



PECO NUCLEAR

A Unit of PECO Energy

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October 25, 1996
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 the unplanned inoperability of the High Pressure Coolant Injection (HPCI) system, a single train safety system due to the loss of the HPCI turbine speed signal caused by a loose speed sensor connector. This condition alone could have prevented the HPCI system from fulfilling its intended safety function to mitigate the consequences of an accident.

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| Reference: | Docket No. 50-352 |
| Report Number: | 1-96-018 |
| Revision Number: | 00 |
| Event Date: | September 25, 1996 |
| Report Date: | October 25, 1996 |
| Facility: | Limerick Generating Station PO Box 2300, Sanatoga, PA 19464-2300 |

This report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(v)(D).

Very truly yours,

DBN

cc: H. J. Miller, Administrator Region I, USNRC
N. S. Perry, USNRC Senior Resident Inspector, LGS

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LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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|--|--------|-----------|---|---------------------|-----------------|--------------------------------|--------|-------------------------------|--|---------------------|-----|
| FACILITY NAME (1) Limerick Generating Station, Unit 1 | | | | | | DOCKET NUMBER (2) 05000 352 | | | PAGE (3) 1 OF 4 | | |
| TITLE (4) Loose Speed Signal Cable Connector Renders the Single Train High Pressure Coolant Injection System Inoperable | | | | | | | | | | | |
| 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 NAME | DOCKET NUMBER | |
| 09 | 25 | 96 | 96 | -- 018 -- | 00 | 10 | 25 | 96 | FACILITY NAME | DOCKET NUMBER | |
| OPERATING MODE (9) 1 | | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) | | | | | | | | |
| POWER LEVEL (10) 100 | | | 20.402(b) | | | 20.405(c) | | | 50.73(a)(2)(iv) | | |
| | | | 20.405(a)(1)(i) | | | 50.36(c)(1) | | | X 50.73(a)(2)(v) | | |
| | | | 20.405(a)(1)(ii) | | | 50.36(c)(2) | | | 50.73(a)(2)(vii) | | |
| | | | 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 J. L. Kantner, Manager, Experience Assessment, LGS | | | | | | | | | TELEPHONE NUMBER (Include Area Code) (610) 718-3400 | | |
| 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) | | | | | | | | | | | |
| YES (If yes, complete EXPECTED SUBMISSION DATE) | | | | | | X NO | | EXPECTED SUBMISSION DATE (15) | | MONTH | DAY |
| | | | | | | | | | | YEAR | |
| ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16) | | | | | | | | | | | |
| <p>At 1104 hours on 09/25/96, during performance of a surveillance test (ST), the High Pressure Coolant Injection (HPCI) system shutdown on an overspeed condition and restarted, cycling several times until the operators tripped the system. The HPCI system was then declared inoperable. A loss of the HPCI turbine speed signal caused the turbine control problem. Additionally, manual control of the HPCI system was not fully available without the HPCI turbine speed indication. This resulted in a condition which alone could have prevented the HPCI system from performing its intended safety function. A loose speed sensor connection was tightened and at 2100 hours, the HPCI system was declared operable after completion of a ST. There was no accident requiring the HPCI system and sufficient Emergency Core Cooling Systems (ECCS) were operable to mitigate the consequences of an accident. Periodic tightness and continuity verifications are being performed on the connector until the connector is replaced. An enhancement is being evaluated to increase the reliability of the connector. Maintenance technicians who repair the HPCI system will be informed of this event and a caution will be added to appropriate maintenance procedures.</p> | | | | | | | | | | | |

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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TEXT (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 1 (Power Operation) at 100% power level. There were no systems, structures or components inoperable that contributed to the event.

Description of the Event:

At 1104 hours on September 25, 1996, licensed Operations personnel were performing Surveillance Test (ST) procedure ST-6-055-320-1, "HPCI Pump, Valve and Flow Test." When the High Pressure Coolant Injection (HPCI, EISS:BJ) system was started, the operators observed valve motion and an increase in HPCI Pump discharge pressure but the HPCI turbine speed still indicated zero (0) rpm. A procedure step requires the Operator to verify an increase in the HPCI turbine speed prior to opening the test return valve to provide a pump discharge flow path. While the operator waited for an increase in turbine speed, the HPCI hydraulic controls shut the stop valve on a turbine overspeed condition. The stop valve automatically reopened when the turbine overspeed condition cleared. A turbine overspeed condition then recurred. This cycling occurred several times in an approximately thirty (30) second time period. There are no alarms for the turbine overspeed condition since the turbine does not become unavailable in this condition. As a result, the operator was unaware that an overspeed condition existed. The operator shutdown the HPCI system due to the abnormal operating indications to avoid any adverse impact on the HPCI system. The operators then declared the HPCI system inoperable.

Maintenance/Instrumentation and Controls (I&C) personnel determined that a loose speed sensor connector at the HPCI turbine caused the loss of turbine speed signal and Main Control Room (MCR) speed indication. The connector was tightened and operations declared the HPCI system operable at 2100 hours following successful completion of the ST procedure. An evaluation has been performed and concluded that the connector is capable of performing its design function provided that the connector is verified to be tight after each HPCI system operation.

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

A four hour notification was made to the NRC at 1448 hours on September 25, 1996, in accordance with the requirements of 10CFR50.72(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. This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(v)(D).

Analysis:

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 period in which the HPCI system was inoperable, and therefore, the HPCI system was not called upon to perform its intended safety function. If the HPCI system had been required to operate, the HPCI system would have provided coolant injection but would have oscillated above and below its design flows. Additionally, manual control of the HPCI system was not fully available without the HPCI turbine speed indication. Sufficient Emergency Core Cooling Systems and the Reactor Core Isolation Cooling (ECCS:BN) system were available to ensure safe shutdown of the reactor, and to mitigate the consequences of an accident. The HPCI system responded as expected due to the loss of speeded signal feedback and was restored expeditiously by Maintenance/I&C and Operations personnel. There was no permanent adverse impact on the HPCI system due to the overspeed operation.

Cause of the Event:

A degraded speed sensor cable connector caused the HPCI system to become inoperable. The last time this connector was disturbed was during HPCI system maintenance performed during the last refueling outage in February, 1996. It is most likely that a latching key on the connector became degraded when a technician over tightened the connector during reassembly. Later, during subsequent HPCI system runs, the connector loosened due to normal equipment vibration until the electrical connection was lost on September 25, 1996. Previous connector over tightening may also have weakened the latching key.

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Corrective Actions:

The connector will be replaced during the next scheduled HPCI system outage. Until then, continuity and tightness checks will be performed prior to and immediately after each HPCI system run.

An enhancement to the connector is being evaluated to increase the reliability of the connector.

The technicians who perform the HPCI system maintenance will be informed of the consequences of over tightening the connector. A caution will be added to the appropriate procedures that manipulate the connector indicating the consequences of over tightening the connector. Other station personnel who manipulate similar connectors will be informed of this event.

Previous Similar Occurrence:

None