

Detroit
Edison

William S. Orser
Senior Vice President

Fermi 2
6400 North Dixie Highway
Newport, Michigan 48166
(313) 586-5201

10CFR50.73

July 6, 1992
NRC-92-0061

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

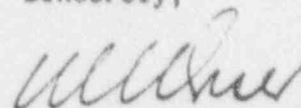
Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Licensee Event Report (LER) No. 91-020-01

Please find enclosed Supplemental LER No. 91-020-01, dated July 6, 1992, for a reportable event that occurred on November 20, 1991. A copy of this LER is also being sent to the Regional Administrator, USNRC Region III.

If you have any questions, please contact Joseph Pendergast, Compliance Engineer, at (313) 586-1682.

Sincerely,



enclosure: NRC Forms 366, 366A

cc: T. G. Colburn
A. B. Davis
M. P. Phillips
S. Stasek
P. L. Torpey

Wayne County Emergency
Management Division

9207140018 920706
PDR ADCK 05000341
S PDR

JUL 8 1992

DCO-IE22

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) **Fermi 2** DOCKET NUMBER (2) **050003411** PAGE (3) **1 OF 05**

TITLE (4) **High Pressure Coolant Injection System Start Failure During Quarterly Surveillance Test**

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)
11	20	91	91	020	0	10	70	692		050000
										050000

OPERATING MODE (9) **1** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)

20.402(b)	20.405(c)	80.73(a)(2)(iv)	73.71(a)
20.406(a)(1)(i)	80.36(e)(1)	<input checked="" type="checkbox"/> 80.73(a)(2)(v)	73.71(c)
20.406(a)(1)(ii)	80.36(e)(2)	80.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.406(a)(1)(iii)	80.73(a)(2)(i)	80.73(a)(2)(viii)(A)	
20.406(a)(1)(iv)	80.73(a)(2)(ii)	80.73(a)(2)(viii)(B)	
20.406(a)(1)(v)	80.73(a)(2)(iii)	80.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **Joseph Pendergast, Compliance Engineer** TELEPHONE NUMBER **313 581-1168**

AREA CODE **313**

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
X	BJ	FICV	W2910	Yes					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen (15) double-space typewritten lines) (16)

On November 20, 1991, at 1954 hours, the High Pressure Coolant Injection System (HPCI) failed to start during performance of surveillance, 24.202.01, "HPCI Pump Time Response and Operability Test at 1000 PSI". In compliance with the appropriate Limiting Condition for Operation, the HPCI system was declared inoperable and the Technical Specification Action Statement was entered.

The system failed to start when the governor control valve (E4100F068) failed to open and admit steam to the HPCI turbine. The initial investigation showed that the Hydraulic Actuator (EGR), E41-K203, was not functioning, thus keeping the governor valve closed. The EGR was replaced. Post maintenance surveillance testing demonstrated that the HPCI system operated properly. On November 22, at 0612 hours, the HPCI system was declared operable.

Detroit Edison believes the cause of the EGR failure to be corrosion from water intrusion into the HPCI oil system. Investigation following the initial failure, subsequent surveillance testing, and a scheduled system outage determined the cause of the water intrusion to be a degraded barometric condenser vacuum pump (which was replaced following the subject EGR failure), and degraded turbine gland seals and turbine lube oil system sealing mechanisms (which were replaced in May of 1992). Procedure changes have been made to enhance monitoring of HPCI turbine vacuum during surveillance testing which should provide early warning of degrading barometric condenser vacuum pump and/or turbine sealing mechanism (carbon rings and dust collar) performance.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS
INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD
COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS
AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR
REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO
THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE
OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Fermi 2	DOCKET NUMBER (2) 0 5 0 0 0 3 4 1 9 1 --	LER NUMBER (5)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		0 2 0	--	0 1	0 2	OF	0 5

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

Initial Plant Conditions:

Operational Condition: 1 (Power Operation)
 Reactor Power: 100 Percent
 Reactor Pressure: 1009 psig
 Reactor Temperature: 540 degrees Fahrenheit

Description of Event:

On November 20, 1991, at 1954 hours, the High Pressure Coolant Injection System [(HPCI)(BJ)] failed to start during its quarterly surveillance, 24.202.01, "HPCI Pump Time Response and Operability Test at 1000 PSI", procedure section 5.1. The HPCI system governor control valve (FCV), E4100F068, failed to open when the HPCI system auxiliary oil pump (P) started. The auxiliary oil pump supplies control oil to the Hydraulic Actuator (EGR) and the turbine control valve. The HPCI system was declared inoperable, and the 14 day Action Statement for Technical Specification, 3.5.1.c.1, was entered. At this time, the required Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling [(RCIC)(BN)] system were verified operable as required by the Technical Specification Action Statements.

Data gathered during the surveillance test showed that the EG-M control box, which provides the control signal to the governor control valve's hydraulic actuator, had sent an open signal to the EGR governor system. The data showed that the EGR did not respond to the signal. A Deviation Event Report (DER 91-0878) was written to investigate and evaluate the HPCI start failure.

On November 22, at 0612 hours, after replacement and adjustment of the EGR, and successful performance of the quarterly surveillance 24.202.01, the HPCI system was declared operable.

Cause of Event:

The initial investigation of the system start failure showed that the EGR was not responding to the signal from the EG-M control unit. The EGR cover was removed and the EGR pilot valve plunger was found to be stuck in place. Moisture was noted in the upper portion of the EGR. The failed EGR was removed from the system and sent to the manufacturer, Woodward Governor

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 80.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Fermi 2	DOCKET NUMBER (2) 0500034191	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
			020	010	3	OF	05

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

Company, for failure analysis. Although the failure could not be repeated at Woodward, the conclusion of the failure analysis supports that the likely root cause of the failure was corrosion as a result of water intrusion into the oil system.

During previous surveillance testing on October 4, 1991, the water content in the HPCI control oil system was also found to be higher than normal. A Deviation Event Report (DER 91-0787) was then initiated to resolve the water ingress problem. This DER required pre- and post-run sampling of the control/lube oil system during the next surveillance test to determine whether the water is entering the oil during the surveillance runs. Samples taken during subsequent surveillance testing contained water in higher than normal concentration. Samples taken previous to the surveillance run, on November 20, were as low as 0.1 percent water content. Post surveillance run samples on November 22, were as high as 1.2 percent water content.

Subsequent troubleshooting indicated that the HPCI barometric condenser vacuum pump was not providing enough vacuum to maintain proper gland seal leakoff, thus causing the noted water in-leakage from the turbine gland seals into the control/lube oil system. Failure of the vacuum pump alone does not render the HPCI system inoperable, however it was a significant contributor to water ingress into the control/lube oil system during operation.

Pre- and post-run oil sampling during a February 13, 1992 surveillance test indicated that while moisture ingress into the lube oil system had decreased as a result of previous corrective actions, it was still present. Potential water ingress paths were reviewed with the turbine vendor and were investigated during a May 1992 system outage with the turbine vendor present. During the outage, the turbine carbon rings were found frozen in place and one dust collar on the coupling end was found damaged. This damage provided a pathway for water intrusion into the turbine oil system.

Analysis of Event:

The failure of HPCI to start during surveillance testing rendered the system inoperable. The appropriate Technical Specification Action Statements were met following this event. While HPCI was inoperable, the Automatic Depressurization System (RV) (part of ECCS) would have been available to reduce reactor pressure to the point where Low Pressure

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 600 HRS. FORWARD COMMENT REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-830) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Fermi 2	DOCKET NUMBER (2) 0 5 0 0 0 3 4 1 9 1	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
			0 2 0 0	0 1	0 4	OF 0 5

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

Coolant Injection (BO) and Core Spray (BM) could have been used. RCIC was available to provide reactor water inventory control at normal operating reactor pressures for modes 1, 2 and 3. If an event had occurred which would have challenged HPCI, the other ECCS systems and RCIC would have fulfilled this safety function.

Based upon the availability of adequate ECCS and RCIC, this event did not impact the safe operation of the plant or the health and safety of the public.

Corrective Actions:

Initial investigation of the HPCI start failure showed that the EGR had failed to function. The EGR was replaced. Following the system's return to service, troubleshooting showed the HPCI barometric condenser vacuum pump failed to maintain proper system vacuum during system operation. The barometric condenser collects and condenses steam leakage from the HPCI turbine shaft seals, Stop and Governor Control valve steam leakoffs. To minimize water in the HPCI control oil system from the turbine gland seals, the vacuum pump was changed out and proper system vacuum verified with HPCI in the standby mode.

During February 12, 1992 surveillance testing, additional monitoring indicated that water ingress had somewhat diminished but was still present. A static pressure test of the HPCI lube oil cooler was performed and did not indicate leaks in the cooler.

During a May, 1992 HPCI system outage, the HPCI turbine carbon rings were found frozen in the turbine gland case and one dust collar on the coupling end was found damaged. These components were replaced. As a precautionary measure, a new EGR was installed. During post maintenance surveillance testing, pre- and post-run oil sampling indicated no detectable water intrusion into the oil system.

As a result of experience gained throughout the investigation of this event, the quarterly surveillance procedure has been modified to enhance monitoring of the HPCI turbine vacuum during surveillance testing. These changes should provide early warning of vacuum pump and/or turbine sealing mechanism (carbon rings and dust collar) degradation. Additionally, surveillance procedures were modified to require running of the HPCI

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20585, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Fermi 2	DOCKET NUMBER (2) 0 5 0 0 0 3 4 1 9 1 -	LER NUMBER (8)		PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		0 2 0	0 1	0 5	OF 0 5

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

barometric condenser vacuum pump for approximately 15 minutes following turbine trip allow removal of residual heat and moisture during turbine casing cooldown.

Previous Similar Events:

This is the only reportable event due to a failed EGR on the HPCI system, where the system failed to start due to a failure of the Turbine Control Valve to open.

Failed Component Data:

- o E41-K203, Woodward Governor Co., Hydraulic Actuator, Model No. R9903-026 (S/N 2084543).