



10CFR50.73

LG-16-027  
April 11, 2016

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

Limerick Generating Station, Units 1 and 2  
Renewed Facility Operating License Nos. NPF-39 and NPF-85  
NRC Docket No. 50-352 and 50-353

Subject: LER 2016-002-00, Condition Prohibited by Technical Specifications

This Licensee Event Report (LER) addresses a condition prohibited by Technical Specifications. Inoperability of station safeguard batteries during cell replacements was identified due to inadequate temporary seismic restraints. This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(B).

There are no commitments contained in this letter.

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

Respectfully,

Original signed by

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 4
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**4. TITLE**  
Condition Prohibited by Technical Specifications Due to Inoperable Safeguard Batteries During Cell Replacements

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
02	10	2016	2016	002	00	04	11	2016	Limerick Unit 2	05000353
									FACILITY NAME	DOCKET NUMBER
										05000

<b>9. OPERATING MODE</b>	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>			
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 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  100	<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 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 checked="" 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	EJ	BTRY	C173	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)

The Unit 1 Division 1 125 VDC Safeguard Battery was rendered inoperable due to installation of temporary seismic restraints that had not been approved for use. This historical issue was identified during a preventive maintenance activity to replace the battery. The investigation identified fifteen reportable events over a three year period. The cause was incomplete scoping of the engineering analysis performed to support battery cell replacements. The analysis did not include the impact of battery replacement activities on the battery rack. The battery cell rack support strategy was revised and a technical evaluation was performed for the seismic qualification of the battery rack during battery cell replacement. The battery cell replacement procedure (M-095-005) will be revised to address the updated technical evaluation and ensure seismic qualification of the battery rack is maintained during maintenance activities.



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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.

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**NARRATIVE**

**Unit Conditions Prior to the Event**

Units 1 and 2 were in Operational Condition (OPCON) 1 (Power Operation) at 100% power. There were no structures, systems or components out of service that contributed to this event.

**Description of the Event**

On Monday, February 10, 2016, Limerick Units 1 and 2 were operating at 100% power. The Unit 1, Division 1, 1A1 125 VDC safeguard battery (EIS:EJ) replacement was in progress under a preventive maintenance work order activity. The activity was to replace cells 43 through 51 (9 cells). At 0842 hours the battery (EIS:BTRY) was declared inoperable to support installation of the temporary seismically qualified battery cart which provides substitute battery cells during maintenance and TS 3.8.2.1 D.C. Sources – Operating, Action “c” was entered. Action “c” required restoration of the inoperable battery within 2 hours. Otherwise, be in Hot Shutdown within the next 12 hours and in Cold Shutdown within the following 24 hours. At 0858 hours, the battery was declared operable and the TS action was exited. The next activity was to replace the 9 cells. At 0900 hours the cell replacement was suspended with 12 cells jumpered out, due to a question regarding the seismic qualification of the battery with temporary cell seismic restraints installed. A technical evaluation had not been approved to authorize the use of the temporary restraints.

An Engineering technical evaluation of the battery temporary seismic restraints was subsequently performed. The remaining 1A1 battery cells were replaced using a revised strategy with approved temporary restraints.

A subsequent investigation determined that the method for on-line battery cell replacement (developed in the early 1990’s) approved the use of a seismically qualified battery cart to jumper cells during replacement but did not approve the use of the temporary seismic restraints to maintain operability of the battery during cell replacement.

A review of work history for the last three years identified that the following Unit 1 batteries were replaced using unapproved seismic restraints to maintain operability and exceeded the TS 3.8.2.1 allowed outage time (AOT):

- The 1A2 battery was replaced in September 2015.
- The 1B1 battery was replaced in December 2015.
- The 1A1 battery was replaced in February 2016.

The following Unit 2 battery cell replacement was performed using unapproved seismic restraints to maintain operability and exceeded the TS 3.8.2.1 AOT:

The 2A2-29 cell was replaced in July 2015.

A review of the operator logs for the last three years identified that the TS 3.8.2.1 D.C. Sources – Operating, Action “c” to restore the inoperable battery within the 2 hour AOT and the “otherwise” Action to be in Hot Shutdown within the next 12 hours were exceeded fifteen times

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**NARRATIVE**

while battery cell replacements were in progress. This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(B) for a condition prohibited by Technical Specifications.

**Analysis of the Event**

There was no actual safety consequence associated with this event. The potential safety consequences of this event were minimal. The safeguard batteries were capable of performing their design function for non-seismic events. The degraded battery may not have been capable of performing its design function during design bases seismic events.

UFSAR section 8.3.2.1.1 describes the Class 1E DC Power System. Each 125/250 V system is comprised of two 125 V batteries, each with its own charger. There are battery carts which can be connected to bypass defective battery cells in any one of the 125/250 V systems. Each 125 V system is comprised of one 125 V battery with its own charger. Each Class 1E 125/250 V system battery is comprised of 120 cells and each 125 V system battery is comprised of 60 cells.

Replacement of a 60 cell Class 1E battery is performed in stages of 9 to 18 cells where it is typical for a stage of cells to be replaced in one day. The entire battery is typically replaced over a period of several consecutive days. Each replacement of a stage typically requires more than 14 hours but less than 20 hours from the initial battery inoperability to the restoration of operability. The replacement starts by electrically removing the cells to be replaced from the battery and electrically connecting the battery cart cells followed by installation of the temporary seismic restraints. The next activity is replacement of the battery cells in the stage, removal of the temporary seismic restraints and restoration of the normal seismic restraints. This is followed by reconnection of the battery cells, removal of the battery cart, and returning the battery to operable status. This sequence is typically repeated on subsequent days until all of the battery cells have been replaced.

**Cause of the Event**

The cause was incomplete scoping of the engineering analysis performed to support battery cell replacements. The work activity did not evaluate the impact of battery replacement activities on the battery rack.

**Corrective Action Completed**

The battery cell rack seismic support strategy was revised and a technical evaluation was performed for the seismic qualification of the battery rack during battery cell replacement.

**Corrective Action Planned**

The battery cell replacement procedure (M-095-005) will be revised to address the updated technical evaluation and ensure seismic qualification of the battery rack is maintained during maintenance activities.

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Previous Similar Occurrences

There were no previous similar occurrences of TS noncompliance in the last three years due to unplanned safeguard battery inoperability during battery cell replacement activities.

Component data:

System EJ DC Power System-Class IE  
 Component BTRY Battery  
 Component number 1A1 Battery  
 Manufacturer C173 C&D Batteries (ELTRA Corp)  
 Model number LC/LCR-21