Shielding, Rev. 0

10 CFR 50.59 Screened-Out Evaluations

- LG2004S066, FWLCS Digital Upgrade Modification - Pre-Outage Cable Installation, Rev. 0
- LG2004S067, RFP/RFPT Low Oil Pressure Switches Single Point Vulnerability to 2 out of 3 Logic Changes, Rev. 0
- LG2004S075, Unit Auxiliary Transformer Sudden Pressure Relay 2/2 Logic Upgrade, Rev. 0
- LG2005S012, P00224 1 Rx Stability/PRNMS - OPRM Activation - Unit 1, Rev. 0
- LG2005S019, Electrical Design Calculations - Correct Deficiencies, Rev. 0
- LG2005S021, Concurrent Use of Refuel Platforms to Move Fuel, Rev. 0
- LG2005S023, Unit 1 Refuel Platform Safety Brake Circuit Protection/Isolation, Rev. 0
- LG2005S043, Install Temp Battery Charger Compliant with T.S. 3.8.2.1 action a, Rev. 0
- LG2005E004, Evaluate Replacement of Cutler Hammer Citation 480 VAC, MCC Compartment Components with Cutler Hammer A200 Components, Rev. 0
- LG2005S071, Unit 1 Feedwater Modification 1R11, Rev. 0
- LG2006S004, FV-C-046-1F002A/B Replacement of CRD Actuator, Rev. 0
- LG2006S022, Installation of Metal Oxide Varistors for SRVs In RSP, Rev. 0
- LG2006S032, Addition of HPCI Suppression Pool Level Transmitters Calibration Head Chambers, Rev. 0
- LG2006S035, Rx Cavity Penetration Bolting Reduction, Rev. 0
- LG2005S052, Installation of Corrosion Monitoring in The 2B-E205 Heat Exchanger, Rev. 0

Modifications

- LG 02-00839, Revise IST Program for DG FO Transfer Pump Testing Requirements, Rev. 0
- LG 04-00360, Replacement and Margin Improvement - HV-051-2F016B, Rev. 1
- LG 04-00428, HPCI Suction Valve Bonnet Vents Both Units, Rev. 2
- LG 04-00647, RHR Heat Exchanger Tube Plugging Greater than 5% of Tubes, Rev. 0
- LG 05-00484, RHR Heat Exchanger Performance with 6150 GPM RHRSW Flow, Rev. 0
- LG 05-00503, Revision to Calculations —78-02 & 04 (Control Room Cooling Load), Rev. 0
- LG 05-00514, Revise RHR Min Flow CV IST method to D/I, Rev. 0
- LG 06-00138, Installation of Metal Oxide Varistors for SRVs in RSP, Rev. 0

Audits and Self-Assessments

FASA 506107-04, LGS NRC Inspection of Modifications and 10 CFR 50.59 Reviews, 9/26/06

Calculations

- LM-50, Differential Pressure Calculation for Motor Operated Valves in Residual Heat Removal System, Rev. 5
- LM-0466, Determine Max. DQ Based MOV Thrust & Torque Capacity Anchor Darling, Rev. 1
- LM-0638, Tube Plugging Limits and Fouling Factors for RHR Heat Exchangers, Rev. 0
- LM-0640, RHR Heat Exchanger Fouling Factor/Tube Plugging Limits for RHRSW Maintenance, Rev. 0
- LM-0656, Determine Failed Fuel Rods from Collision of Refuel Platforms, Rev. 0
- LM-0662, 2B RHR Heat Exchanger Capability with Reduced RHRSW Flow, Rev. 0
- M-51-08, RHR, LPCI, and Containment Spray Pressure Drop, Rev. 4A
- M-78-02, Control Room Area Cooling Load, Rev. 18
- 6900E.02, Safeguard Auxiliary System - Phase Overcurrent Relay Selection and Coordination, Rev. 8
- 6900E.11, Load Center Circuit Breakers Overcurrent Trip Devices, Rev. 8

Analysis

- A-246, GE Motor Operated Valve Frequency Changes, Rev. 1A
- LS-0290, Reactor Building Generic Lead Shielding Support Details, Rev. 1

Completed Surveillances

ST-6-051-231-1, A RHR Pump, Valve and Flow Test, dated 7/6/06

Issue Reports

149191	292374	385296	453419
164393	308166	386299	457164
274434	317910	385301	534998
274795	319108	385543	536381
285622	338956	385549	536762

Action Requests

A1500149, Evaluation 08, Drywell Permanent Shielding Seismic Separation Criteria, 3/1/05

Procedures

- LLOT0540, Licensed Operator Initial Training Feedwater System, Rev. 24
- S12.1.A, RHR Service Water System Startup, Rev. 44
- S97.0.M, Refueling Platform Operation, Rev. 19

Work Orders

R0551561, (051-1F046B) Check Valve Inspection -M-400-10

Section 1R04: Equipment Alignment

Partial Walkdowns

Procedures

S12.1.A (COL-1), "Alignment For Normal Operation of the Residual Heat Removal Heat Removal Service Water System For - A," Revision 23
S51.1.A, "Set Up of RHR System for Automatic Operation in LPCI Mode," Revision 33
S92.1.N, Diesel Generator Set Up For Automatic operation Following Maintenance, Rev. 33
S92.9.N, Routine Inspection of the Diesel Generators, Rev. 51
ST-6-092-113-1, D13 Diesel Generator 24 Hour Endurance Test, Rev. 27

Drawings

M-51, P&ID "Residual Heat Removal (Unit 2)," Sheet 5, Revision 24

Issue Reports and Action Requests

A1581890

Miscellaneous

Technical Specifications Section 3.5, "Emergency Core Cooling System"
UFSAR Section 6.3.2.2.4, "Low Pressure Coolant Injection Subsystem," Revision 13
Control Room Narrative Logs, 11/11/06 through 11/13/2006

Section 1R05: Fire Protection

Miscellaneous

1F-R-108, "Unit 1 RCIC Pump Room 108 - Fire Area 33," Revision 7
2F-R-179, "Unit 2 RCIC Pump Room 179 - Fire Area 56," Revision 5
UFSAR, Appendix 9A, "Fire Protection Evaluation Report"
F-T-620, "Unit 1 Turbine Enclosure HVAC Area and Equipment Compartment Exhaust Filter Area Rooms, Fire Area 99"

Section 1R06: Flood Protection Measures

Procedures

SE-4, "Flood," Revision 5
SE-4-1, "Reactor Enclosure Flooding," Revision 6

Issue Reports and Action Requests

A1506587, "HPCI Drain Lines Damaged During FM Retrieval"
IR 310773, "HPCI Drain Lines Damaged During FM Retrieval"
IR 348594, "RCIC Flooding - Identify 42" MSO"
IR 484935, "HV-055-2F054 Has a Packing Leak"

Miscellaneous

ARC-MCR-117 A5, "Unit 1 - HPCI Pump Room Flood," Revision 1
ARC-MCR-217 A5, "Unit 2 - HPCI Pump Room Flood," Revision 1
Bechtel Power Company, Job No. 18253-001-095, "Reactor Enclosure el. 177'-0" Flood Levels," dated October 6, 1987
M-1359, P&ID, "Fire Area Location: Reactor Enclosure Unit 1; Plan at El. 177'0"" Revision 0

M-1366, P&ID, "Fire Area Location: Reactor Enclosure Unit 2; Plan at El. 177'0"" Revision 0
M-55, P&ID, "High Pressure Coolant Injection," Sheet 1, Revision 5
M-55, P&ID, "High Pressure Coolant Injection," Sheet 2, Revision 2
NPB-14, "Moderate Energy Line Break Analysis for Reactor Enclosures, Control Structures, SPPS, DG Enclosures, etc," Revision 6
NPB-32, "Flooding of ECCS Compartments From the Suppression Pool (MEPB Analysis)," Revision 3
Technical Specifications Section 3/4.5, "Emergency Core Cooling System"
UFSAR, Section 6.3.2, "Emergency Core Cooling System"

Work Orders

C0182116, "LSH-055-140 Calibration Check"
R0681366, "LSH-055-140 Routine Cal and Check"
R0729259, "LSH-055-240 Calibration Check"

Section 1R11: Licensed Operator Requalification Program

Procedures

EP-MA-114-100-F-01 "State/Local Event Notification Form"
Limerick Generating Station Emergency Action Levels (EALs)

Section 1R12: Maintenance Effectiveness

Procedures

ER-AA-310-1004, "Maintenance Rule-Performance Monitoring"
ER-LG-310-1010, "Maintenance Rule Implementation Limerick Generating Station"
Maintenance Rule Scope and Performance Monitoring for Containment and Leak Testing; System 60
Technical Specification Table 3.6.3-1, "Primary Containment Isolation Valves"

Issue Reports and Action Requests

A1495598, "HV-049-1F031 did not Stroke from the Remote Shutdown Panel"
IR 550055, "Maintenance CAP Management Issues"
IR 528184, "HV-049-2F031 Failed to Stroke Closed"
IR 309818, "HV-051-2F024A Fails to Close"
IR 462370, "HV-049-1F007 Failed to Close"
IR 311238, "HV-052-2F039A Failed to Stroke Closed"
IR 491998, "Valve Failed to Stroke Closed from the MCR"

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

CC-AA-309-101, "Engineering Technical Evaluations," Revision 8
ER-AA-321, Attachment 3, "Administrative Requirements for Inservice Testing," Revision 6
ST-6-011-203-0, "'A' ESW Valve Test," Revision 33
ST-6-051-231-2, "'A' RHR Pump, Valve, and Flow Test," Revision 50
ST-6-107-201-0, "IST Valve Stroke for New Baseline," Revision 3
T-103, "Entry Due to U/2 Div 2 Steam Leak Detection Alarm."
ON-115, "Loss of Control Enclosure Cooling," Revision 17

Issue Reports, Action Requests

A1370492, "HV-011-046 Overhaul Air Operated Actuator"
A1410493, "HV-011-046 Overhaul Air Operated Actuator"
A1587808, "HV-011-046 Open Stroke Time in 'Alert'"
IR 541499, "HV-011-046 Open Stroke Time in 'Alert'"
IR 548957, "HV-051-2F027A Failed to Stroke Open"
IR 561897, "A MCR Chiller Condenser ESW Leak"

Miscellaneous

ASME OM Code -1990, Subsection ISTC 4.2.8(b) and 4.2.9(b)
Exelon Nuclear Logs, 10/24/06
M-11, P&ID, "Emergency Service Water," Sheet 2, Revision 77
M-51, P&ID, "Residual Heat Removal," Sheet 5, Revision 24
Specification ML-008, "Specification Cover Sheet," Revision 7
Technical Specifications 3.6.2.2, "Suppression Pool Spray"
Technical Specifications 3.2.3, "Suppression Pool Cooling"
Technical Specifications 3.6.3, "Primary Containment Isolation Valves"
Technical Specification 3.3.2, "Isolation Actuation Instrumentation"
Control Room Operator Log, October 7, 2006
Technical Specification 3.7.2, "Control Room Emergency Fresh Air Supply System"

Work Orders

C0171484, "Replace CS Valve Guides with SS on HV-011-046"
C0219142, "Stoke Valve to Verify New Max Allowable"

Section 1R15: Operability

Procedures

ER-AA-321, Attachment 3, "Administrative Requirements for Inservice Testing," Revision 6
ST-6-011-203-0, "'A' ESW Valve Test," Revision 33
ST-6-107-201-0, "IST Valve Stroke for New Baseline," Revision 3
OP-AA-108-115, Operability Determinations, Revision 0
ST-2-020-401-1, "Electrical Power Systems 1BG501 Diesel Generator Critical and Non-Critical Instruments Calibration/Functional Test," Revision 25
ST-2-052-102-1, Div 2 Core Spray LSF/SAA, Revision 9
ST-6-092-322-1, D12 Diesel Generator LOCA/LOAD Reject Testing and Fast Start Operability Test Run, Revision 12
ST-6-092-113-1, D13 Diesel Generator 24 Hour Endurance Test, Revision 27
ST-6-043-320-2 "Daily Jet Pump Operability Verification for Two Recirculation Loop Operation"

Issue Reports and Action Requests

A1370492, "HV-011-046 Overhaul Air Operated Actuator"
A1410493, "HV-011-046 Overhaul Air Operated Actuator"
A1582542, "D/G Jacket Water Lo Pressure Alarm"
A1587808, "HV-011-046 Open Stroke Time in 'Alert'"
IR 507509, "Spurious D12 Diesel Running Alarm"
IR 507662, "Generic Implications on D/G Jacket Water Pump Discharge Pressure"
IR 526924, "D12 Jacket Water Temperature Ind is Reading Low"
IR 527233, "D12 D/G jacket Water Lo Pressure Alarm"
IR 541499, "HV-011-046 Open Stroke Time in 'Alert'"

IR 556759, "Unexpected D12 EDG out of service alarms"
IR 561890, "Unit 2 Jet PP 12 Differential Pressure Out of Band Low"

Drawings

M-071-00048, Sh. 6,7,9, Schematic Engine Control D12 Diesel Generator, Revisions 14, 0, 1, respectively
M-071-00065, Sh. 8 and 11, Control Schematic D12 Diesel Generator, Revisions 0 and 0

Miscellaneous

ASME OM Code 1990, Sections ISTC 4.2.4 and 4.2.8
IST Valve Evaluation Form - HV-011-046, Report # 00541499, 10/8/06
Specification ML-008, "Specification Cover Sheet," Revision 7
Stroke Time Trend Data - HV-011-046, 7/05 - 10/06
Operator Logs dated 11/11/06 through 11/12/2006
LGS UFSAR Section 8.3.1.1.3, Standby Power Supply
LGS Technical Specification 3/4.8.1 and Bases
LGS Technical Specification 3.4.1.2, "Jet Pumps"

Work Orders

C0171484, "Replace CS Valve Guides with SS on HV-011-046"
C0219142, "Stoke Valve to Verify New Max Allowable"
M1575351, "D/G Jacket Water Pump Disch"
R0900532, "Inspect and Clean ESW Return Header"

Section 1R17: Permanent Plant Modifications

Issue Reports

IR 560628, "Change Injection Point for 2R09 Noble Metals Injection"

Section 1R19: Post Maintenance Testing

Procedures

ER-AA-335-004, "Manual Ultrasonic Measurement of Material Thickness and Interfering Conditions," Revision 2
OP-AA-108-115, "Operability Determinations," Revision 0
IC-C-11-04011, "Calibration Testing of Auxiliary Relays," Rev. 3
ST-6-011-231-0, "A Loop ESW Pump Valve and Flow Test," Rev. 55
ST-6-049-230-2, "RCIC Pump, Valve and Flow Test"
OT-101, "High Drywell Pressure," Revision 27

Issue Reports and Action Requests

AR 00552274, "011-0063 Failed Leak Check Per ST-6-011-231-0"
AR 00561267, "1B DW Chiller Trip on HI Bearing Temperature"
A1594841, "1B' Drywell Chiller 1B-K111 Trip"

Section 1R22: Surveillance Testing

Procedures

RT-2-050-408-1, "RCIC - Pump Suction Pressure - Low Calibration / Functional Test," Revision 3, 10/02/06
S49.1.C, "Recovery from RCIC Turbine Trip," Revision 13
S88.1A, "Remote Shutdown Panel Controls," Revision 17
ST-2-088-321-1, "Remote Shutdown System Div 1 RHR Operability Test," Revision 17, 10/06/06
ST-2-088-414-1, "Remote Shutdown System - RCIC Turbine Trip Indication Calibration," Revision 9, 10/3/06
ST-6-092-113-1, "D13 Diesel Generator 24 Hour Endurance Test," Revision 27
ST-6-107-596-1, "Drywell Floor Drain Sump/Equipment Drain Tank Surveillance Log/OPCON 1,2,3," Revision 19, completed 11/11/06

Issue Reports and Action Requests

IR 274434, "RCIC Suction Pressure Transmitter Damping Addition"
IR 319338, "U/2 RCIC Suction/Discharge Pressure Higher Than Expected"
IR 431449, "Valve HV-049-1F008 Valve has a Pressure Seal Leak"
IR 531541, D13 TIC-GA-120C Oscillating
IR 557885, D13 Fuel Oil Instrument Needs Calibration
IR 558225, D13 Lube Oil Tank 1C-T565 Level Less than 2/3 Full

Miscellaneous

ARC-MCR-116 B1, "RCIC Pump Suction Lo Press," Revision 0
ARC-MCR-216 B1, "RCIC Pump Suction Lo Press," Revision 0
M-49, P&ID, "Reactor Core Isolation Cooling (Unit 1)," Sheet 1, Revision 52
M-50, P&ID, "RCIC Pump Turbine (Unit 1)," Sheet 1, Revision 36
M-51, P&ID "Residual Heat Removal," Sheet 5, Revision 24
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Procedures

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Procedures

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 LER 2-05-003, "Transient Exceeded Licensed Maximum Power Level"
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IR 311238, "HV-052-2F039A Failed to Stroke Closed"
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Section 4OA3: Event Followup

Issue Reports

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IR 575420, "LGS Volt Reg Calc not Revised in Timely Manner"
IR 352003, "20 Regulating Transformer Tap Changer Not Operating in Auto"
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Procedures

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Section 4OA5: Other Activities

Procedures

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S49.9.A, "Routine Inspection of RCIC System," Revision 23
S92.1.O, "Local and Remote Manual Startup of a Diesel Generator," Revision 44
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A1572691, "2ARHR PP Full Flow Test Return Valve"
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Unavailability Spreadsheets for RCIC, HPCI, EDGs, RHR, ESW, and RHRSW (various dates)
System Health Reports for RCIC, HPCI, EDGs, RHR, ESW, and RHRSW dated September 2006

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access Management System
AR	action request
AVC	automatic voltage control
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	condition reports
EAL	emergency action level
ECR	engineering change request
EDG	emergency diesel generator
EOP	emergency operating procedure
ESW	emergency service water
FASA	focused area self assessment
HPCI	high pressure coolant injection
IMC	inspection manual chapter
IP	inspection procedure
IR	issue report
kV	Kilo Volt
LER	licensee event report
LGS	Limerick Generating Station
LOCA	Loss of Coolant Accident
LOOP	loss of offsite power
LTC	load tap changer
MSPI	mitigating systems performance index
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
ODCM	off-site dose calculation manual
OPCON	operational condition
PAR	protective action recommendation
PARS	Publicly Available Records
PI	performance indicator
PJM	Pennsylvania, New Jersey, Maryland
P&ID	pipng and instrumentation drawing
PMT	post-maintenance test
RECW	reactor enclosure cooling water
RETS	radiological effluent technical specifications
RHR	residual heat removal
RHRSW	residual heat removal service water
SDP	significance determination process
SE	safety evaluation
SSC	structure, system, component
SRA	senior risk analyst
TI	temporary instruction
TS	technical specification
TSO	transmission system operator
UFSAR	updated final safety analysis report
VAC	volt alternating current