PHILADELPHIA ELECTRIC COMPANY

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PHILADELPHIA, PA. 19101

(215) 841-4000

January 7, 1988

Docket No. 50-352

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Licensee Event Report
Limerick Generating Station - Unit 1

Attached is a corrected copy of LER 87-066. Coded field (7) of NRC form 366 was incorrectly dated 1/07/87 rather than 01/07/88. We regret any inconvenience this error may have caused you or your staff. This LER reports the inoperability of the High Pressure Coolant Injection System due to a malfunction of the hydraulic-mechanical overspeed trip mechanism.

Reference:	Docket No. 50-352
Report Number:	87-066
Revision Number:	00
Event Date:	December 8, 1987
Report Date:	January 7, 1988
Facility:	Limerick Generating Station P.O. Box A, Sanatoga, PA 19464

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(v)(d).

Very truly yours,

R. H. Logue
Assistant to the Manager
Nuclear Support Division

cc: W. T. Russell, Administrator, Region I, USNRC
E. M. Kelly, Senior Resident Inspector, USNRC

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Limerick Generating Station - Unit 1

DOCKET NUMBER (2): 0 5 0 0 0 3 5 2

PAGE (3): 1 OF 0 6

TITLE (4): HPCI Inoperability Due to Malfunction of Hydraulic-Mechanical Overspeed Trip Mechanism

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
1 2	0 8	8 7	8 7	- 0 6 6	- 0 0	0 1	0 7	8 8		0 5 0 0 0
										0 5 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9): 1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)	
POWER LEVEL (10): 0 9 9	20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)	
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)		
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Charles A. Mengers, Senior Engineer, Licensing Section	2 1 5 8 4 1 - 5 1 1 8 1 4

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

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 fifteen single-space typewritten lines) (16)

Abstract:

On December 8, 1987 at 1447 hours, during the performance of surveillance test ST-6-055-230-1, "HPCI Pump, Valve And Flow Test", the High Pressure Coolant Injection (HPCI) system (an Emergency Core Cooling System) was declared inoperable due to the erratic operation of the HPCI turbine stop valve. Approximately 20 minutes into the test, while in its full flow test configuration, the HPCI stop valve unexpectedly fully closed and reopened. The stop valve continued to close and reopen several times. An immediate investigation into the cause of the problem revealed that although a HPCI turbine overspeed condition was not present, the hydraulic-mechanical overspeed trip mechanism was cycling between the tripped and normal positions. The cause of the malfunction is believed to have been a blockage of a small internal drain port in the overspeed trip and automatic reset piston assembly. There were no adverse consequences of this event. No radioactive material was released as a result of the event. The Automatic Depressurization System (ADS), Reactor Core Isolation Control (RCIC) System and the other Emergency Core Cooling Systems were operable during the event. The HPCI system was declared operable at 1830 hours on December 9, 1987 after being inoperable for 27 hours and 43 minutes. Increased surveillance of the overspeed trip mechanism has been initiated. Appropriate procedures have been revised to include monitoring stop valve position while the auxiliary oil pump is running.

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Plant Operating Conditions Prior to the Event:

Operating Mode 1 (Power Operation)

Reactor Power 99%

Description of the Event:

On December 8, 1987 at 1447 hours, during the performance of a surveillance test the High Pressure Coolant Injection (HPCI) System (an Emergency Core Cooling System) was declared inoperable due to the erratic operation of the HPCI turbine stop valve.

Approximately 20 minutes into the performance of ST-6-055-230-1, "HPCI Pump, Valve And Flow Test", with the HPCI system operating in its full flow test configuration, the HPCI stop valve FV-56-112 unexpectedly fully closed and reopened. The stop valve continued to close and reopen several times. The test engineers and operators then made the decision to shut down the HPCI turbine and declare the HPCI system inoperable. Cycling of the HPCI stop valve continued with the turbine secured and the auxiliary oil pump running.

An immediate investigation discovered that the hydraulic portion of the hydraulic-mechanical overspeed trip mechanism was cycling to the tripped position causing the stop valve movement. The cycling of the trip mechanism stopped following manual manipulation of the reset knob. The HPCI system was unavailable for service for 27 hours and 43 minutes.

Consequences of the Event:

There were no adverse consequences as a result of this event. No radioactive material was released as a result of the event. The Automatic Depressurization System (ADS), Reactor Core Isolation Cooling (RCIC) System and other low pressure emergency core cooling systems were operable during this event. If the HPCI had been required to operate, the Automatic Depressurization System would have responded reducing reactor pressure permitting the low pressure cooling systems to initiate.

Cause of the Event:

The erratic operation of the HPCI stop valve was caused by the cycling of the HPCI hydraulic-mechanical overspeed trip mechanism (see diagram on page 5 of this LER) to its tripped condition. The cause of the malfunction of the trip mechanism is believed to have been the blockage of the small internal drain port 'F' in the overspeed trip reset plunger assembly. Port 'F' performs a dual function; 1) draining hydraulic fluid from under the piston which leaks in from port 'C' during normal operation and 2) draining hydraulic fluid following a trip as part of the automatic reset function. The blockage of port 'F' would have allowed normal oil leakage to become entrapped and pressurize the volume under the piston, raising it to the tripped position. This aligned openings in the piston with ports 'C' and 'B' thereby reducing oil pressure to the pilot valve on the turbine stop valve hydraulic cylinder and closing the stop valve. The automatic reset function then operated as designed and stopped the oil flow to port 'C' and the piston repositioned re-establishing oil pressure to the pilot valve of the hydraulic cylinder and opening the stop valve. At the same time, oil pressure was re-established to port 'C' and the blocked port 'F' may have prevented the drain-off of normal oil leakage past the piston preventing it from reseating entirely. This may have once again lifted the piston to the tripped position restarting the cycle.

The hydraulic-mechanical overspeed trip mechanism is manufactured by the Terry Corporation and is detailed on page 5 of this LER.

Corrective Actions:

The HPCI system was declared inoperable at 1447 hours on December 8, 1987, and Technical Specification 3.5.1.c Action 'c' was entered. General Electric personnel were consulted to determine what corrective actions to pursue. The following steps were then taken:

12/8/87 - The auxiliary oil pump was run for 20 minutes while manually cycling the overspeed mechanism and rotating the reset knob in an attempt to flush the internals of the mechanism.

12/9/87 - The reset spring force was measured and found to be within acceptable limits.

- The HPCI turbine was satisfactorily run for 1 hour and 40 minutes in accordance with ST-6-055-230-1, "HPCI Pump, Valve And Flow Test".

Following these corrective actions the incident could not be duplicated with the HPCI turbine shutdown or in operation. The HPCI system was declared operable at 1830 hours on December 9, 1987, after ST-6-055-230-1 was successfully completed.

Actions Taken to Prevent Recurrence:

Plant records were examined to verify that proper procedures were satisfactorily completed for the last HPCI turbine lube oil and filter change. Results of this examination showed that the HPCI oil was changed in February, 1987. During this change "Preventive Maintenance Procedure for HPCI Oil Tank Clean, Inspection and Drain and Refill", (PMQ-056-022) was performed. This procedure included verification of internal cleanliness and addition of the correct filtered oil.

During the 1987 Refuel Outage "Preventive Maintenance Procedure for HPCI Oil Filter Replacement", (PMQ-056-028) was performed. This procedure included verification of internal cleanliness, installation of a filter element and addition of the correct filtered oil.

On December 10, the auxiliary oil pump was run for 40 minutes and a turbine lube oil sample obtained from the sump. The sample was checked for particulates and found to be within acceptable limits.

A temporary increase in the runtime of the auxiliary oil pump in conjunction with an increased surveillance of the overspeed trip mechanism has been initiated with an eventual return to the monthly surveillance frequency. On December 16, 1987, the auxiliary oil pump was run for 30 minutes for the first of the increased surveillances. RT-1-055-330-1, "HPCI Turbine Overspeed Trip Operability Check", was successfully completed at that time. During its performance the overspeed trip mechanism was manually cycled 8-10 times with no abnormal movement observed. Appropriate procedures have been revised to include monitoring stop valve position while the auxiliary oil pump is running to prevent any undetected recurrence of the event.

EIIS Codes:

BJ - High Pressure Coolant Injection System

BN - Reactor Core Isolation Cooling System

SHV - Shutoff Valve

TRB - Turbine

Previous Similar Events:

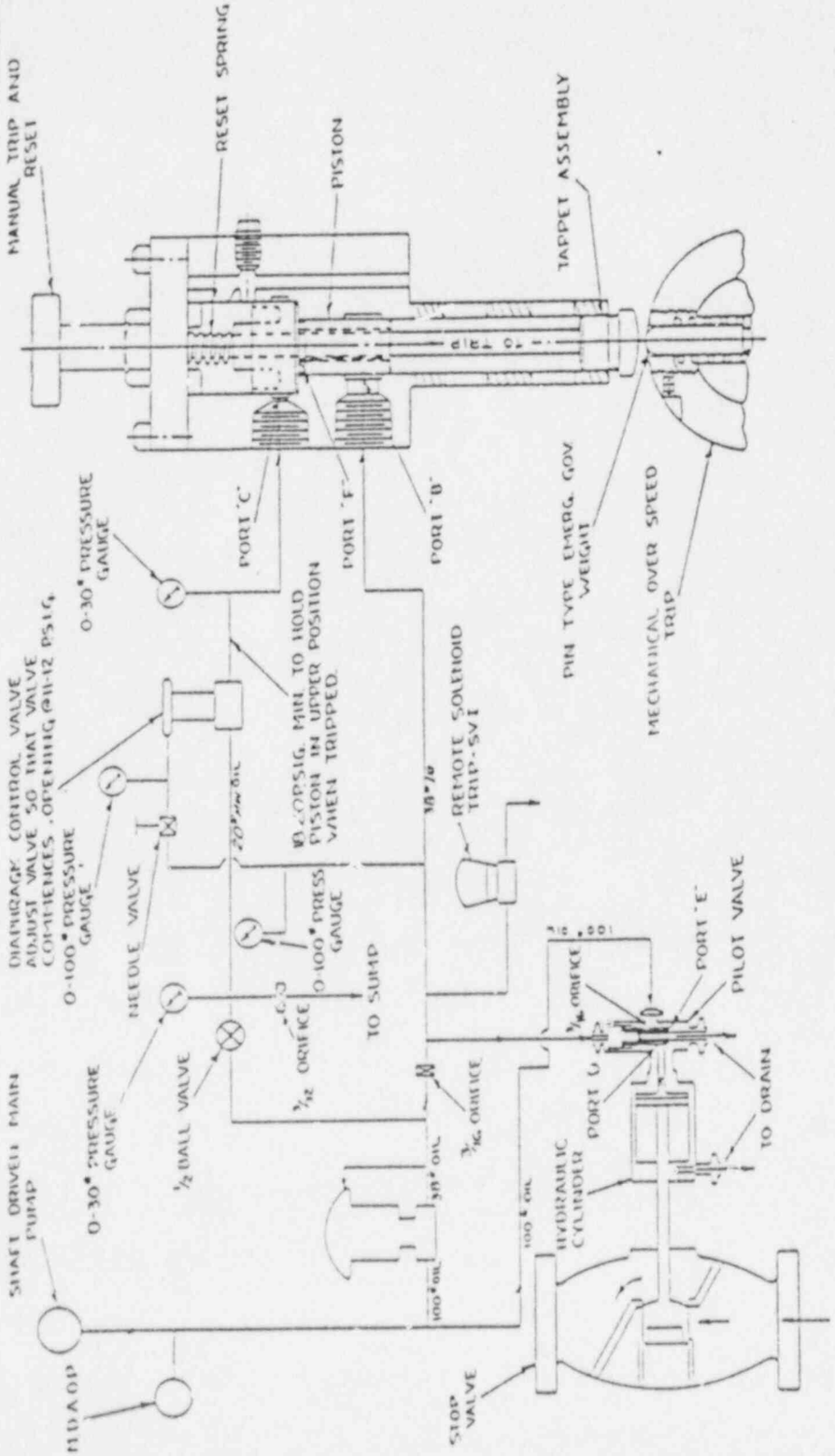
Limerick LER 87-015 reports an inoperable HPCI stop valve due to a different cause.

Tracking Code - (C99) External Cause, Other

NRC Form 366A
(9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO 3150-0104
EXPIRES 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station Unit 1	0 5 0 0 0 3 5 2	8 7	— 0 1 6	— 0 0	0 6 OF 0 6

TEXT (If more space is required, use additional NRC Form 366A's) (17)