Exelon Nuclear

10CFR50.73

December 13, 2006

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

Limerick Generating Station, Unit 2
Facility Operating License No. NPF-85
NRC Docket No. 50-353

Subject: LER 2-06-001, HPCI Speed Control Failure

This Licensee Event Report (LER) addresses a condition that could have prevented fulfillment of the safety function for the High Pressure Coolant Injection system. This event was caused by a failure of the ramp generator signal converter (RGSC). The most likely cause was an intermittent connection in the RGSC or a failure of amplifier U2. The RGSC was replaced and successfully tested.

Report Number:	2-06-001
Revision:	00
Event Date:	October 13, 2006
Discovered Date:	October 15, 2006
Report Date:	December 13, 2006

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(v)(D).

There are no commitments contained in this letter.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Original signed by Chris Mudrick for Ron J. DeGregorio

Ron J. DeGregorio
Vice President – Limerick
Exelon Generation Company, LLC

cc: S. J. Collins, Administrator Region I, USNRC
S. L. Hansell, USNRC Senior Resident Inspector, LGS

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Limerick Generating Station, Unit 2	05000353	1 OF 4

4. TITLE
HPCI Ramp Generator Signal Converter Failure

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
										05000
10	13	2006	2006	- 001 -	0	12	13	2006	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE
1

10. POWER LEVEL
100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☒ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Robert E. Kreider, Manager- Regulatory Assurance	610-718-3400

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	BJ	SC	G080	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On Sunday October 15, 2006, the Unit 2 high pressure coolant injection system turbine control valve failed to open during the weekly operability routine test. A failed ramp generator signal converter caused the event. The ramp generator signal converter was replaced and successfully tested.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Unit Conditions Prior to the Event

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

Description of the Event

On Sunday October 15, 2006, at 08:46 hours, Operations was performing the weekly High Pressure Coolant Injection (HPCI) (EIIS:BJ) Turbine Hydraulic Operability Check (RT-6-055-340-2). The test directed the operator to start the HPCI auxiliary oil pump and verify that the HPCI turbine control valve (FV-56-211) (EIIS:SCV) opens. However, the control valve failed to open.

An investigation determined that the ramp generator signal converter (RGSC) (EIIS:SC) had failed. It was further identified through a review of non-alarming computer points that a step change in RGSC output occurred on October 13, 2006 at 08:05 hours. The RGSC was replaced and calibrated. HPCI was tested and returned to operable status on October 17, 2006 at 19:25 hours.

This event involved a condition that could have prevented fulfillment of the safety function for the HPCI system which is reportable per the requirements of 10CFR50.72(b)(3)(v) and 10CFR50.73(a)(2)(v). An 8-hour NRC ENS notification (EN# 42907) was completed on October 15, 2006 at 15:44 hours. This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(v)(D).

Analysis of the Event

There were no actual safety consequences associated with this event. The potential safety consequences of this event were minimal. Once discovered, the inoperability of the HPCI system was limited to less than 59 hours. The reactor core isolation cooling (RCIC), automatic depressurization system (ADS), residual heat removal (RHR), and core spray (CS) systems remained operable during the period that HPCI was inoperable.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

The RGSC module is part of the HPCI Turbine Control system. The RGSC module provides the turbine speed reference signal to the Electro Governor-Mechanical (EG-M) control box. The RGSC module has two basic functions: 1) The ramp generator function controls turbine acceleration during the startup transient, and 2) the signal converter function conditions the output signal from the flow controller during system operation. The same model RGSC is used in both the HPCI and RCIC systems.

A failure analysis on the RGSC module confirmed that the component output was lower than expected. The analysis determined that the failure was caused by either an intermittent connection between the U1 amplifier output and the input to amplifier U2 or an internal fault or intermittent connection in amplifier U2. The RGSC is replaced on an 8-year frequency and was last replaced in June 2002. Limerick has not experienced any prior failures of the HPCI RGSC.

Cause of the Event

The event was caused by a failure of the RGSC. This failure occurred either due to an intermittent connection between amplifiers U1 and U2 or an intermittent failure of amplifier U2, which is an RGSC board subcomponent.

Corrective Action Completed

The RGSC was replaced.

Previous Similar Occurrences

There were two previous similar occurrences where HPCI failed during testing. LER 1-99-008 reported a failure to start during testing due to EGR hydraulic actuator binding. LER 1-96-018 reported an automatic shutdown of HPCI during testing due to a loose speed sensor connector.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Component data:

System:	BJ	(High Pressure Coolant Injection System)
Component:	SC	(Control, Speed)
Manufacturer:	G080	(General Electric Company)
P/N (Woodward)		A9903-091 Rev.A
P/N (GE)		DD213A8527P002
S/N (Woodward)		1536662