



10CFR50.73

LG-16-060  
May 18, 2016

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Limerick Generating Station, Unit 1  
Renewed Facility Operating License No. NPF-39  
NRC Docket No. 50-352

Subject: LER 2016-003-00, Plant Shutdown Required by Technical Specifications

This Licensee Event Report (LER) addresses a plant shutdown required by Technical Specifications. This LER also reports an event that resulted in the condition of the plant, including its reactor coolant system pressure boundary, being degraded. This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(A) and 10CFR50.73(a)(2)(ii)(A).

There are no commitments contained in this letter.

If you have any questions, please contact Robert B. Dickinson at (610) 718-3400.

Respectfully,

A handwritten signature in black ink, appearing to read "R. Libra".

Richard W. Libra  
Vice President – Limerick Generating Station  
Exelon Generation Company, LLC

cc: Administrator Region I, USNRC  
USNRC Senior Resident Inspector, LGS



**LICENSEE EVENT REPORT (LER)**  
(See Page 2 for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Limerick Generating Station, Unit 1	<b>2. DOCKET NUMBER</b> 05000352	<b>3. PAGE</b> 1 OF 3
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**4. TITLE**  
Plant Shutdown Required by Technical Specification Due to a Pressure Boundary Leak

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	20	2016	2016	003	00	05	18	2016	FACILITY NAME	DOCKET NUMBER
										05000
										05000

9. OPERATING MODE		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)					
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)					
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)					
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)					
10. POWER LEVEL  14.5	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)					
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)					
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)					
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER					
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A					

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME Robert B. Dickinson, Manager – Regulatory Assurance	TELEPHONE NUMBER (Include Area Code) 610-718-3400
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	BO	ISV	A585	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

Reactor coolant system pressure boundary leakage was identified by a drywell leak inspection team during a planned shutdown for a Unit 1 refueling outage. This event resulted in a plant shutdown required by Technical Specifications. The Unit 1 'A' RHR Shutdown Cooling Return Check Valve equalizing line developed a crack at the toe of a weld due to high cyclic fatigue induced by vibration from the reactor recirculation system. The Unit 1 welds were reworked to EPRI 2x1 at select locations on the "A" and "B" RHR Shutdown Cooling Return check valve equalizing lines for HV-051-1F050A and 50B. The similar Unit 2 welds on equalizing lines for HV-051-2F050A and 50B will be examined and reinforced. The scope will be added into the next refueling outage (2R14) currently scheduled for April 2017.



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
		YEAR	SEQUENTIAL NUMBER	REV NO.		OF	
		2016	- 003	- 00	2		3

**NARRATIVE**

**Unit Conditions Prior to the Event**

Unit 1 was in Operational Condition (OPCON) 1 (Power Operation) at approximately 14.5 percent power performing a planned Unit 1 shutdown to support a refueling outage. There were no structures, systems or components out of service that contributed to this event.

**Description of the Event**

On Sunday March 20, 2016, Limerick Unit 1 was operating at 14.5 percent power performing a planned Unit 1 shutdown to support a refueling outage (1R16). At 2154 hours, the drywell leak inspection team identified a 0.5 gpm pressure boundary leak on the shutdown cooling (BO:EIIS) testable check valve (ISV:EIIS) equalizing line. The control room supervisor (CRS) entered Technical Specification (TS) 3.4.3.2 Reactor Coolant System - Operational Leakage Action "a" which requires being in at least Hot Shutdown within 12 hours and Cold Shutdown within the next 24 hours. The 12 hour Hot Shutdown TS Action was met at 0133 hours and the 24 hour Cold Shutdown Action was met at 1401 hours.

An investigation determined that Unit 1 Unidentified Leakage increased from 0.03 gpm to 0.06 gpm between January 16, 2016 and January 18, 2016. Leakage increased to 0.24 gpm on January 19, 2016 and continued to vary with reactor recirculation pump speed for the remainder of the cycle. The maximum leakage recorded was 1.2 gpm which stabilized at 1.0 gpm following power reduction to 95 percent. On March 20, 2016 Maintenance Technicians performed a planned drywell entry at 14.5 percent power and identified a leak on the 3/4 inch reactor side equalizing line of the 1A Shutdown Cooling (SDC) Return Line Inboard Testable Check Primary Containment Isolation Valve, HV-051-1F050A. The leak was located approximately 1/4 inch from the valve body weld and was determined to be pressure boundary leakage.

A 4-hour ENS (#51809) was completed at 2351 hours as required by 10CFR50.72(b)(2)(i) for the initiation of a plant shutdown required by TS. The ENS also reported an event that resulted in the condition of the plant principal safety barriers being seriously degraded per 10CFR50.72(b)(3)(ii). Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(A) and 10CFR50.73(a)(2)(ii)(A).

**Analysis of the Event**

There was no actual safety consequence associated with this event. The potential safety consequences of this event were minimal. The Unidentified Leakage remained a small fraction of the 5 gpm TS 3.4.3.2 LCO. HPCI was unavailable less than 29 minutes due to testing and RCIC was unavailable for less than 13 hours due to maintenance and testing during the three month period (January, February and March of 2016) of elevated drywell leakage. HPCI is designed to prevent the actuation of the automatic depressurization system (ADS) and ensure that the reactor core remains covered in the event of a small pipe break size of one-inch diameter or less.

**LICENSEE EVENT REPORT (LER)  
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**NARRATIVE**

The SDC return is a 12-inch diameter line equipped with an outboard motor operated valve (MOV) primary containment isolation valve (PCIV) and an inboard testable check valve PCIV. The testable check valve has a bypass line that is equipped with an air operated valve (AOV) PCIV which is used to equalize the differential pressure across the testable check valve disc when the valve is opened during stroke testing. Testable check valves are also used in similar applications on low pressure coolant injection (LPCI) and core spray (CS) injection lines. The SDC valve is subject to vibration induced high cycle fatigue due to recirculation pump flow induced vibration. The LPCI and CS injection lines' socket welds are not subject to vibration induced high cycle fatigue.

The affected section of bypass line piping was replaced with a new socket weld with a 2x1 weld to improve pipe stability and minimize stresses at the toe as a result of the 2x1 weld configuration. A 2x1 weld was also applied at the similar valve body socket welds for the HV-051-1F050A residual heat removal (RHR) side and HV-051-1F050B RHR and reactor side welds.

**Cause of the Event**

The Unit 1 'A' RHR Shutdown Cooling Return Check Valve equalizing line developed a crack at the toe of the weld due to high cyclic fatigue induced by vibration from the reactor recirculation system (Apparent Cause).

**Corrective Action Completed**

The Unit 1 welds were reworked to EPRI 2x1 at select locations on the "A" and "B" RHR Shutdown Cooling Return check valve equalizing lines for HV-051-1F050A and 50B.

**Corrective Action Planned**

The similar Unit 2 welds on equalizing lines for HV-051-2F050A and 50B will be examined and reinforced. The scope will be added into the next refueling outage (2R14) currently scheduled for April 2017.

**Previous Similar Occurrences**

There were no previous similar occurrences of pressure boundary leakage in the past 5 years.

**Component data:**

System	BO	RHR/Low Pressure Coolant Injection System
Component	ISV	Valve, Isolation
Component number	HV-051-1F050A	
Manufacturer	A585 Weir Valves & Controls USA Inc.	
Model number	50301-A	
Serial Number	2-50301-A	