



10CFR50.73

September 10, 2012

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

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

Subject: LER 2012-004-00, Common-cause Inoperability of Independent Channels

This Licensee Event Report (LER) addresses a common-cause inoperability of two independent channels in the reactor protection system and a condition prohibited by Technical Specifications. The inoperability was due to a steam leak on an instrument line shared by two instruments which is used to measure main turbine first stage pressure.

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(vii) and 10CFR50.73(a)(2)(i)(B).

There are no regulatory 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 Generating Station
Exelon Generation Company, LLC

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

LICENSEE EVENT REPORT (LER)

(See reverse 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 Section (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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4. TITLE
Common-cause Inoperability of Independent Channels Due to Pipe 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
07	11	2012	2012	- 004	- 00	09	10	2012	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)									
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input checked="" 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

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	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	JC	PIS	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:
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

An instrument pipe used to sense main turbine first stage pressure developed a leak that caused inoperability of two instruments in the reactor protection system. The Reactor Protection System Instrumentation Technical Specification one-hour action to place the affected trip systems in the tripped condition was not met. The instruments' reactor protection system function is to bypass the turbine stop valve closure and turbine control valve fast closure trip functions when turbine first stage pressure is equivalent to a thermal power of less than 29.5 percent. The instrument also bypasses the turbine stop valve closure and turbine control valve fast closure trip functions in the end-of-cycle recirculation pump trip logic. The cause of the event was vibration induced fatigue of the affected instrument pipe. The failed instrument pipe was repaired. The "turbine control valve/stop valve scram bypassed" alarm response procedure was revised to direct a power reduction if trip unit status can not be determined within 15 minutes. A modification will be installed to address vibration induced fatigue on the affected instrument piping.

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NARRATIVE

Unit Conditions Prior to the Event

Unit 1 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 Wednesday, July 11, 2012, Limerick Unit 1 was operating at approximately 100% power. At 1046 hours, an operator reported observing a steam plume on the main turbine. An investigation was initiated to identify the source of the leak. At 2345 hours, the Turbine Control Valve / Stop Valve Scram Bypassed alarm was received in the main control room. At 0004 hours, an Equipment Operator (EO) in the auxiliary equipment room reported that the reactor protection system (RPS) (EIS:JC) 1C and 1D main turbine first stage pressure instruments (EIS:PIS) were indicating zero and two percent respectively with their trip lights off. The 1A and 1B channels were indicating normally between 94 to 96 percent.

At 0035 hours, the control room supervisor (CRS) determined that the A2 and B2 RPS channels for the turbine stop valve (TSV) closure and turbine control valve (TCV) fast closure trip functions were inoperable. TS 3.3.1 RPS Instrumentation action "a" was entered which required verifying within one hour that one TCV channel in each trip system was operable. This action was completed. Action "a" also required verifying within one hour that three TSV channels in each trip system were operable. This action could not be completed. Therefore, at 0121 hours, action "d" was entered which required taking Action 6 in Table 3.3.1-1. Action 6 required initiation of a reduction in power within 15 minutes and a reduction of turbine first stage pressure until the function is automatically bypassed within 2 hours. At 0133 hours, a power reduction was initiated. At 0306 hours, power was reduced to less than 29.5 percent which made completion of the Action 6 two hour requirement not applicable. At 0316 hours, the 1A and 1B RPS channels were automatically bypassed at 22 percent power. TS 3.3.1 action "c" was also entered due to having less than the minimum number of channels in both RPS trip systems. Action "c" required placing the inoperable channels in one trip system in the tripped condition within 6 hours. Action "c" was exited when power was reduced to less than 29.5 percent.

The CRS also determined that two TSV closure channels and two TCV fast closure trip function channels of the end-of-cycle recirculation pump trip (EOC-RPT) logic on one trip system were inoperable. TS 3.3.4.2 EOC-RPT System Instrumentation action "c.2" was entered for four channels inoperable on one trip system which required declaring the affected trip system inoperable. Action "d" was entered since one trip system was inoperable which required restoration within 72 hours. The TS actions were exited when power was reduced to less than 29.5 percent and the actions were no longer applicable.

An investigation determined that one of two main turbine first stage pressure instrument lines had failed. The line was repaired and the affected instruments were declared operable. On Saturday July 14, 2012, at 0409 hours, Unit 1 power was increased above 29.5 percent.

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The investigation also determined that the RPS Instrumentation TS action "a" one-hour action should have been entered at 0004 hours when the EO reported that two instruments were failed. The CRS delayed declaring the instruments inoperable until 0035 while an evaluation proceeded to determine the affected RPS trip systems. For purposes of reporting, the initial alarm at 2345 was firm evidence that the affected instruments were inoperable at the time of the alarm.

This event involved the common-cause inoperability of two independent channels in the reactor protection system. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(vii).

This event also involved a condition prohibited by TS since the RPS Instrumentation one-hour action to place the affected trip system in the tripped condition was not completed. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(B).

Two channels of RPS remained operable; therefore, the RPS safety function was maintained during the event.

Analysis of the Event

There was no actual safety consequence associated with this event. The potential safety consequences of this event were minimal. The A2 and B2 RPS channels for the turbine stop valve closure and turbine control valve fast closure trip functions were rendered inoperable by the instrument line failure.

The A1 and B1 RPS channels remained operable and capable of initiating an automatic actuation of the RPS system during the event. If the A1 or B1 channel for the turbine stop valve closure and turbine control valve fast closure trip functions had failed during a main turbine trip, the RPS system would not have automatically actuated on the TSV or TCV closure. However, the reactor high pressure trip function or the Average Power Range Monitor (APRM) neutron flux upscale trip would have automatically initiated a reactor shutdown when operating at power greater than main steam bypass valve capacity.

The failure analysis identified that the 3/4 inch instrument pipe failed at the half-coupling connection to the main steam line. Circumferential fatigue cracks were observed along the weld toe most likely due to reverse bending. The failure by fatigue indicates the line was subject to vibration. A modification will be installed to address vibration induced fatigue on the affected instrument piping.

Cause of the Event

The cause of the event was vibration induced fatigue of the affected instrument pipe.

Corrective Action Completed

The failed instrument pipe was repaired.

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The "Turbine Control Valve/Stop Valve Scram Bypassed" alarm response procedure was revised to direct a power reduction if trip unit status can not be determined within 15 minutes.

Corrective Action Planned

A modification will be installed to address vibration induced fatigue on the affected instrument piping.

Previous Similar Occurrences

There were no previous similar occurrences of RPS instrument pipe failures in the past 3 years.

Component data:

System: JC (Plant Protection System)
 Component: PIS (Switch, Indicating, Pressure)
 Manufacturer: R369 (Rosemount Nuclear Instruments Inc.)
 Model: 710DU0TT