



10CFR50.73

LG-15-054
April 24, 2015

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 2015-001-00, Valid Automatic Actuation of the Reactor Protection System
with the Reactor Critical Due to Closure of One Main Steam Isolation Valve

This Licensee Event Report (LER) addresses a valid automatic actuation of the reactor protection system (RPS) when the reactor was critical. The event was due to an unexpected closure of the 1C Inboard main steam isolation valve (MSIV). The valve closed due to a fitting failure for the instrument gas supply tubing at the valve.

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

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

Thomas J. Dougherty
Vice President – Limerick
Exelon Generation Company, LLC

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

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|---|--------|--|--|---|---------|---|-----------|---------------|--|---------------|------|---|--|--|
| NRC FORM 366 (01-2014) | | U.S. NUCLEAR REGULATORY COMMISSION | | APPROVED BY OMB: NO. 3150-0104 | | EXPIRES: 01/31/2017 | | | | | | | | |
|  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. | | | | | | | | | | | | |
| 1. FACILITY NAME Limerick Generating Station, Unit 1 | | | | 2. DOCKET NUMBER 05000352 | | 3. PAGE 1 OF 3 | | | | | | | | |
| 4. TITLE Valid Automatic Actuation of the Reactor Protection System With the Reactor Critical Due to One MSIV Closure | | | | | | | | | | | | | | |
| 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 | 23 | 2015 | 2015 | - 001 | - 00 | 04 | 24 | 2015 | 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 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) | | |
| 100 | | | <input type="checkbox"/> 20.2203(a)(2)(ii) | | | <input type="checkbox"/> 50.36(c)(1)(ii)(A) | | | <input checked="" 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 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 | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | | | | | |
| B | SB | ISV | A585 | Y | | | | | | | | | | |
| 14. SUPPLEMENTAL REPORT EXPECTED | | | | | | 15. EXPECTED SUBMISSION DATE | | | MONTH | DAY | YEAR | | | |
| <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | | | | | | | | | | | | | | |
| ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) <p style="margin-top: 20px;"> A valid automatic actuation of the reactor protection system (RPS) occurred due to a high reactor pressure condition following an unexpected closure of the 1C Inboard main steam isolation valve (MSIV). The cause of the event was that an undersized fitting was installed on the air supply tubing to the 1C Inboard MSIV, which was not capable of withstanding existing cyclic stresses. The fitting failed due to cyclic fatigue. An inspection of Unit 1 inboard (I/B) and Outboard (O/B) MSIV Primary Containment Instrument Gas (PCIG)/Instrument Air tubing was performed to verify that the correct fittings are installed as specified by the design drawings or subsequent evaluation. The inspection of Unit 2 will occur during the in progress refueling outage. The failed fitting connection was replaced with a more robust fitting that is suitable for the application. </p> | | | | | | | | | | | | | | |

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

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| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
|-------------------------------------|-----------|---------------|-------------------|---------|---------|
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| Limerick Generating Station, Unit 1 | 05000352 | | | | 2 OF 3 |

NARRATIVE**Unit Conditions Prior to the Event**

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

Description of the Event

On Monday, February 23, 2015, Limerick Unit 1 was operating at approximately 100% power. At 2139 hours, a valid automatic actuation of RPS (EIIIS:JC) was initiated due to a valid reactor high pressure condition. The high pressure condition was caused by an unexpected closure of the 1C I/B MSIV. The valve (EIIIS:ISV) failed closed when a fitting installed on the instrument gas supply tubing to the valve failed. The valve is designed to fail closed on a loss of the instrument gas supply.

The operators entered the procedure for reactor pressure vessel (RPV) control (T-101) and stabilized reactor parameters. The operators verified that all control rods were fully inserted.

Reactor water level initially decreased to a minimum of -25.5 inches and increased to a maximum of +44.5 inches on wide range level instrumentation. The +54 inch high-level turbine trip setpoint was not exceeded. The reactor water level of less than +12.5 inches resulted in an isolation signal to the closed Group IIA and Group IIB residual heat removal (RHR) system valves as expected.

The highest reactor pressure observed during the event was 1113 psig. Reactor pressure remained less than the lowest safety relief valve (SRV) setpoint of 1170 psig; therefore, no SRVs actuated. The main steam bypass valves opened as designed to control reactor pressure.

The post-scrum investigation identified a failure of the 3/8 inch to 1/4 inch reducing port connector on the 1C I/B MSIV. The failed reducing port connection was replaced with a 3/8 inch port connector which is a more robust design. The three unaffected Unit 1 I/B MSIVs do not use the 3/8 to 1/4 inch reducing port connector. All of the I/B MSIVs are now using the same port connector design. The O/B MSIVs do not use a port connector.

A 4-hour NRC ENS notification was required by 10CFR50.72(b)(2)(iv)(B) for an actuation of RPS when the reactor was critical. The ENS notification (#50847) was completed on Tuesday, February 24, 2015, at 0102 EST. This event involved an automatic actuation of RPS.

Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

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NARRATIVE

Analysis of the Event

There was no actual safety consequence associated with this event. The potential safety consequences of this event were minimal. The plant equipment performed as designed during the transient. The operators effectively stabilized reactor parameters and verified all control rods were fully inserted.

Exelon PowerLabs failure analysis determined that the fitting failed due to high cycle fatigue. Review of the design configuration, recent modifications, and maintenance found no issues identifying inadequate tubing support or excessive system vibration.

Cause of the Event

The reactor scram was the result of a high reactor pressure condition due to the unexpected closure of the 1C I/B MSIV following the failure of a fitting on the instrument gas supply tubing to the valve. The cause of the event was that an undersized fitting was installed on the air supply tubing to the 1C I/B MSIV, which was not capable of withstanding existing cyclic stresses.

Corrective Actions Completed

The 1C I/B MSIV instrument gas supply reducing port connector was replaced with a 3/8 inch port connector.

An inspection of Unit 1 I/B and O/B MSIV PCIG/Instrument Air tubing was performed to verify the correct fittings are installed as specified by the design drawings or subsequent evaluation. The inspection found the correct fittings on the remaining Unit 1 I/B and O/B MSIVs.

Corrective Action Planned

An inspection of Unit 2 I/B and O/B MSIV PCIG/Instrument Air tubing will be performed during the current refueling outage to verify the correct fittings are installed as specified by the design drawings or subsequent evaluation.

Previous Similar Occurrences

There was no previous similar occurrence in the last five years of an automatic actuation of RPS due to an unexpected MSIV closure.

Component data:

System: SB Main/Reheat Steam System
 Component: ISV Valve, Isolation
 Component number: HV-041-1F022C-OP
 Manufacturer: A585 Weir Valves & Controls USA INC.
 Model number: 21150-H DWG