

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION

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PLANT MANAGER
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August 6, 1992

Docket No. 50-352
License No. NPF-39

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

SUBJECT: Licensee Event Report
Limerick Generating Station - Unit 1

This LER reports a condition which alone could have prevented the High Pressure Coolant Injection (HPCI) system from fulfilling its intended safety function to mitigate the consequences of an accident due to a malfunction of the hydraulic - mechanical overspeed trip mechanism, which caused the erratic operation of the HPCI turbine stop valve. This malfunction resulted from particles that had clogged equipment associated with the overspeed trip mechanism.

Reference:	Docket No. 50-352
Report Number:	1-92-015
Revision Number:	00
Event Date:	July 7, 1992
Report Date:	August 6, 1992
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA 19464-2300

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

Very truly yours,

LA Apple for JD

DMS:cah

cc: T. T. Martin, Administrator, Region I, USNRC
T. J. Kenny, USNRC Senior Resident Inspector, LGS

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)										Limerick Generating Station, Unit 1										DOCKET NUMBER (2)					PAGE (3)															
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TITLE (4) High Pressure Coolant Injection System Inoperability due to a Malfunction of the 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)						
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OPERATING MODE (9)						THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																																		
2						20.402(b)						20.405(c)						60.73(a)(2)(iv)							73.71(b)															
POWER LEVEL (10)						0 0 6						20.405(a)(1)(i)						60.36(c)(1)						X 60.73(a)(2)(v)							73.71(c)									
						20.405(a)(1)(ii)						60.36(c)(2)						60.73(a)(2)(vii)							OTHER (Specify in Abstract below and in Text, NRC Form 365A)															
						20.405(a)(1)(iii)						60.73(a)(2)(ii)						60.73(a)(2)(viii)(A)																						
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LICENSEE CONTACT FOR THIS LER (12)																																								
NAME															TELEPHONE NUMBER																									
G. J. Madsen, Regulatory Engineer, Limerick Generating Station															2 1 5 3 2 7 - 1 2 0 0																									
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																								
CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC		CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC																						
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)

On July 7, 1992, while performing the High Pressure Coolant Injection (HPCI) system pump, valve, and flow surveillance test (ST), the HPCI system turbine stop valve unexpectedly fully closed and reopened. The turbine stop valve continued to close and reopen several times. Operations personnel then manually secured the HPCI system, and entered Technical Specifications (TS) ACTION 3.5.1.c. An investigation revealed that particles had clogged equipment associated with the hydraulic-mechanical turbine overspeed trip mechanism, causing the stop valve movement. On July 8, 1992, cleaning and flushing of the hydraulic-mechanical overspeed trip mechanism internals was completed, the HPCI ST procedure was successfully performed, the HPCI system was declared operable, and TS ACTION 3.5.1.c was exited within the TS allowed time. The consequences of this event were minimal in that the Reactor Core Isolation Cooling system, and sufficient Emergency Core Cooling Systems were operable during this event to mitigate the consequences of an accident. The source of the particles that had entered the HPCI hydraulic system could not be positively determined. To prevent the recurrence of a similar event, appropriate HPCI system maintenance procedures will be revised to ensure that flushing of the hydraulic system is performed during each refueling outage.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	PROVISION NUMBER		
Limerick Generating Station, Unit 1	0 5 0 0 0 3 5 2	9 2	0 1 5	0 0	0 2	OF 0 4

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

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition (OPCON) 2 (Startup) at 6% power level. Startup of the Unit 1 reactor was being performed by Operations personnel in accordance with General Plant (GP) procedure GP-2, "Normal Plant Startup." As directed by procedure GP-2, Operations personnel were performing the Surveillance Test (ST) procedure ST-6-055-230-1, "HPCI Pump, Valve, and Flow Test," to verify the operability of the High Pressure Coolant Injection (HPCI) (EIIS:BJ) system when the reactor pressure is at or between 920 psig and 1020 psig. Performance of this ST procedure satisfies the Technical Specifications (TS) Surveillance Requirement (SR) 4.5.1.b.3 for the Emergency Core Cooling Systems (ECCS). Additionally, the other required ECCS (e.g., Core Spray system (EIIS:BM), Low Pressure Coolant Injection system (EIIS:BD), and Automatic Depressurization System) were operable at the time of this event.

Description of the Event:

On July 7, 1992, at 1020 hours, while Operations personnel were performing procedure ST-6-055-230-1, the HPCI system turbine stop valve (EIIS:SHU), FV-56-112, unexpectedly fully closed and reopened, while the HPCI system was operating in its full flow test configuration. The turbine stop valve continued to close and reopen several times. Operations personnel then manually secured the HPCI system in accordance with System (S) operating procedure S55.2.A, "HPCI Shutdown from Automatic or Manual Initiation," and declared the HPCI system inoperable. Following the HPCI system shutdown with the auxiliary oil pump still operating, the turbine stop valve continued to cycle open and closed. The TS ACTION 3.5.1.c for the HPCI system being inoperable was entered, and an immediate investigation by the HPCI system engineer identified that the hydraulic-mechanical overspeed trip mechanism was cycling to the tripped position causing the turbine stop valve movement. The auxiliary oil pump was then secured and the turbine stop valve stopped cycling.

A four hour notification was made to the NRC at 1428 hours, on July 7, 1992, in accordance with the requirements of 10 CFR 50.72(b)(2)(iii)(D) since this event resulted in a condition which alone could have prevented the HPCI system from fulfilling its intended safety function to mitigate the consequences of an accident.

On July 8, 1992, cleaning and flushing of the overspeed trip mechanism tappet assembly, the hydraulic pressure control orifice, and all hydraulic lines upstream of the tappet assembly and orifice was completed. Following successful completion of procedure ST-6-055-230-1, the HPCI system was declared operable on July 7 1992, at 1230 hours, and the TS ACTION 3.5.1.c was exited prior to expiration of the TS ACTION time limit. The HPCI system was inoperable for a time period of 50 hours. This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(v)(D).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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	9 2	— 0 1 5	— 0 1 0	0 3	OF 0 4

TEXT (If more space is required, use additional NRC Form 365A's) (17)

Analysis of the Event:

The consequences of this event were minimal in that no radioactive material was released to the environment as a result of the HPCI system being inoperable. Additionally, an accident condition did not occur during the time in which the HPCI system was inoperable, and therefore, HPCI was not called upon to perform its intended safety function. If the HPCI system had been required to operate, sufficient ECCS and the Reactor Core Isolation Cooling (RCIC) system (EIS:BN) were available to ensure safe shutdown of the reactor, and to mitigate the consequences of an accident.

Cause of the Event:

The cause of the hydraulic-mechanical overspeed trip mechanism malfunction was determined to be small particles clogging a trip tappet assembly leak-off port and a hydraulic pressure control orifice, both of which are located downstream of the HPCI system oil filters. The trip tappet assembly leak-off port (less than 3/32 of an inch) and the hydraulic pressure control orifice (3/32 of an inch), are both very small in size. This clogging resulted in the cycling of the overspeed trip mechanism to the tripped position, causing the turbine stop valve movement. The source of the particles has not been positively determined. During the recently completed Unit 1 refueling outage, various portions of the hydraulic system had been disassembled for inspection and cleaning. We suspect that particles from activities in the HPCI pump room entered the disassembled hydraulic system downstream of the 5 micron oil filters. Appropriate cleanliness standards were already reflected in the maintenance procedures and practices, and cleanliness checks during maintenance revealed no anomalous indications.

The clogging of the leak-off port and the hydraulic pressure control orifice may have been prevented had an 'optional' oil system flushing section of the common Unit 1 and Unit 2 HPCI system maintenance procedure M-C-756-001, "HPCI Turbine Major Inspection" been performed. Since the results of the post-maintenance oil sample testing were satisfactory and within acceptable limits, and because all HPCI system components which were disassembled and inspected during the Unit 1 refueling outage were found to be clean, in accordance with procedure M-C-756-001, plant personnel concluded that a flush of the oil system was not necessary.

Corrective Actions:

On July 8, 1992, cleaning and flushing of the overspeed trip mechanism tappet assembly, the hydraulic pressure control orifice, and all hydraulic lines upstream of the tappet assembly and the orifice was completed. The HPCI system was then satisfactorily operated for approximately three hours in accordance with procedure ST-6-055-230-1, and was declared operable.

In addition to the corrective action completed above, the following actions will be implemented to prevent the recurrence of a similar event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Limerick Generating Station, Unit 1	0 5 0 0 0 3 5 2	9 2	— 0 1 5	— 0 0	0 4	OF	0 4

TEXT (If more space is required, use additional NRC Form 306A's) (17)

1. Procedure M-C-756-001 will be revised to require the performance of the section to flush the hydraulic system, following the periodic major HPCI system overhaul maintenance work. Additionally the common Unit 1 and Unit 2 HPCI system maintenance procedure PMQ-56-038, "Preventive Maintenance Procedure For HPCI TurLine Inspection," presently does not contain instructions to flush the HPCI hydraulic system. Therefore, procedure PMQ-56-038 will be revised to include procedural steps which also will require the flushing of the hydraulic system during each refueling outage. Other Unit 1 and Unit 2 HPCI system maintenance procedures will be reviewed and revised as necessary. All necessary procedure revisions are expected to be completed by October 31, 1992, prior to the upcoming Unit 2 refueling

All steps have been incorporated into the common Unit 1 and Unit 2 system maintenance procedure, M-C-756-005, "HPCI Overspeed Trip Device Maintenance," to inspect and ensure that the ports on the overspeed trip mechanism tappet assembly are not obstructed following maintenance work on the overspeed trip mechanism.

3. The generic implications of this event have been assessed. As a result, appropriate common Unit 1 and Unit 2 RCIC system maintenance procedures will be reviewed and revised as necessary, to include flushing of the hydraulic system following RCIC system overhaul maintenance work. These reviews and necessary revisions are expected to be completed by October 31, 1992.

Previous Similar Occurrences:

LER 1-87-066 dated January 7, 1988, reported the 'suspected' blockage of an internal drain port, causing the HPCI system hydraulic-mechanical overspeed trip mechanism to cycle to the tripped position, resulting in the erratic operation of the turbine stop valve. An immediate corrective action that was recommended by General Electric Company for LER 1-87-066, was to perform the quarterly routine test (RT) procedure, RT-1-055-330-1, "HPCI Turbine Overspeed Trip Operability Check", to flush the HPCI system hydraulic-mechanical overspeed trip mechanism internals by running the auxiliary oil pump and manually exercising the overspeed trip mechanism. The performance of procedure RT-1-055-330-1 does not require the disassembly of the hydraulic system components for the flush. The flush of the overspeed trip mechanism was completed, per procedure RT-1-055-330-1, and the incident could not be duplicated with the HPCI system in shutdown or in operation. Accordingly, the root cause of that event could not be determined, and the event was considered to be an isolated occurrence. The corrective action from this previous event would not have prevented this event being reported from occurring, since the performance of procedure RT-1-055-330-1 would not have removed the particles which clogged the leak-off port and the hydraulic control orifice.

Tracking Codes: X2 Failure that cannot be assigned from codes