UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

December 23, 2014

Mr. Michael J. Pacilio
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Rd.
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING STATION - NRC EVALUATION OF CHANGES, TESTS, OR EXPERIMENTS AND PERMANENT PLANT MODIFICATIONS TEAM INSPECTION REPORT 05000352/2014007 AND 05000353/2014007

Dear Mr. Pacilio:

On November 21, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Limerick Generating Station (LGS), Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on November 21, 2014, with Mr. T. Dougherty, Site Vice President, 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. In conducting the inspection, the team reviewed selected procedures, calculations and records, observed activities, and interviewed station personnel.

Based on the results of this inspection, no findings 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, Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Paul G. Krohn, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure: Inspection Report 05000352/2014007; 05000353/2014007
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

Mr. Michael J. Pacilio
President and Chief Nuclear Officer
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Sincerely,

/RA/

Paul G. Krohn, Chief
Engineering Branch 2
Division of Reactor Safety

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.:	50-352, 50-353
License Nos.:	NPF-39, NPF-85
Report Nos.:	05000352/2014007 and 05000353/2014007
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 and 2
Location:	Sanatoga, PA 19464
Inspection Period:	November 3 through November 21, 2014
Inspectors:	J. Ayala, Reactor Inspector, Division of Reactor Safety (DRS), Team Leader F. Arner, Senior Reactor Inspector, DRS M. Orr, Reactor Inspector, DRS
Approved By:	Paul G. Krohn, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000352/2014007, 05000353/2014007; 11/03/2014-11/21/2014; Limerick Generating Station Units 1 and 2; Permanent Plant Modifications Engineering Team Inspection.

This report covers a 2-week on-site inspection of the evaluations of changes, tests, or experiments and permanent plant modifications. The inspection was conducted by three region based engineering inspectors. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5, dated February 2014.

No findings were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R17 Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications (IP 71111.17)

.1 Evaluations of Changes, Tests, or Experiments (28 samples)

a. Inspection Scope

The team reviewed six safety evaluations to evaluate whether the changes to the facility or procedures, as described in the Updated Final Safety Analysis Report (UFSAR), had been reviewed and documented in accordance Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59 requirements. In addition, the team evaluated whether Exelon had been required to obtain U.S. Nuclear Regulatory Commission (NRC) approval prior to implementing the changes. The team interviewed plant staff and reviewed supporting information including calculations, analyses, design change documentation, procedures, the UFSAR, Technical Specifications (TS), and plant drawings to assess the adequacy of the safety evaluations. The team compared the safety evaluations and supporting documents to the guidance and methods provided in Nuclear Energy Institute (NEI) 96-07, “Guidelines for 10 CFR 50.59 Evaluations,” Revision 1, as endorsed by NRC Regulatory Guide 1.187, “Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments,” to determine the adequacy of the safety evaluations.

The team also reviewed a sample of twenty-two 10 CFR 50.59 screenings for which Exelon had concluded that a safety evaluation was not required. These reviews were performed to assess whether Exelon's threshold for performing safety evaluations was consistent with 10 CFR 50.59. The sample included design changes, calculations, and procedure changes.

The team reviewed the safety evaluations and screenings that Exelon had performed and approved during the time period covered by this inspection not previously reviewed by NRC inspectors. All 50.59 safety evaluations completed since the last modifications inspection were reviewed, and the screenings and applicability determinations selected were based on the safety significance, risk significance, and complexity of the change to the facility.

In addition, the team compared Exelon’s administrative procedures used to control the screening, preparation, review, and approval of safety evaluations to the guidance in NEI 96-07 to evaluate whether the procedures adequately implemented the requirements of 10 CFR 50.59. The reviewed safety evaluations and screenings are listed in the Attachment.

b. Findings

No findings were identified.

.2 Permanent Plant Modifications (10 samples)

.2.1 High Pressure Coolant Injection and Residual Heat Removal Service Water Motor Operated Valve (MOV) Loss of Power/Overload Annunciator Circuit Modification

a. Inspection Scope

The team reviewed modification engineering change request (ECR) 11-00105 which de-energized the 'A' and 'B' loop Residual Heat Removal Service Water (RHRSW) cooling tower return line isolation valves, HV-012-113 and HV-012-213 in the closed position. The modification also de-energized (in the open position) valves HV-055-1(2)24 and HV-055-1(2)25 in the condensate storage tank (CST) supply line to the High Pressure Coolant Injection (HPCI), Reactor Core Isolation Cooling (RCIC), and Core Spray pumps. The design change included opening and locking the associated motor control center (MCC) breakers, and reconfiguring the alarm wiring for the RHRSW MCC panels to defeat unnecessary alarms and to maintain the system out-of-service alarms for the remaining equipment. The MOV loss-of-power/overload alarms associated with the HPCI and RCIC suction valves were removed with the valves de-energized in the open position. The design change did not impact the isolation of the HPCI or RCIC system from the CST during transfer to the suppression pool because this is achieved with other automatically operated valves not affected by this design change. The modification was implemented to mitigate postulated fire induced multiple spurious operation of the valves.

The team reviewed the modification to verify that the design bases, licensing bases, and performance capability of the HPCI, RCIC, and RHRSW systems had not been degraded by the design change. The team interviewed design engineers and reviewed system operational procedures along with emergency operating procedures to determine if any adverse conditions existed with the valve motors being de-energized. Additionally, the team reviewed work instructions along with electrical schematics to confirm that the modification was appropriately implemented. Finally, the team reviewed the results of the modification to verify consistency between licensing bases documents, actual field installation and plant procedures and controls. The team performed a walkdown of the accessible portion of the affected valves to confirm they were in the proper position. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report.

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.2 RCIC Turbine Governor Speed Limit Increase

a. Inspection Scope

The team reviewed modification ECR 10-00379 which processed design document and calculation changes required to support an increase in the speed calibration range of the RCIC turbine governor. This speed increase provided for additional system operating margin by increasing the upper turbine and pump speed setpoint from 4625 revolutions per minute (rpm) to 4725 rpm. The design change was intended to increase system margin by allowing the pump to operate at a higher speed to deliver the system rated flowrate against the maximum required reactor backpressure. This speed compensation would ensure design flowrates even if the RCIC pump degraded from its current operating point. The design change was implemented by a revision to the existing calibration procedure for the RCIC turbine governor control system.

The team reviewed the modification to verify that the design bases, licensing bases, and performance capability of the RCIC system had not been degraded by the design change. The team reviewed the change to determine if the margin to the overspeed trip remained acceptable. The team also reviewed the change to determine that the system pressure would remain below the maximum allowable design service pressure of the RCIC discharge piping. The team discussed the potential impact on the system motor operated valves with Exelon design engineers and reviewed affected system calculations. This was performed to determine if the change would adversely impact design conditions or the setup of the system MOVs. Finally, the team reviewed the results of the modification to determine consistency between licensing bases documents, calculations and procedures. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report.

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.3 0A/B-K112 Control Enclosure Chillers Condenser Water Flow Change

a. Inspection Scope

The team reviewed design change ECR 12-00110 which determined the lowest condenser flowrate that the control enclosure chiller can operate at while still performing all of its design safety-related functions. The control structure chilled water system is designed to provide chilled water to various cooling coils to maintain ambient air temperatures within the control room, auxiliary equipment room, emergency switchgear room, and battery rooms. The 0A/B-K112 control enclosure chiller is a part of the chilled water system and is designed to chill the return water to a specified supply temperature for cooling. The chiller condenser is a part of the control enclosure chiller and is designed

to condense the refrigerant gas leaving the compressor to a liquid in order that the refrigerant may be re-used in the evaporator. Service water or emergency service water (ESW) at a specified minimum flowrate is used as the cooling medium for the condenser. The design change was initiated because periodic ESW flow balance testing had been showing that the ability to deliver the design rated flowrate of 600 gallons per minute (gpm) had been challenged on several occasions.

The team reviewed the analysis to verify that the design bases, licensing bases, and performance capability of the control enclosure chiller had not been degraded by the determination of a revised limiting condenser flowrate. The team interviewed design engineers and reviewed the cooling loads from calculations to verify that the reduced required condenser flowrate would be acceptable under the most limiting accident conditions. The team reviewed the results from a vendor assessment which was performed to analyze the capability of the system to meet its performance requirements at various reduced condenser water flowrates. The team reviewed the results of an Exelon heat balance performed at various flowrates to validate the vendor analysis. The team reviewed the revised surveillance tests to ensure that margin above the lowest allowable limit accounted for flow measurement error. The team reviewed the lineup performed during the ESW flow-balance testing to ensure consistency with system conditions expected during accident conditions. Additionally, the team performed a walkdown of the control enclosure chiller to assess the material condition of the equipment. Finally, the team reviewed procedures to ensure that operations personnel monitored temperature conditions of various equipment areas when aligned in ESW system configurations which had the potential for reduced flow to various safety-related components. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report.

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.4 Emergency Diesel Generator Speed Switch Replacement

a. Inspection Scope

The team reviewed modification ECR LG 11-00219 which replaced the Emergency Diesel Generator (EDG) engine speed switch on all eight EDGs. Exelon implemented the modification following a Fairbanks Morse EDG speed switch redesign, rendering the original component obsolete and no longer available. This alternate replacement item performs the same functions as the original (i.e. turning off starting air and standby keep warm systems, and starting ESW and ventilation); however, the new switch has a different form and fit due to a difference in input power requirements. Specifically, Fairbanks Morse designed a voltage converter circuit that was physically integrated onto the mounting base. The team conducted the review to ensure that the design bases, licensing bases, and performance capability of the EDGs had not been adversely affected by the modification.

The team reviewed the high and low speed switch setpoints to verify there were no adverse impacts to operating margins and that the speed switch functioned in accordance with the design basis. The team reviewed post-maintenance test (PMT) data to confirm that the replacement speed switch met the acceptance criteria and the EDGs were operable. Additionally, the team reviewed associated work order packages and conducted interviews with design, procurement, and system engineers regarding the design, installation, and testing of the switches to verify that the modification was adequate. The team verified that drawings affected by the installation had been appropriately updated. Finally, the team conducted walkdowns of seven of the eight EDGs to assess material condition.

The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

.2.5 HBC-507-01 RHRSW Piping Found Below Minimum Wall

a. Inspection Scope

The team reviewed modification ECP LG-13-00145 which involved the application of a weld overlay to an area on the outside of a 30 inch diameter carbon steel RHRSW pipe. The modification was performed to correct two below minimum-wall thickness localized areas in the common loop B return piping from the RHR heat exchangers. The affected section of straight run piping is safety related (passive mode) and includes ESW system loop A and loop B returns to the RHRSW system.

The team reviewed the modification to determine that the design bases, licensing basis, and performance capability of the RHRSW system had been not degraded by the modification. The team interviewed engineers and reviewed the modification package to determine if the change met design requirements. A walkdown of the associated piping section was performed to assess the overall material condition. The team also reviewed the design, configuration, and testing of the system to evaluate whether the modification could result in an adverse effect to safety components. A review of condition reports was performed to evaluate whether there were any reliability or performance issues associated with the post-modification configuration.

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.6 HV-049-1F084 Replacement and Orientation Change

a. Inspection Scope

The team reviewed modification ECP LG 13-00527 which was implemented to replace the RCIC turbine exhaust vacuum breaker inboard primary containment isolation valve (PCIV) and rotate the valve position so the operator is vertical vice its original 30 degree rolled position. The new orientation is desired to reduce body guide wear in the area where the wedge rides when the valve opens and improve a negative trend in local leak rate testing (LLRT) results. HV-049-1F084 is a normally open valve that is used to ensure that a vacuum does not occur between the RCIC turbine exhaust and the suppression pool.

The team reviewed the modification to verify that the design bases, licensing basis, and performance capability of PCIV HV-049-1F084 had not been degraded by the modification. The team interviewed engineers and reviewed the configuration to determine if the changes affected design requirements. Additionally, the team reviewed work orders, post-modification testing results and associated maintenance to determine if the changes were appropriately implemented. The team performed a walkdown of accessible portions of the RCIC system including the subject PCIV and related areas to determine if the modification was in accordance with the design, and to assess the overall material condition following the modification. The team verified that applicable stress and hanger calculations and drawings had been revised. A review of condition reports was performed to evaluate whether there were any reliability or performance issues associated with the post-modification configuration. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report.

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.7 SBO EDG Jacket Water Heat-Up Analysis and Implementing Procedures

a. Inspection Scope

The team reviewed design change DCP LG 12-00174 which issued a design calculation demonstrating that sufficient time was available to restart a tripped EDG during a station blackout (SBO) event. Previously, Exelon did not have a design calculation which demonstrated that sufficient time was available to restart a tripped EDG within the required one hour time limit to meet SBO requirements. No analysis had been done that addressed the issue of EDG jacket water heat-up and high temperature trip due to the availability of only one ESW loop during an SBO. Exelon credits three non-blackout unit EDGs available to mitigate the consequences of an SBO event within an hour. Since one

ESW pump on each loop is powered from each unit, it is possible that with three EDGs starting, one may not initially have ESW cooling. Exelon was issued a non-cited violation during a previous NRC inspection (05000352;353/2011007) for failure to demonstrate by calculation the ability to meet the one-hour requirement for restoring the third EDG following an SBO event.

DCP LG 12-00174 issued calculation LM-0688, "SBO – Cooldown of Diesel Jacket Water System," showing that after a high temperature trip, the EDG jacket water will cool sufficiently to allow the jacket water temperature trip to reset within the required one hour timeframe, allowing the restart of that EDG. The modification included revisions to LGS emergency operating procedures and design basis documents (DBD).

The team reviewed the design change to verify that the design bases, licensing basis, and performance capability of the EDGs had not been degraded by the modification. Additionally, the team reviewed the revised procedures and DBD to determine if the changes were implemented as planned. The team also performed walkdowns of the EDGs and associated components in the EDG rooms to assess the overall material condition. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.8 K-1 Contactor Replacement for Emergency Diesel Generator

a. Inspection Scope

The team reviewed modification ECR 11-00280 which replaced the K-1 contactor on several EDGs. Exelon implemented the modification following a Fairbanks Morse recommendation due to the K-1 contactor being obsolete on the instrument control board. The EDGs are designed to start and be able to accept load within 10 seconds to provide power during a design basis accident or loss of offsite power. The K-1 contactor is part of the EDG circuitry that provides the generator field flash. This alternate replacement item performs the same functions as the original; however, the new contactor has a different form and fit due to a difference in size and has different input power requirements.

The team reviewed the modification to verify that the design basis, licensing basis, and performance capability of the EDG and supported safety-related components had not been degraded by the modification. The team reviewed calculations to ensure that the lower current input would not degrade the performance of the EDG and that the reduction in size of the contactor met seismic qualifications. The team interviewed plant engineers and reviewed drawings to determine if the changes met design and licensing requirements. Additionally, the team reviewed evaluations, and the PMT results to determine if Exelon had properly implemented the K-1 contactor modification.

The team also reviewed condition reports to evaluate whether the contactor performed reliably since installation and whether any new performance issues had resulted from the modification. The team also walked down the EDG rooms to assess the K-1 contactor material condition. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report.

The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.9 Diesel Fuel Oil Consumption Calculation Update

a. Inspection Scope

The team reviewed design change ECR 09-00487 which updated the EDG fuel oil consumption calculation. Exelon updated the calculation as a result of an NRC component design basis inspection (05000352; 353/2009006). The NRC issue was identified in Issue Report (IR) 976128. The NRC had questioned Exelon's ability to meet the EDG design basis run time of seven days for EDG D12 based on statements identified in calculation LM-0007, "Diesel Generator Fuel Oil Consumption," Revision 2.

The team reviewed the calculation update and supporting documentation to verify the design basis, licensing basis, and performance capability of the EDG. The team interviewed plant engineers to determine if the calculation inputs and results met design and licensing requirements. The team reviewed the calculation inputs for LM-0007 to determine the basis for fuel consumption. The team verified that Exelon was using EDG maximum loading for the entire seven day duration for fuel oil consumption even though EDG loading decreases after the initial 10 minutes, which would result in lower loading and fuel oil consumption. The team also reviewed ANSI/ANS-59.51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators" to verify that Exelon was using appropriate methodologies for calculating fuel oil consumption. Additionally, the team reviewed associated evaluations and condition reports. The team also walked down the EDG rooms to assess material condition. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report. The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2.10 Defeat of 5V Diagnostic Signal Circuit on ASD Redundant Controller Dual Power Supply Assemblies

a. Inspection Scope

The team reviewed modification ECR-13-00404 which removed a diagnostic signal from each of two dual power supply assemblies that power their respective redundant

controllers for the adjustable speed drive (ASD). The ASDs provide power to control the reactor recirculation pump (RRP) speed. The diagnostic signal is received when both of the redundant power supplies feeding the controller are not working as expected (i.e., less than adequate voltage levels). A failure of the primary controller "A" will result in a transfer of all control function to the "B" controller. Exelon implemented the modification as a result of identifying a problem with the controller logic.

IR 1423618 identified that the 1A RRP tripped when the primary controller "A" sense a low voltage condition and tried to swap to the secondary controller "B", with the controller "B" out of service for other reasons. The sensed loss of controller "A" voltage resulted in an anticipated loss of power to the ASD controller and a RRP trip. Exelon identified that the voltage supplied to the controllers was within acceptable values but that the controller logic was not working as expected. The modification performed bypassed this signal by inserting a constant voltage signal into the input of the controllers. With additional redundancy built into the ASD controllers, there are other active diagnostic signals available that will adequately detect and provide notification via alarms and status log messages of misoperation of either dual power supply assemblies, thereby maintaining equipment protection of the drive components.

The team reviewed the modification to verify that the design basis, licensing basis, and performance capability of the ASD controllers had not been degraded by the modification. The team interviewed plant engineers and reviewed drawings to determine if the changes met design and licensing requirements. Additionally, the team reviewed evaluations and the PMT results to determine if Exelon had properly implemented the logic modification. The team also reviewed condition reports to evaluate whether the controllers performed reliably and whether any new performance issues had resulted from the modification. The 10 CFR 50.59 screening determination associated with this modification was also reviewed as described in Section 1R17.1 of this report.

The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of CRs associated with 10 CFR 50.59 and plant modification issues to evaluate whether Exelon was appropriately identifying, characterizing, and correcting problems associated with these areas, and whether the planned or completed corrective actions were appropriate. In addition, the team reviewed CRs written on issues identified during the inspection to verify Exelon adequately described the problem and incorporated the issue into their corrective action system.

The reviewed CRs are listed in the Attachment.

b. Findings

No findings were identified.

4OA6 Meetings, including Exit

The team presented the inspection results to Mr. T. Dougherty, Site Vice President, and other members of Exelon's staff at an exit meeting on November 21, 2014. The team returned the proprietary information reviewed during the inspection and verified that this report does not contain proprietary information.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Dougherty	Site Vice President
D. Lewis	Plant Manager
J. Bendyk	System Engineer
J. Berg	System Engineer
B. Braun	System Engineer
B. Brower	Mechanical Design Engineer
G. Budock	Regulatory Assurance
E. Hosterman	Design Engineer
T. Kuklenski	Procurement Engineer
N. Lampey	EDG Systems Engineer
M. Mcgill	Design Engineer
F. Michaels	Procurement Engineering Supervisor
D. O'Connor	Appendix J Programs Engineer
N. Roy	Design Engineer
R. Schwab	Mechanical Design Engineer
G. Yerry	Procurement Engineer

ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

None

Discussed

05000352/353/2009006-01	NCV	Failure to Verify Battery Capacity to Recover from Station Blackout (Section IR21.2.1.1)
05000352/2011007-01	NCV	Failure to Evaluate Station Blackout Timeline for EDG Availability (section 1R17.1b)

LIST OF DOCUMENTS REVIEWED

10 CFR 50.59 Evaluations

LG2011E004, Assessment of the effect of ECR 01-00816 on Station Blackout Coping, Revision 0

LG2012E001, Provide an Alternate Means of Monitoring Reactor Well Seal Leak for Unit 1, Revision 0

LG2012E002, Correct for Potential Reactor Protection System Level 3 (+12.5”) Setpoint Error, Revision 0
LG2012E003, Limerick Unit 1 Cycle 15 Management, Revision 0
LG2013E001, Digital Electro-Hydraulic Control System Upgrades, Revision 0
LG2013E002, Application of TRACG04P Version 4.2.69.0 for OPRM Setpoint Determination at Limerick, Revision 0

10 CFR 50.59 Screened-out Evaluations

ECP- LG-14-00111, Service Level 1 Coating Qualification DBA Results, Revision 0
ECR-LG-10-00208, Phase 1A Replacement of the RHRSW Return Loop A, Revision 5
ECR-LG-10-00379, RCIC Turbine Governor Speed Limit Increase, Revision 0
ECR-LG-10-00482, ECR to Replace “A” RHRSW Loop Return Piping – 2R13, Revision 2
ECR-LG-11-00105, High Pressure Coolant Injection and Residual Heat Removal Service Water Motor Operated Valve (MOV) Loss of Power/Overload Annunciator Circuit Modification, Revision 0
ECR-LG-11-00434, Revise Unit 2 HP Turbine 1st Stage Pressure Switch Setpoints, Revision 0
ECR-LG-12-00035, Application of TRACG04P Version 4.2.69.0 for OPRM Setpoint Determination at Limerick, Revision 0
ECR-LG-12-00110, 0A/B-K112 Control Enclosure Chillers Condenser Water Flow Change, Revision 0
ECR-LG-13-00041, ECR for Changes to RHRSW Min Flows to RHR HX’s, Revision 0
ECR-LG-13-00073, Disable EHC SVLL Logic to Mitigate U2 Power Transient, Revision 0
ECR-LG-13-00157, Magnesium Rotor Motor Boroscope Inspection Results, Revision 0
LG2012S040, Steam Trap on RCIC Steam Line Not Working as Designed, Revision 0
LG2013S005, TRACG04P Error Correction (Version 4.2.69.0) for AOO
LG2013S006, Application of TRACG04P Version 4.2.69.0 for OPRM Setpoint Determination at Limerick, Revision 0
LG2013S018, Limerick Unit 2 Cycle 13 Core Reload Design, Revision 0
LG2014S010, Limerick Unit 1 Cycle 16 Core Reload Design, Revision 0
LG2014S034, ECR Needed to Install Time Delay in EDG Compressor Circuit, Revision 0
LS2012S026, Control Structure Chiller Condenser Cooling Water Flow Rate Change, Revision 0

Modification Packages

ECR-LG-09-00487, CDBI Diesel Fuel Oil Consumption Calc Update, Revision 0*
ECR-LG-10-00379, RCIC Turbine Governor Speed Limit Increase, Revision 0
ECR-LG-11-00280, 114-80811 K-1 Contactor ARI for Diesel Generator IEE, Revision 0*
ECR-LG-11-00105, High Pressure Coolant Injection and Residual Heat Removal Service Water Motor Operated Valve (MOV) Loss of Power/Overload Annunciator Circuit Modification, Revision 0*
ECR-LG-11-00219, 118-00733 EDG Speed Switch X-GA-(1,2) 0025A,B,C,D, Revision 2
ECR-LG-12-00110, 0A/B-K112 Control Enclosure Chillers Condenser Water Flow Change, Revision 0

ECR-LG-12-00174, NCV for SBO Related EDG – Jacket Water Cooling, Revision 0*
ECR-LG-13-00145, HBC-507-01 RHRSW Piping Found Below Minimum Wall, Revision 1
ECR-LG-13-00404, Defeat of 5V Diagnostic Signal Circuit on ASD Redundant Controller Dual Power Supply Assemblies, Revision 0*
ECR-LG-13-00527, HV-049-1F084 Has Guide Wear on Upstream Left Side, Revision 0*
(*modification that is also a 10 CFR 50.59 screen-out evaluation sample not previously listed)

Calculations, Analysis, and Evaluations
Carrier Engineering Analysis, Reduced Condenser Water Flow, dated 02/22/12
HV-049-1F013, DC Motor GL96-05 Gate Valve, Revision 4
LE-0052, Class 1 E Battery Load Duty Cycle Determination, Revision 15
LE-0069, Class 1 E 125V DC System Voltage Analysis, Revision 17
LM-0007, Diesel Generator Fuel Oil Consumption, Revision 6
LM-036, Evaluation of Heat Transfer Data for the Unit 1 and 2 RHR Heat Exchangers as Required by GL 89-13, Revision 1
LM-0688, SBO – Cooldown of Diesel Jacket Water System, Revision 0
M-49-04, RCIC Pump Pressure, NPSH, Allowable Degradation and Pipe Volumes, Revision 13
M-50-03, RCIC Restricting Orifice, FO-050-1(2)D005 and Pressure Control Valve, PCV-050-1(2) F015, Revision 0

Drawings
8031-M-11, P&ID Emergency Service Water, (Unit 1, Unit 2 and Common), Revision 74
8031-M-12, P&ID Residual Heat Removal Service Water (Unit 1), Revision 7
8031-M-12, Sht. 1, P&ID Residual Heat Removal Service Water (Common), Revision 78
8031-M-43, Sht. 3, P&ID Reactor Recirculation Pump (Unit 2), Revision 23
8031-M-49, Sht. 1, Reactor Core Isolation Cooling, Revision 55
8031-M-51, Sht. 5, P&ID Residual Heat Removal (Unit 2), Revision 30
8031-M-51, Sht. 6, P&ID Residual Heat Removal (Unit 2), Revision 23
8031-M-51, Sht. 7, P&ID Residual Heat Removal (Unit 2), Revision 21
8031-M-52, P&ID Core Spray, Revision 51
8031-M-55, P&ID HPCI, Revision 58
HBB-145-01, Sht. 1, Isometric - Reactor Building, RCIC – Unit 1, Revision 9
M-71-48, Sht. 12, Schematic, Engine Control, Revision 3
M-71-127, Sht. 21, Wiring Diagram Diesel Generator Power Unit, Revision 1
M-71-00147, Sht. 001, Nuclear Exciter/Regulator, Revision 21
M-204, Piping and Mechanical, Reactor Bldg. Unit No. 1, Tunnel at El. 198'-0" Areas 15 & 16, Revision 24
P12620666, Sht. 1 and 2, Assembly, Speed Switch, Revision 2
P12620767, Sht. 3, Assembly, Speed Switch, Revision 0

Procedures
IC-11-00713, Tuning of Inner Loop and Outer Loop RCIC Controls, Revision 2
OP-LG-108-103-1101, Limerick Generating Station Unit 1 Locked Valve List, Revision 16
RT-2-011-251-0, ESW Loop A Flow Balance, Revision 26
S49.1.D, RCIC System Full Flow Functional Test and Turbine Oil Priming, Revision 42
S49.7.A, Transfer of RCIC from Pressure Control Mode to Injection Mode and Back, Revision 11
SB12.7.B, Utilization of Cooling Tower or Spray Pond as a Heat Sink for RHRSW and ESW, Revision 20
SE-1, Remote Shutdown, Revision 70
SE-10, LOCA, Revision 59
ST-6-049-230-1, RCIC Pump, Valve and Flow Test performed 9-21-14
T-100, Scram/Scram Recovery, Revision 17
T-100, Scram/Scram Recovery – Bases, Revision 15
T-101, RPV Control RC/Q, RC/L, RC/P, Revision 21

Issue Reports

388121	1247387	1489571	2414567*
656269	1292570	1636884	2415270*
976128	1391416	1681878	2415287*
1172515	1414816	2059870	
1182458	1489181	2395063	

(*denotes NRC identified during this inspection)

Procedures
S53.0.A, Normal Makeup/Response to Low Level in Fuel Storage Pool or Reactor Well, Revision 25
M-055-004, HPCI Turbine Inspection, Revision 2
M-020-010, Standby Diesel Generator Cylinder Liner Replacement, Revision 12
E-1, Loss of All AC Power (Station Blackout), Revision 45
E-10/20, Loss of Offsite Power, Revision 50

Work Orders

R1293241-01	C0249677	C0217181	C0247409
C0246287	C0242449	C0226216	
C0239635	R1223823	C0247402	

Miscellaneous

ANSI/ANS-59.51-1997, Fuel Oil Systems for Safety-Related Emergency Diesel Generators
Core Operating Limits Report for Limerick Generating Station Unit 1 Reload 14 Cycle 15 FCP ECR LG 12-00450, Revision 0
Core Operating Limits Report for Limerick Generating Station Unit 1 Reload 15 Cycle 16 FCP ECR LG 13-00136, Revision 1
Core Operating Limits Report for Limerick Generating Station Unit 2 Reload 12 Cycle 13, Revision 8
Core Operating Limits Report for Limerick Generating Station Unit 2 Reload 11 Cycle 12, Revision 7
Fairbanks Morse Engines Certificate of Conformance, dated 11/12/12
LEOT0090, Control Enclosure Chilled Water, Revision 6
Limerick Generating Station Updated Final Safety Analysis Report
Limerick Generating Station Plant Technical Specifications
LLOT0011, Emergency Service Water System, Revision 1

Surveillance and Modification Acceptance Tests

ST-4-LLR-991-1, RCIC Vacuum Relief, performed 3/27/14
ST-6-092-311-1, D11 Diesel Generator Slow Start Operability Test Run, performed 10/28/14
ST-6-092-312-2, D22 Diesel Generator Slow Start Operability Test Run, performed 10/02/14
ST-6-092-314-2, D24 Diesel Generator Slow Start Operability Test Run, performed 10/02/14
ST-6-092-316-1, D12 Diesel Generator Fast Start Operability Test Run, performed 10/08/14
MIDASTEST 2012.285, MOV Post-Test Data Review Worksheet, performed 3/25/14

Design & Licensing Bases

L-T-13, Station Blackout, LGS Units 1 and 2, Revision 3
L-S-02, Emergency Service Water System, Revision 15
L-S-07, Diesel Generator and Auxiliary Systems, Revision 15

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ASD	Adjustable Speed Drive
CFR	Code of Federal Regulations
CST	Condensate Storage Tank
DBD	Design Basis Documnet
DRS	Division of Reactor Safety
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
ESW	Emergency Service Water
GPM	Gallons per Minute
HPCI	High Pressure Coolant Injection
IR	Issue Report
LGS	Limerick Generating Station
LLRT	Local Leak Rate Testing
MCC	Motor Control Center
MOV	Motor Operated Valve
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
P&ID	Piping and Instrumentation Diagram
PARS	Publicly Available Records
PCIV	Primary Containment Isolation Valve
PMT	Post-Modification Test
RCIC	Reactor Core Isolation Cooling
RHRSW	Residual Heat Removal Service Water
RPM	Revolutions per Minute
RRP	Reactor Recirculation Pump
SBO	Station Blackout
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report