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10CFR50.73

May 20, 1996
NRC-96-0033

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

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Licensee Event Report (LER) No. 96-007

Pursuant to 10 CFR 50.73, Detroit Edison is submitting the enclosed LER No. 96-007 regarding an event where the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems were conservatively declared inoperable during a plant startup on April 19, 1996. The Fermi 2 Technical Specifications (TS) required entry into TS 3.0.3 and the plant was subsequently shutdown.

The following commitment is being made in this LER:

> Provisions will be made to ensure that the calibration of the pressure transmitters associated with the pressure regulator are periodically checked on a more frequent basis. These calibration checks will be scheduled and performed, as necessary, during each cold shutdown.

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If you have any questions, please contact Mr. Norman K. Peterson, Supervisor, Compliance at 313-586-4258.

Sincerely,

Enclosure: NRC Forms 366, 366A

cc: T. G. Colburn
M. J. Jordan
H. J. Miller
A. Vegel
M. V. Yudasz, Jr.
Region III
Wayne County Emergency Management Division

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Fermi 2	0 5 0 0 0 3 4 1	1 OF 6

TITLE (4) Plant Shutdown due to Technical Specification 3.0.3 Entry

EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON	DAY	YR	YR	SEQUENTIAL NUMBER	REVISION NUMBER		MON	DAY	YR	FACILITY NAMES	DOCKET NUMBER (S)
04	19	96	96	- 0 0 7 -	0 0		05	20	96		0 5 0 0 0
											0 5 0 0 0

OPERATING MODE (9)	POWER LEVEL (10)
2	0 0 8

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)

X 10 CFR 50.73 (a) (2) (i) (A), 50.73 (a) (2) (i) (B)

OTHER -

(Specify in Abstract below and in text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

Norman K. Peterson - Supervisor, Compliance	TELEPHONE NUMBER AREA CODE	313 586-4258

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 (16)

On April 19, 1996 with the plant in Operational Condition 2 (Startup), the Reactor Core Isolation Cooling (RCIC) system was conservatively declared inoperable due to turbine shaft gland leakage, although the required surveillance testing had been satisfactorily completed. The High Pressure Coolant Injection (HPCI) system was not tested within the time required by the Technical Specifications (TS) and was also declared inoperable. This necessitated entry into TS 3.0.3 and the plant was subsequently shutdown to effect repairs on the RCIC system.

The cause of the RCIC system inoperability was steam leakage from the RCIC turbine shaft glands while the RCIC turbine was in the standby condition. The turbine shaft gland leakage was caused by steam leakage past the seat of the RCIC turbine steam admission valve. This was a conservative decision as the RCIC system surveillance testing had been successfully completed and the steam leakage did not present an immediate operability concern. The cause of the HPCI system inoperability was the failure to perform the required surveillance testing in the time required by the TS. Unexpected indications with the reactor pressure regulator during the startup caused the operators to conservatively stop raising reactor pressure and not perform the HPCI system surveillance test until the cause of the pressure regulator discrepancies were understood and resolved.

Corrective actions included the repair of the RCIC turbine steam admission valve, troubleshooting of the pressure regulator and performance of the HPCI system surveillance test during the plant startup on April 22, 1996.

Initial Plant Condition:

Operational Condition:	2 (Startup)
Reactor Power:	8 Percent
Reactor Pressure:	950 psig
Reactor Temperature:	540 degrees Fahrenheit

Description of the Event:

A. Background

During the time period from April 17 to April 19, 1996 the plant was in the process of starting up from a forced outage. During the startup, surveillance tests for the High Pressure Coolant Injection (HPCI) system [BJ] and the Reactor Core Isolation Cooling (RCIC) system [BN] were scheduled to be performed to meet Surveillance Requirements 4.5.1.b.3 and 4.7.4.b, respectively. These Surveillance Requirements specify that the surveillance tests be performed when steam is being supplied to the HPCI and RCIC turbines at a pressure between 945 psig and 1045 psig. The HPCI and RCIC systems are required to be operable in Operational Conditions 1, 2, and 3 with reactor steam dome pressure greater than 150 psig. The provisions of Technical Specification (TS) 4.0.4 are not applicable to the Surveillance Requirements mentioned above, provided the surveillance tests are performed within 12 hours after reactor steam pressure is adequate to perform the tests.

B. Event Description

On April 17, 1996 the plant was in the process of starting up from a forced outage. The plant exited Operational Condition 4 (Cold Shutdown) at 1221 hours. On April 18, 1996 the reactor was critical at 0624 hours, the RCIC system was placed in a standby lineup at 0826 hours and the HPCI system was placed in a standby lineup at 0955 hours. Reactor pressure of 150 psig was reached at approximately 1030 hours. The planned sequence of events for the startup was to raise reactor pressure to 945 psig, enter the containment for a Reactor Coolant System (RCS) leakage inspection, and perform the scheduled HPCI and RCIC surveillance tests prior to proceeding into Operational Condition 1 (Power Operation). Reactor pressure of 945 psig was reached at 1657 hours.

At 2239 hours, following completion of the containment RCS leakage inspection, the RCIC system was manually started in accordance with Surveillance Procedure 24.206.01, "RCIC System Pump and Valve Operability Test." The surveillance test was satisfactorily completed at 2317 hours. However, the RCIC system was conservatively

declared inoperable due to steam leakage from the RCIC turbine shaft glands [BN][SEAL] with the turbine in the standby condition. In the System Engineer's judgement, this steam leakage could have had an adverse affect on the RCIC turbine speed control circuitry [BN][SC] during time. The shaft gland steam leakage was not evident while the RCIC turbine was in operation due to proper operation of the gland seal system for the turbine. With the RCIC system inoperable, TS 3.0.4 would not have allowed entry into Operational Condition 1 until the RCIC system was returned to operable status.

Following completion of the RCIC system testing, preparations were begun for the HPCI system testing. Surveillance Procedure 24.202.01, "HPCI Pump Time Response and Operability Test at 1025 PSI" contains a prerequisite that the HPCI steam supply pressure be between 945 psig and 1045 psig in order to perform the test. Based upon this and the text of TS Surveillance Requirement 4.5.1.b.3, which states that the test be run "...when steam is being supplied to the turbine at 1025 +20, -80 psig...", the operating crew concluded the pressure to which the prerequisite referred was not the reactor steam dome pressure. The HPCI turbine steam inlet pressure was approximately 920 psig as read on both the Control Room and local indicators. This pressure was also verified to be correct by connecting a Heise gage at the local pressure sensing point.

The 25 psig pressure difference between the reactor steam dome pressure and the HPCI turbine steam inlet pressure was due to the 10 inch HPCI turbine steam supply valve (E41-F003) being closed and a 1 inch bypass valve (E41-F600) being open. The 1 inch bypass line is used to maintain the 10 inch HPCI turbine steam supply line warm while the HPCI system is in standby to improve system reliability. Steam flow losses through the 1 inch bypass line are thought to have caused the pressure difference.

At 0313 hours on April 19, 1996, based upon HPCI turbine steam line pressure being 920 psig, the Shift Supervisor authorized reactor pressure to be increased to a value sufficiently high enough to meet the prerequisite to perform the HPCI surveillance test.

At 0325 hours, the pressure increase was stopped at approximately 950 psig due to unexpected indications associated with the operation of the reactor steam pressure regulators [SB][RG]. Plant maintenance personnel were contacted to begin troubleshooting of the pressure regulators and the plant was maintained stable during the troubleshooting effort. The decision was also made to not perform the HPCI system surveillance test until the unexpected indications with the pressure regulator were understood and resolved.

At 0457 hours, the HPCI system was declared inoperable due to not performing the required surveillance testing within the time required by TS 4.5.1.b.3. With the RCIC

system also not yet operable, TS 3.0.3 was entered. A plant shutdown was initiated at 0550 hours.

During the plant shutdown, the weekly Channel Functional Tests for both divisions of the Intermediate Range Monitors (IRMs) [IG] and the Average Power Range Monitors (APRMs) [IG] also exceeded their surveillance intervals. At 0900 hours, both divisions of the IRMs became inoperable and a plant shutdown action statement was entered in accordance with TS 3.3.1. Similarly, at 1125 hours, less than the required number of the APRMs were operable and a plant shutdown action statement was entered to comply with TS 3.3.1. This surveillance testing was not performed immediately prior to the plant startup as it was anticipated the plant would be in Operational Condition 1, where the weekly surveillance tests are not required, prior to the end of the surveillance interval. The operating crew also elected not to perform the surveillance tests during the plant shutdown.

The plant was placed in Operational Condition 3 (Hot Shutdown) at 1148 hours by inserting a manual scram from approximately 1 percent power. At 1606 hours reactor pressure was lowered to 150 psig and TS 3.0.3 was exited.

Cause of the Event:

The cause of the RCIC system inoperability was steam leakage from the RCIC turbine shaft glands while the RCIC turbine was in the standby condition. The turbine shaft gland leakage was caused by steam leakage past the seat of the RCIC turbine steam admission valve (E51-F045) [BN][V]. The valve seat leakage was caused by a slight amount of flow induced plug to seat misalignment.

The cause of the HPCI system inoperability was a conservative decision not to perform the required surveillance testing during troubleshooting of the reactor pressure regulator. Unexpected indications with the reactor pressure regulator caused the operating crew to conservatively stop raising reactor pressure and maintain the plant in a stable condition until the cause of the discrepancies were understood and resolved.

The reactor steam pressure regulator indication discrepancies were attributable to a measurable offset between the regulator pressure transmitter signals that exceeded the offset between the selected controlling and backup regulator. The small transient differences between the magnitudes of these signals caused the control of the pressure regulator system to alternate between Number 1 and Number 2 regulator. Reactor pressure control was not degraded and no alarms were initiated as a result of this condition.

Analysis of the Event:

Although the RCIC system was considered inoperable due to steam leakage from the turbine shaft glands, the system surveillance test had been satisfactorily completed shortly before the plant shutdown. As stated above, the reason for considering the RCIC system inoperable was that the steam leakage could have caused degradation or failure of the turbine speed control circuitry after a substantial period of time with the system in the standby condition. Therefore, the RCIC system would have been available to perform its intended function for the duration of this event had it been needed.

The HPCI system was considered inoperable solely because its required surveillance test had not been performed within the prescribed surveillance time limit. No significant maintenance had been performed on this system during the forced outage that would have caused it to become inoperable. The required HPCI system surveillance testing was satisfactorily completed at 1402 hours on April 22, 1996, during the subsequent plant startup. Therefore, the HPCI system would have been available to perform its intended function for the duration of this event had it been needed.

The IRMs and APRMs were also considered inoperable solely because required surveillance testing was not elected to be performed within the required surveillance interval. Subsequent surveillance testing was satisfactorily completed on April 19, 1996, and no problems were noted. Therefore, these instruments would have been available to perform their intended function for the duration of this event, if needed.

Based upon the above discussion, the health and safety of the public were not adversely affected by this event.

Corrective Actions:

A. Immediate Corrective Actions

Troubleshooting of the reactor steam pressure regulator was conducted to determine the cause of the indication discrepancies. No significant problems or equipment failures were noted, however, slight adjustments to one pressure transmitter were made.

Channel functional tests for the IRMs and APRMs were successfully completed during the afternoon shift on April 19, 1996 and these instruments were restored to operable status.

During the initial forced outage, valve E51-F045 was disassembled and the valve seat was repaired. Following discovery of continued leakage during the plant startup on April 18, 1996, a controlled manual closure thrust increase was performed which stopped the leakage. After the plant was shutdown, the valve was again disassembled

and inspected. The valve seating surface was found to be acceptable, however, slight "cocking" of the plug could be simulated as the plug contacts the inbody seat. This confirmed the seat leakage was caused by a slight amount of flow induced plug to seat misalignment. The motor operated valve torque switch setting was increased to overcome this problem. The RCIC system was run during the subsequent plant startup on April 22, 1996 and no anomalies or leakage problems were noted.

As was described above, the HPCI system was successfully tested during the April 22, 1996 plant startup.

B. Corrective Actions to Prevent Recurrence

Provisions will be made to ensure that the calibration of the pressure transmitters associated with the pressure regulator are periodically checked on a more frequent basis. These calibration checks will be scheduled and performed, as necessary, during each cold shutdown.

Additional Information:

A. Failed Components

None.

B. Previous LERs on Similar Problems

LER 88-005 describes an event where reactor pressure exceeded 150 psig without the HPCI and RCIC systems being operable due to not placing them in a standby lineup. This resulted in entry into TS 3.0.3, however the plant was not shutdown as these systems were placed in their standby lineups before a shutdown was required. The cause of this event was personnel error.

LER 87-012 describes an event where a failed fuse rendered several HPCI and RCIC system isolation instruments inoperable. Both the HPCI and RCIC systems were declared inoperable, TS 3.0.3 was entered and the plant was shutdown. The cause of this event was equipment failure.

LER 86-037 describes an event where the HPCI and RCIC systems were rendered inoperable on two separate occasions during surveillance testing. It was not realized until after the testing that conditions existed which should have caused entry into TS 3.0.3. The cause of this event was personnel error resulting from an unclear step in the procedure.