



10CFR50.73

LG-15-121
November 2, 2015

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

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

Subject: LER 2015-005-00, Condition That Could Have Prevented Fulfillment of the High Pressure Coolant Injection (HPCI) System Safety Function

This Licensee Event Report (LER) addresses a condition that could have prevented fulfillment of the high pressure coolant injection (HPCI) system safety function. One isolation actuation instrument channel for high steam flow failed. This failure caused the HPCI system steam line inboard isolation valve to close and rendered the HPCI system inoperable. 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, 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.

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|--|-------------------------------------|--------------------------|
| 1. FACILITY NAME Limerick Generating Station, Unit 2 | 2. DOCKET NUMBER 05000353 | 3. PAGE 1 OF 4 |
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4. TITLE
Condition That Could Have Prevented Fulfillment of the High Pressure Coolant Injection System Safety Function

| 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 |
| 09 | 03 | 2015 | 2015 | 005 | 00 | 11 | 02 | 2015 | | 05000 |
| | | | | | | | | | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 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 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 type="checkbox"/> 50.73(a)(2)(i)(B) | <input checked="" 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 |
|--|--|

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
| B | LK | PIS | R369 | Y | B | BJ | PDS | R369 | Y |

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

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

While operating at full power, the Unit 2 Division 4 high steam flow isolation actuation instrument for the High Pressure Coolant Injection (HPCI) system failed. The instrument failure caused an isolation of the inboard steam supply line primary containment isolation valve (PCIV). The event was initiated by a capacitor failure on an unrelated trip unit located below the HPCI Division 4 high steam flow trip units. The initial failure resulted in collateral damage to one of the HPCI trip units that resulted in a HPCI system steam line automatic isolation. Three trip units were replaced and tested successfully.



**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, 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

Unit 2 was 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 Thursday, September 3, 2015, Limerick Unit 2 was operating at approximately 100% power. At approximately 1901 hours, the High Pressure Coolant Injection (HPCI) system (EIIS:BJ) "Steam Line High Flow" main control room alarm (EIIS:ALM) actuated and the inboard HPCI steam line PCIV (EIIS:ISV) (HV-055-2F002) automatically closed on an invalid high steam flow isolation actuation. The control room supervisor (CRS) declared the HPCI system inoperable and entered Technical Specification (TS) 3.5.1 ECCS-Operating, action c.1 which requires restoration of the HPCI system within 14 days. The CRS also declared the Division 4 HPCI steam line flow trip unit inoperable and entered TS 3.3.2 Isolation Actuation Instrumentation, action b.1, which required restoration of the channel within 6 hours or taking Table 3.3.2-1 Action 23. Action 23 required verifying the affected isolation valves closed. The TS actions were met. Investigation identified an acrid odor near the Division 4 HPCI steam high flow trip units in the auxiliary equipment room (AER). HPCI was declared inoperable at 1901 hours.

Follow-up investigation determined that the heat related damage on the HPCI isolation instrumentation originated at a trip unit for the nitrogen supply to the automatic depressurization system (ADS) instrument gas (PISL-059-252B). This trip unit was located directly below the HPCI Division 4 high steam flow slave trip unit (PDS-055-2N660D), which also sustained heat related damage.

The HPCI Division 4 high steam flow master and slave trip units were replaced as a precautionary action and the instrument channel was restored to operable status on September 4, 2015, at 1552 hours.

The HPCI steam line was re-pressurized and the HPCI system was restored to operable status on Friday, September 4, 2015, at 1752 hours (approximately 23 hours of inoperability).

The ADS instrument gas trip unit was replaced and the instrument channel was restored to operable status on September 5, 2015, at 0952 hours.

An eight-hour ENS notification (#51368) was completed on Thursday, September 3, 2015 at 2204 hours as required by 10CFR50.72(b)(3)(v)(D) for a condition that could have prevented the fulfillment of the safety function of structures or systems needed to mitigate the consequences of an accident due to the unplanned inoperability of the HPCI system.

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NARRATIVE

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(v)(D) for a condition that could have prevented the fulfillment of the safety function of structures or systems needed to mitigate the consequences of an accident.

Analysis of the Event

There was no actual safety consequence associated with this event. The potential safety consequences of this event were minimal. HPCI was inoperable for approximately 23 hours to repair the failed trip units.

The event was initiated by a failure of the PISL-059-252B Nitrogen Supply to ADS Instrument Gas trip unit that resulted in heat damage of the card. The PDS-055-2N660D HPCI Steam Line High Flow trip unit was damaged by the heat rising from the instrument gas trip unit failure which was located directly below the degraded HPCI steam flow trip unit. The failure of the HPCI steam flow trip unit caused an invalid automatic isolation of the Division 4 inboard HPCI system steam line PCIV (HV-055-2F002) which rendered HPCI inoperable. An additional HPCI Steam Line High Flow trip unit (PDIS-055-2N657D) was examined but no heat damage was identified. It could not be determined whether the master or slave Division 4 HPCI high steam flow trip unit caused the isolation; therefore, both trip units were replaced.

A failure analysis was performed on the degraded Rosemount model 510DU master trip unit. The analysis determined that the trip unit C3 capacitor had failed. The heat from the capacitor failure damaged the HPCI trip unit which failed causing a steam line isolation.

Cause of the Event

The event was initiated by a capacitor failure on an unrelated trip unit located below the HPCI Division 4 high steam flow trip units. The initial failure resulted in collateral damage to one of the HPCI trip units that resulted in a HPCI system steam line automatic isolation.

Corrective Action Completed

The three trip units were replaced and tested successfully.

Previous Similar Occurrences

There was no previous inoperability of the HPCI system due to a HPCI steam line isolation caused by a failed trip unit in the prior ten years.

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NARRATIVE

Component data:

System: LK Nitrogen Supply System
 Component: PIS Switch, Indicating, Pressure
 Component number: PISL-059-252B
 Description: Long-term Nitrogen Supply to ADS System
 Manufacturer: R369 Rosemount Nuclear Instruments Inc.
 Model number: 510DU
 Serial number: 12131

System: BJ High Pressure Coolant Injection System
 Component: PDS Switch, Differential, Pressure
 Component number: PDS-055-2N660D
 Description: Main Steam Flow to HPCI
 Manufacturer: R369 Rosemount Nuclear Instruments Inc.
 Model number: 710DU0TT
 Serial number: 64013