Exelon Nuclear
Limerick Generating Station
P.O. Box 2300
Sanatoga, PA 19464

www.exeloncorp.com

Exelon Nuclear

10CFR50.73

May 23, 2002

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

Limerick Generating Station, Unit 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: LER 1-02-002, Inoperable Core Spray Header Differential Pressure Alarm Resulted in a Condition Prohibited By Technical Specifications

This Licensee Event Report (LER) addresses the inoperability of the Core Spray Header Differential Pressure Alarm due to variation in the instrument zero offset that resulted in a noncompliance with Technical Specification requirements.

Report Number:	1-02-002
Revision:	00
Event Date:	February 4, 2000
Discovered Date:	March 26, 2002
Report Date:	May 23, 2002

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

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

Sincerely,

William Levis
Vice President - Limerick

cc: H. J. Miller, Administrator Region I, USNRC
A. L. Burritt, USNRC Senior Resident Inspector, LGS

IE22

NRC FORM 366 (1-2001)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Limerick Generating Station, Unit 1	05000 352	1 OF 4

TITLE (4)

Inoperable Core Spray Internal Line Break Alarm due to Instrument Zero Offset Change.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Limerick Unit 2	05000353
02	04	2000	2002	002	00	05	23	2002	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	097

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

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)		50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)	x	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Marino C. Kaminski, Manager – Experience Assessment	(610) 718-3400

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FA CTURER	REPORTABLE TO EPIX
B	BM	PDIS	R369	N					

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) **(16)**

On February 4, 2000, the "Core Spray Line Internal Break" alarm was determined to be inoperable due to a change in the as-found zero offset value of the monitored parameter. The condition is most likely caused by an accumulation of steam voiding in the vertical leg of the Core Spray header. Technical Specification 3.5.1, ECCS - Operating, requires this alarm to detect differential pressure in excess of 4.4 psid between the "A" and "B" Core Spray headers. The alarm was inoperable since it was not capable of detecting all Core Spray line breaks internal to the reactor pressure vessel. The setpoints have since been modified to account for the expected variations in the zero offset values of the monitored parameter.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station, Unit 1	05000352	2002	-- 002 --	00	2 OF 4

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

Unit Conditions Prior to the Event

Unit 1 was in Operational Condition (OPCON) 1 (Power Operation) at approximately 97% power. 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 February 4, 2000, the Unit 1 "Core Spray Line Internal Break" alarm (EIIS:PDA) spuriously annunciated during the "HPCI Pump, Valve and Flow" surveillance test. An investigation of this condition determined that the instrument setpoint zero offset was invalid for the as-found value of negative 0.5 psid for Core Spray (EIIS:BM) Header differential pressure. The instrument setpoint zero offset values were later modified to permit operation with differential pressures between 0.0 psid and negative 2.5 psid. The Unit 1 instrument setpoint was modified on July 10, 2000 and the instrument was declared operable. The Unit 2 instrument setpoint was modified on July 11, 2000.

This issue was identified as reportable on March 26, 2002. An NRC inspector had identified this historical issue and requested a review for reportability since a similar condition had been reported in 1998 (LER 1-98-015). The requested station reportability review of the issue determined that there was firm evidence that a condition prohibited by technical specifications existed before the point of discovery on February 4, 2000. This was not identified when the Unit 1 alarm was declared inoperable resulting in the late reporting of this condition.

Technical Specification 3.5.1, ECCS – Operating, requires this alarm to detect differential pressure in excess of 4.4 psid between the "A" and "B" Core Spray headers. The alarm was inoperable since it was not capable of detecting all Core Spray line breaks internal to the reactor pressure vessel. TS compliance has been maintained since the point of discovery on February 4, 2000. However, this event involved an operation prohibited by Technical Specifications. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(B).

Analysis of the Event

There were no actual safety consequences associated with this event. The potential safety consequences of this event were minimal. The alarm would have actuated for a line break in the "A" loop but may not have actuated for a line break in the "B" loop. Inspections of welds on the core spray lines are included in the reactor pressure vessel (RPV) inservice inspection (ISI) program.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station, Unit 1	05000352	2002	-- 002 --	00	3 OF 4

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

A difference in the configuration of the Core Spray headers inside the RPV (EIIS:RPV) core shroud results in the "A" loop being more susceptible to steam void accumulation. The lower ("B" loop) ring header spray nozzles are mounted on the top of the header, which inhibits steam entry. The upper ("A" loop) ring spray header nozzles are mounted on the bottom of the header, which facilitates steam entry. The 0.25 inch vent hole at the high point of the "A" loop header inlet pipe does not vent enough steam to keep the header full at all times resulting in different pressures being sensed by the Core Spray Line Internal Break instrumentation. The sensed differential pressure has been verified to be between 0.0 psid and negative 2.5 psid after accounting for indicator accuracy limits. The negative 2.5 psid value corresponds to the expected value for complete voiding of the "A" header with no voiding of the "B" header. The value of Core Spray header differential pressure equals "B" header pressure minus "A" header pressure.

The instrument setpoints have been revised to account for this normal variation in the sensed pressure. This ensures TS 3.5.1 ECCS compliance will be maintained for all conditions.

General Electric (GE) Service Information Letter (SIL) 300 was issued in 1979 to address Core Spray Line Break Detection instrumentation that is downscale during normal operation. The SIL provided a range of expected differential pressures across the core shroud for use in calibration of the instrument. This SIL addressed velocity and process noise effects but did not consider possible voiding effects. The expected differential pressure at full power is approximately 6 psid. Sensing a differential pressure of approximately 6 psid would be indicative of a Core Spray header failure in the area outside the shroud.

Since a design bases Loss of Coolant Accident (LOCA) would result in RPV coolant flashing to steam, including the coolant in the header, the voided condition has been previously evaluated and core reflood time is not affected. The potential for water hammer damage due to voiding in the header has been evaluated as acceptable. The nozzle opening areas are approximately equal to the pipe diameter resulting in the equivalent of an open pipe.

Cause of the Event

This event occurred due to a previously unidentified condition that causes a variation of the zero offset value for the sensed differential pressure. The previous modification of the instrument field setpoints to account for apparent power rerate flow based zero offset did not allow for possible variation in this parameter due to accumulation of steam voids in the piping.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station, Unit 1	05000352	2002	-- 002 --	00	4 OF 4

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

Corrective Action Completed

The Core Spray Line Internal Line Break alarm field setpoints have been modified to allow for the expected range of instrument zero offset values.

Previous Similar Occurrences

LER 1-98-015 reported a calibration error for the Core Spray Header Differential Pressure Alarm on September 28, 1998.

Component information:

Component:	Switch, Indicating, Differential, Pressure
Manufacturer:	Rosemount Nuclear Instruments Inc.
Model number:	710DU0TT