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

May 13, 2011

Mr. Michael J. Pacilio
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer, Exelon Nuclear
4300 Winfield Rd.
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 – NRC TEMPORARY INSTRUCTION 2515/183 INSPECTION REPORT 05000352/2011008 AND 05000353/2011008

Dear Mr. Pacilio:

On April 28, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Limerick Generating Station using Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event." The enclosed inspection report documents the inspection results which were discussed on April 28, 2011, with Mr. P. Gardner and other members of your staff.

The objective of this inspection was to promptly assess the capabilities of Limerick Generating Station to respond to extraordinary consequences similar to those that have recently occurred at the Japanese Fukushima Daiichi Nuclear Station. The results from this inspection, along with the results from this inspection performed at other operating commercial nuclear plants in the United States will be used to evaluate the United States nuclear industry's readiness to safely respond to similar events. These results will also help the NRC to determine if additional regulatory actions are warranted.

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report. You are not required to respond to this letter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure: Inspection Report 05000352/2011008 and 05000353/2011008

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

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/RA/

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REGION I

Docket Nos:	50-352, 50-353
License Nos:	NPF-39, NPF-85
Report No:	05000352/2011008 and 05000353/2011008
Licensee:	Exelon Generating Company, LLC
Facility:	Limerick Generating Station, Units 1 and 2
Location:	Sanatoga, PA 19464
Dates:	April 8, 2011 through April 28, 2011
Inspectors:	E. DiPaolo, Senior Resident Inspector N. Sieller, Resident Inspector T. Hedigan, Operations Engineer
Approved by:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000352/2011008 and 05000353/2011008; 04/08/2011 – 04/28/2011; Limerick Generating Station, Units 1 and 2; Temporary Instruction 2515/183 - Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event.

This report covers an announced Temporary Instruction (TI) inspection. The inspection was conducted by two resident inspectors and a region based inspector. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

INSPECTION SCOPE

The intent of the TI is to provide a broad overview of the industry's preparedness for events that may exceed the current design basis for a plant. The focus of the TI was on (1) assessing the licensee's capability to mitigate consequences from large fires or explosions on site, (2) assessing the licensee's capability to mitigate station blackout (SBO) conditions, (3) assessing the licensee's capability to mitigate internal and external flooding events accounted for by the station's design, and (4) assessing the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. If necessary, a more specific followup inspection will be performed at a later date.

INSPECTION RESULTS

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events, typically bounded by security threats, committed to as part of NRC Security Order Section B.5.b issued February 25, 2002, and severe accident management guidelines and as required by Title 10 of the Code of Federal Regulations (10 CFR) 50.54(hh). Use Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," Section 02.03 and 03.03 as a guideline. If IP 71111.05T was recently performed at the facility the inspector should review the inspection results and findings to identify any other potential areas of inspection. Particular emphasis should be placed on strategies related to the spent fuel pool. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action	Describe what the licensee did to test or inspect equipment.
a. Verify through test or inspection that equipment is available and functional. Active equipment shall be tested and passive equipment shall be walked down and inspected. It is not expected that permanently installed equipment that is tested under an existing regulatory testing program be retested. This review should be done for a reasonable sample of mitigating strategies/equipment.	The licensee reviewed the B.5.b equipment inspection and testing preventive maintenance tasks to ensure that the tasks were up to date and the equipment was available and functional. In addition, site walkdowns were conducted to verify the adequacy of required inventories. Portable equipment such as the portable fire pump and DC generator were run to verify readiness. The B.5.b and Severe Accident Management Procedures (SAMP) were verified current and staged in the appropriate locations.
	Describe inspector actions taken to confirm equipment readiness (e.g., observed a test, reviewed test results, discussed actions, reviewed records, etc.).
	The inspectors evaluated the adequacy of installed and portable equipment staged explicitly for implementation of the mitigation strategies. The types of equipment examined included: portable pump and associated suction and discharge hoses, adapters, and tools; portable generator/DC power supply; and equipment lockers and associated tools. The inspectors review included field verification and inventory checks of standby and staged equipment, and compatibility of the portable equipment with installed systems. In addition, the inspectors evaluated the staging/storage locations of B.5.b related equipment to ensure the survivability and availability of equipment. Documents reviewed are listed in the Attachment.

		Discuss general results including corrective actions by licensee.
		During the course of the licensee's review, several issue reports (IR) were generated to document degraded conditions and enhancement opportunities. The inspectors' review also identified minor issues that were captured in IRs by the licensee for further evaluation. The inspectors determined that none of the NRC or licensee-identified issues adversely impacted the availability or functionality of the required equipment. IRs generated are listed in the Attachment. These issues will be dispositioned through the licensee's corrective action program (CAP).
Licensee Action		Describe the licensee's actions to verify that procedures are in place and can be executed (e.g. walkdowns, demonstrations, tests, etc.).
b. Verify through walkdowns or demonstration that procedures to implement the strategies associated with B.5.b and 10 CFR 50.54(hh) are in place and are executable. Licensees may choose not to connect or		The licensee had personnel walkdown procedures for B.5.b. and SAMP. The respective procedures were reviewed to ensure that they could be performed as written. During the walkdowns some procedural enhancements were identified by the operators. IR 1191259 was written to document the procedure enhancements. The inspectors reviewed these actions and determined them to be appropriate.
		Describe inspector actions and the sample strategies reviewed. Assess whether procedures were in place and could be used as intended.

operate permanently installed equipment during this verification. This review should be done for a reasonable sample of mitigating strategies/equipment.		The inspectors examined the station's established guidelines and implementing procedures for the B.5.b mitigation strategies. The inspectors selected a number of mitigation strategies and conducted plant walkdowns with an operator to verify: the adequacy and completeness of the procedures; familiarity of operators with the procedure objectives and specific guidance; staging and compatibility of equipment; and the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios. Documents reviewed are listed in the Attachment.
		Discuss general results including corrective actions by licensee.
		During the course of the licensee's review, several IRs were generated to document degraded conditions and enhancement opportunities. The inspectors' review also identified minor issues that were captured in IRs by the licensee for further evaluation. The inspectors determined that none of the NRC or licensee-identified issues had the potential to significantly impact Limerick's response to strategies associated with B.5.b and 10 CFR 50.54(hh).
Licensee Action		Describe the licensee's actions and conclusions regarding training and qualifications of operators and support staff.
c. Verify the training and qualifications of operators and the support staff needed to implement the procedures and work instructions are current for activities related to Security Order Section B.5.b and severe		The licensee verified that initial B.5.b training was conducted. Additionally, the licensee verified that all required operations personnel have received initial and continuing SAMP training. SAMP training is conducted annually as part of emergency preparedness training. B.5.b continuing training is conducted every two years in accordance with the Long Range Training Plan. The licensee reviewed training records and documentation to ensure that the training was up to date and verified that there were a sufficient number of trained personnel on-site and throughout Exelon to implement the severe accident mitigation guidelines.

accident management guidelines as required by 10 CFR 50.54 (hh).		Describe inspectors actions and the sample strategies reviewed to assess training and qualifications of operators and support staff.
		The inspectors reviewed the documentation of training for each individual procedure and verified that the appropriate groups of operators were trained on the B.5.b and SAMP procedures. Documents reviewed are listed in the Attachment.
		Discuss general results including corrective actions by licensee.
		The licensee identified that one procedure (T-242) was not identified on the equipment operator (EO) task list. It was confirmed that the EO's are trained on this procedure and capable of performing the tasks. IR 1191205 was written to add this procedure to the EO task list. Based on these reviews, the inspectors concluded that the training and qualifications of operators and the support staff needed to implement the procedures and work instructions are current for activities related to Security Order Section B.5.b and severe accident management guidelines as required by 10 CFR 50.54 (hh).

Licensee Action		Describe the licensee's actions and conclusions regarding applicable agreements and contracts are in place.
d. Verify that any applicable agreements and contracts are in place and are capable of meeting the conditions needed to mitigate the consequences of these events. This review should be done for a reasonable sample of mitigating strategies/equipment.		The licensee verified that agreements from the municipal fire departments and other commitments for various pieces of support equipment required to implement the strategies were in place and active.
		For a sample of mitigating strategies involving contracts or agreements with offsite entities, describe inspectors actions to confirm agreements and contracts are in place and current (e.g., confirm that offsite fire assistance agreement is in place and current).
		The inspectors verified that the licensee had in place current memoranda of understanding with off-site agencies to provide assistance in mitigation strategies. In addition, the inspectors verified the licensee had adequate lifting capability (e.g., fire truck with an extension ladder) to elevate the monitor or spray nozzles to allow spraying into the spent fuel pool and/or pumping capacity to charge the fire header or provide spray into the spent fuel pool. Documents reviewed are listed in the Attachment.
		Discuss general results including corrective actions by licensee.
		No deficiencies were identified. The inspectors concluded that applicable agreements and contracts are in place and are capable of meeting the conditions needed to mitigate the consequences of these events.
Licensee Action		Document the corrective action report number and briefly summarize problems noted by the licensee that have significant potential to prevent the success of any existing mitigating strategy.

e. Review any open corrective action documents to assess problems with mitigating strategy implementation identified by the licensee. Assess the impact of the problem on the mitigating capability and the remaining capability that is not impacted.		The inspectors reviewed numerous IRs during this inspection, including all IRs identified by the licensee during their recent self assessments of B.5.b mitigating strategies. The reviewed IRs are listed in the Attachment to this report. In addition, NRC Resident Inspectors conduct daily reviews of newly issued IRs. The inspectors evaluated the licensee's immediate corrective actions for the associated IRs and concluded that the actions appeared to be reasonable, with no significant impact on the mitigating capabilities.

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions, as required by 10 CFR 50.63, "Loss of All Alternating Current Power," and station design, is functional and valid. Refer to TI 2515/120, "Inspection of Implementation of Station Blackout Rule Multi-Plant Action Item A-22" as a guideline. It is not intended that TI 2515/120 be completely reinspected. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action		Describe the licensee's actions to verify the adequacy of equipment needed to mitigate an SBO event.
a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.		The licensee conducted walkdowns and inspections to verify that all materials required for an SBO were adequate and properly staged. The licensee performed routine test RT-6-000-904-0, "Inspection of Emergency Equipment," a semi-annual recurring test, which performs an inventory of SBO-staged equipment and verifies the equipment is in good working order.

		Describe inspectors actions to verify equipment is available and useable.
		The inspectors assessed the licensee's capability to mitigate SBO conditions by conducting a review of the licensee's walkdown activities, interviewing operators, and independently performing a walkdown of on-site SBO equipment. Specifically, the inspectors walked down all emergency diesel generators, station batteries, and alternate AC power source switchgear. The inspectors verified that all necessary equipment to perform SBO actions was identified in established procedures. The inspectors reviewed the last performance of RT-6-000-904-0, which was performed on March 18, 2011. Documents reviewed are listed in the Attachment.
		Discuss general results including corrective actions by licensee.
		No deficiencies were identified. The inspectors concluded that the licensee's reviews verified that SBO equipment was ready to respond to an SBO condition.
Licensee Action		Describe the licensee's actions to verify the capability to mitigate an SBO event.
b. Demonstrate through walkdowns that procedures for response to an SBO are executable.		Licensee actions included the identification of procedures required for response to a SBO and a walkdown for both units to verify that the procedures were executable. The licensee performed an audit of the SBO and associated procedures to confirm all designated locations have the required procedures, the procedures are the latest revision, and the procedures are in good condition. The licensee verified that licensed operators are periodically trained and tested on SBO and that all licensed operators were properly qualified.
		Describe inspectors actions to assess whether procedures were in place and could be used as intended.

		The inspectors assessed the licensee's capabilities by conducting a review of the licensee's walkdown activities. In addition, the inspectors selected several portions of the procedures walked down by the licensee and walked those down to independently verify the licensee's conclusions. The inspectors observed a walk through of a Unit 1 SBO event on the simulator performed by a licensed senior reactor operator. Documents reviewed are listed in the Attachment.
		Discuss general results including corrective actions by licensee.
		The NRC inspectors determined that Limerick's procedures for response to an SBO were executable. However, the inspectors identified a potential issue regarding the licensing basis for the assumed alternate AC power source. Supplemental Safety Evaluation for Station Blackout Rule (10 CFR 50.63) for Limerick Units 1 and 2, dated June 10, 1992, documented the NRC Staff's evaluation of Limerick's proposed alternate AC power source for the blacked out unit. The alternate AC power source credited the excess capacity from the non-blacked out unit's emergency diesel generators (EDG). Considering the single failure criterion, three EDGs on the non-blacked out unit were assumed to be available. The inspectors found that, in certain SBO scenarios, only two EDGs from the non-blacked out unit would be available, whereas the current licensing basis assumes three EDGs would be available on the non-blacked out unit. For the cases of a Unit 1 SBO with the single failure of either EDG D23 or D24, only two EDGs would remain available. This is because D23 and D24 power the 'C' and 'D' emergency service water (ESW) pumps, respectively. EDGs D21 and D22 cannot power these pumps, yet they rely on 'C' and 'D' ESW pumps for cooling during a Unit 1 SBO. Therefore, the loss of EDG D23 also results in the unavailability of EDG D21, and the loss of EDG D24 results in the unavailability of EDG D22. This deficiency does not apply to Unit 2 SBO events, because each Unit 1 EDG has the ability to power an ESW pump. D11 normally powers the 'A' ESW pump and D12 normally powers the 'B' ESW pump. D13 and D14 have the capability to power the 'C' and 'D' ESW pumps, respectively, by removing their associated circuit breaker from their normal location in the Unit 2 switchgear and reinstalling the breaker in the redundant cubicle in the Unit 1 switchgear. The inspectors verified that procedures and training were in-place to install circuit breakers into the appropriate redundant breaker cubicles on D13 and D14 for the 'C' and 'D' ESW pumps, and to operate the ESW pumps using Unit 1 power.

		The inspectors observed a walk though of a Unit 1 SBO event on the simulator with only two available EDGs on Unit 2, performed by a licensed senior reactor operator. The licensee demonstrated that sufficient power was available to maintain the units in a safe condition for the 4-hour SBO coping time. This was accomplished by operating the reactor core isolation cooling system and removing heat from the suppression pool using one residual heat removal pump in the suppression pool cooling mode on each unit. The inspectors also noted that for the condition described above (i.e., failure of EDG D23 or D24 during Unit 1 SBO with a resultant loss of ESW for EDG D21 or D22), plant operators could subsequently recover a third Unit 2 EDG. This could be performed by energizing Unit 1 emergency bus D11 or D12, starting the appropriate ESW pump powered from the bus ('A' for D11 and 'B' for D12) which will provide cooling to EDG D21 or D22, and then starting the EDG. The inability to satisfy the licensing basis assumed alternate AC power source (i.e., three EDG's on the non-blacked out unit without using recovery procedures) during a certain Unit 1 station blackout event requires further review to determine compliance with 10 CFR Part 50.63, "Loss of All Alternate Current Power." The licensee entered this issue into the CAP as IR 1208490, Potential Station Blackout Procedure Bases Licensing Issue. This unresolved item (URI) is identified as **URI 05000352, 353/2011008-01, Station Blackout Licensing Basis Assumed Alternate AC Power Source.** During the course of the licensee's review, several IRs were generated to document degraded conditions and enhancement opportunities. The inspectors' review also identified minor issues that were captured in IRs by the licensee for further evaluation. The inspectors determined that none of the NRC or licensee-identified issues had the potential to significantly impact Limerick's response to a SBO event. The IRs generated as a result of the SBO review are listed in the Attachment. These issues will be dispositioned through the licensee's CAP.

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design. Refer to IP 71111.01, "Adverse Weather Protection," Section 02.04, "Evaluate Readiness to Cope with External Flooding" as a guideline. The inspection should include, but not be limited to, an assessment of any licensee actions to verify through walkdowns and inspections that all required materials and equipment are adequate and properly staged. These walkdowns and inspections shall include verification that accessible doors, barriers, and penetration seals are functional.	
Licensee Action	Describe the licensee's actions to verify the capability to mitigate existing design basis flooding events.
a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.	The licensee reviewed applicable design documentation to verify their internal and external flooding design basis. These documents included the Updated Final Safety Analysis Report, Severe Accident Risk Assessment, Individual Plant Examination for Severe Accident Vulnerabilities, Individual Plant Examination for External Events, and several flooding calculations. The licensee verified that flooding procedures were in place and approved for use at the site. Licensed and non-licensed operator training was reviewed to ensure personnel have been properly trained and tested on the flooding procedures. The licensee reviewed test and maintenance records of systems, structures, and components (SSC) required to mitigate a flood to ensure they would were being properly maintained. Physical walkdowns were performed of all flooding related equipment and staged material to ensure they were adequate and properly staged.
	Describe inspectors actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.

		The inspectors reviewed Limerick's design basis documents for internal and external floods to determine what areas of the plant were most susceptible to flooding. The inspectors selected several areas to walkdown based on their risk significance and flooding potential. These areas included: • ESW / Residual Heat Removal Service Water (RHRSW) Pipe Tunnel; • Unit 1 Reactor Enclosure Emergency Core Cooling System rooms; • Turbine Building to Control Enclosure doors; and • Emergency Diesel Generator Fuel Oil Storage Tank Access Pits. The inspectors determined the inspected areas were adequately protected against potential floods. The inspectors reviewed applicable flooding procedures for these areas and verified they were executable and adequate to mitigate flooding events. The inspectors also reviewed the results of the licensee's walkdowns to assess the type and extent of degraded conditions that were identified. The inspectors verified that IRs were generated to enter these issues into the CAP. For a sample of IRs, the inspectors verified that the licensee's corrective actions were appropriate and timely, and commensurate with their significance. Documents reviewed are listed in the Attachment.
		Discuss general results including corrective actions by licensee.
		The inspectors determined that at Limerick Generating Station Units 1 and 2, all required materials are adequate and properly staged, tested, and maintained to protect against internal and external flooding events within the station's design basis. During the course of the licensee's review, several IRs were generated to document degraded conditions and enhancement opportunities. The inspectors' review also identified several minor issues that were captured in IRs by the licensee for further evaluation. The inspectors determined that none of the NRC or licensee-identified issues had the potential to significantly impact Limerick's response to a flooding event. The IRs generated as a result of the flooding review are listed in the Attachment. These issues will be dispositioned through the licensee's CAP.

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. Assess the licensee's development of any new mitigating strategies for identified vulnerabilities (e.g., entered it in to the corrective action program and any immediate actions taken). As a minimum, the licensee should have performed walkdowns and inspections of important equipment (permanent and temporary) such as storage tanks, plant water intake structures, and fire and flood response equipment; and developed mitigating strategies to cope with the loss of that important function. Use IP 71111.21, "Component Design Basis Inspection," Appendix 3, "Component Walkdown Considerations," as a guideline to assess the thoroughness of the licensee's walkdowns and inspections.	
Licensee Action	Describe the licensee's actions to assess the potential impact of seismic events on the availability of equipment used in fire and flooding mitigation strategies.
a. Verify through walkdowns that all required materials are adequate and properly staged, tested, and maintained.	In addition to the flooding documentation reviewed as part of Section 03.03, the licensee reviewed all fire related procedures. This included the emergency procedure for responding to fires (SE-8), individual response strategies for each fire area, and procedures for individual system/component operation. The licensee performed walkdowns of all SSCs credited for flood and fire mitigation to assess the potential impact of a seismic event on their functionality and availability. These walkdowns included examination of fire and flood barriers (such as seals, doors, and walls), storage tanks, and fire system piping and pumps. The licensee reviewed all flood and fire related surveillance tests and preventive maintenance records to ensure materials and equipment were being properly maintained.
	Describe inspectors actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.

		The inspectors reviewed Limerick's design basis documents to determine what areas of the plant were most susceptible to fire and flooding events. The inspectors selected areas to walkdown based on their risk significance and flooding potential. These areas were the same as those listed in Section 03.03, above. The inspectors reviewed applicable procedures for these areas to verify they were executable and adequate to mitigate flooding and fire events. The inspectors reviewed the results of the licensee's walkdowns to assess the type and extent of issues that were identified. The inspectors verified that all identified vulnerabilities were entered into the CAP. Documents reviewed are listed in the Attachment.
		Discuss general results including corrective actions by licensee. Briefly summarize any new mitigating strategies identified by the licensee as a result of their reviews.
		The inspectors determined that many of the SSCs relied upon to mitigate flood and fire events at Limerick are not designed to meet seismic qualification standards. Therefore, a design basis seismic event at the site could adversely impact the plant's fire and flood mitigation capabilities. The licensee identified several specific vulnerabilities and documented them in IR 1201621 for additional evaluation and follow-up. At this time, no new mitigating strategies have been identified by the licensee. Regarding fire protection, the inspectors determined that the fire protection system was not designed to seismic Category 1 specifications. This includes the water-based systems (pumps, cooling tower supply source, ring header, risers, and piping), as well as the Cardox suppression system and Halon suppression system. Therefore, a design basis earthquake at the site could significantly impact the plant's ability to respond to a potential fire.

		Regarding flood mitigation, the licensee identified several SSCs that were not designed to seismic Category 1 specifications. Accordingly, these SSCs could not be relied upon to fulfill their flood mitigation function following a design basis earthquake. Examples include: • Many of the Turbine Building walls are credited for external and internal flood scenarios. Although analysis has shown that the Turbine Building will not collapse due to a safe shutdown earthquake, it is not known what impact a seismic event would have on its flood mitigating capabilities. • Limerick's flood and fire penetration seals are not specifically designed or tested to be seismic. • The collapse of non-seismic structures could impact drainage flow paths across the site. The above stated vulnerabilities are considered beyond-design-basis. However, the licensee documented these vulnerabilities in IR 1201621 for further evaluation and follow-up. The inspectors concluded that the licensee meets the current licensing and design bases for fire protection and flooding.

Meetings

4OA6 Exit Meeting

The inspectors presented the inspection results to Mr. P. Gardner and other members of licensee management at the conclusion of the inspection on April 28, 2011. Proprietary information reviewed by the inspectors during the inspection was returned to the licensee. The inspectors verified the inspection report does not contain proprietary information.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
W. McGuire, Site Vice President
P. Gardner, Plant Manager
J. Hunter, Manager, Regulatory Assurance
C. Markle, Senior Operations CAP Coordinator
L. Harding, Regulatory Assurance Engineer
H. T. Johnston, Engineer
F. Coffey, Manager, Operations Support
R. Brown, Senior Operations Procedure Writer
M. Barth, Engineer
T. Byers, Licensed Senior Reactor Operator
L. Stanford, Licensed Operator Instructor

Nuclear Regulatory Commission
T. Hedigan, Operations Engineer
C. Cahill, Senior Reactor Analyst

Other Personnel
M. Murphy, Inspector, Commonwealth of Pennsylvania

LIST OF ITEMS OPENED OR CLOSED

Opened

05000352, 353/2011008-01	URI	Station Blackout Licensing Basis Assumed Alternate AC Power Source (Section 03.02.b)

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Issue Reports with an asterisk (*) indicate the document was written as a result of the inspection effort.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events

Procedures:

AD-LG-101-1001, Limerick Site Procedure Writer's Guide, Rev. 1
R11831161, Portable 125Volt DC Power Supply for Safety/Relief Valve Operation, Rev. 0
RT-6-000-913-0, Inspection of B.5.b Security Order Equipment, Rev. 7
S100.1.A, Operation of the Godwin Dri-Prime HL110M Diesel Driven Portable Pump, Rev. 7
T-242, Defeat of HPCI/RCIC Isolation Logic, Rev. 9
TSG-3.1, Trip/SAMP Action Timing, Rev. 0
TSG-4.1, Operational Contingency Guidelines, Rev. 9
TSG-4.2, Extreme Damage Mitigation Guideline for Loss of a Large Area of the Plant, Rev. 3

Issue Reports:

IR 1191205, Procedure T-242 was Not Identified on the EO Task List
IR 1191259, Nuclear Event Report NC-11-009, Procedure Walkdown Improvements
IR 1191259, Procedure Enhancements
*IR 1193092, SRV Portable Power Supply Fuse Rating Low Margin
IR 1194246, B.5.b Equipment Testing Results Were not Properly Documented
IR 1201834, Evaluate Refueling Bridge Storage Location and Add Procedure Requirements
*IR 1203103, NRC Temporary Instruction Procedure Review Comments
IR 120834, Evaluate Refueling Bridge Storage Location and Add Procedure Requirements
IR 567707, B.5.b Phase 2 and 3 Response Strategies
IR 809507, Enhancement Opportunities Identified During B.5.b Inspection

Other:

993022-34, Self Assessment-Limerick Triennial Fire Protection Inspection Preparatory Check-in Self-Assessment of B.5.b, Revision 0

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions

Procedures:

E-1 Bases, Loss of All AC Power (Station Blackout), Rev. 1
E-1, Loss of All AC Power (Station Blackout), Rev. 37
E-10/20, Loss of Offsite Power, Rev. 62
ON-115, Loss of Control Enclosure Cooling, Rev. 19
RT-6-000-904-0, Inspection of Emergency Equipment, Rev. 7
S11.0.A, Abnormal Operation of ESW System, Rev. 27
S11.6.A, Transfer C&D ESW Pumps to Alternate Power Supply, Rev. 8
S92.1.O, Local and Remote Manual Startup of a Diesel Generator, Rev. 53

Calculations/Evaluations:

NRC Station Blackout Safety Evaluation, June 1991
NRC Station Blackout Supplemental Safety Evaluation, June 1992
SAIC-91/6651, Limerick Generating Station Technical Evaluation Report (ADAMS Legacy Library Accession Number 9103140335), March 1991

Issue Reports:

1193353, NER NC-11-009 Station Blackout Walkdown Procedure Enhancements
*1208490, Potential Station Blackout Procedure Bases Licensing Issue
*1208496, Evaluate Shedding Turbine Generator Emergency Seal Oil Pump in SBO Events
*1211142, Review SBO Procedure DC Load Shedding

Other:

RG 1.155, Regulatory Guide 1.155, Station Blackout, August 1988
TI 2515/120, Inspection of Implementation of Station Blackout Rule, September 1993

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design

Procedures:

RT-6-100-370-0, Inspection of EDG Fuel Oil Storage Tank Access Leak Collection Sumps, Rev. 8
RT-6-100-371-0, Inspection of EDG Fuel Oil Storage Tank Access Pits, Rev. 3
S09.2.B, Isolating and Draining of One Condenser Water Box Section, Rev. 28
SE-4, Flood, Rev. 6
SE-4-1, Reactor Enclosure Flooding, Rev. 8
SE-4-2, Turbine/Control Enclosure Flooding, Rev. 2
SE-4-3, Flooding External to Power Block, Rev. 5

Issue Reports:

*1005554, Evaluate Preventive Maintenance for Residual Heat Removal Access Panel Caulk, Hinges, Gaskets
1189257, Vehicles Parked in Flood Zone
1192441, Water Seeping From Top of Electrical Box
1195126, Editorial Changes to Drawing A-0307
1195145, Evaluate Material Storage in Front of Turbine Enclosure Water Release Panel
1195175, Door to Turbine Enclosure Appears Degraded
1195202, Door Not Fully Seating Against Lower Door Jamb
1195229, Temporary Plug In Unidentified Pipe Stub In Turbine Enclosure Wall
1201993, Sandbags Not Available For Flood Procedure SE-4-3
*1208582, Evidence of Water Intrusion Into ESW/RHRSW Pipe Tunnel
*1208612, Missing Gasket on Diesel Fuel Oil Tank Vault Manhole
*1208879, Adequacy of Flood Watch as Compensatory Action for RHR Room Hatch Removal

Other:

Limerick Generating Station Units 1 and 2 Individual Plant Examination for External Events, June 1995
Limerick Generating Station Units 1 and 2 Updated Final Safety Analysis Report, Rev. 15

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events

Procedures:

S09.2.B, Isolating and Draining of One Condenser Water Box Section, Rev. 28
SE-4, Flood, Rev. 6
SE-4-1, Reactor Enclosure Flooding, Rev. 8
SE-4-2, Turbine/Control Enclosure Flooding, Rev. 2
SE-4-3, Flooding External to Power Block, Rev. 5

Issue Reports:

1201621, Beyond Design Basis Vulnerabilities

Other:

Limerick Generating Station Units 1 and 2 Individual Plant Examination for External Events, June 1995
Limerick Generating Station Units 1 and 2 Updated Final Safety Analysis Report, Rev. 15

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
CAP	Corrective Action Program
CFR	Code of Federal Regulations
EDG	Emergency Diesel Generator
ESW	Emergency Service Water
EO	Equipment Operator
IP	Inspection Procedure
NER	Nuclear Event Report
NRC	Nuclear Regulatory Commission
RHRSW	Residual Heat Removal Service Water
SAMP	Severe Accident Management Procedures
SBO	Station Blackout
SSC	Structures, Systems, or Components
TI	Temporary Instruction
URI	Unresolved Item
10CFR	Title 10 of the Code of Federal Regulations