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DTE Energy



10CFR50.73

November 14, 2002
NRC-02-0075

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. 02-004

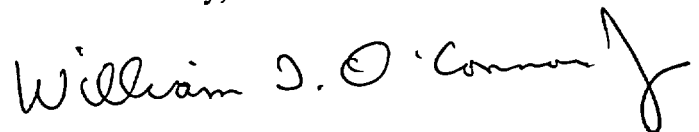
Pursuant to 10 CFR 50.73(a)(2)(iv)(A), Detroit Edison is submitting the enclosed LER No. 02-004. This LER documents a reactor scram and the automatic actuation of any systems listed in paragraph (a)(2)(iv)(B).

The following commitment is being made in this LER:

A supplement to this LER will be submitted to document the root cause of the failure of Circulating Water Pump 2. This supplement will be submitted by May 21, 2003.

Should you have any questions or require additional information, please contact Mr. Norman K. Peterson of my staff at (734) 586-4258.

Sincerely,



cc: T. J. Kim
M. A. Ring
M. V. Yudas, Jr.
NRC Resident Office
Region III
Regional Administrator, Region III
Wayne County Emergency Management Division

IE22

Estimated burden per response to comply with this mandatory information collection request 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME Fermi 2	2. DOCKET NUMBER 05000341	3. PAGE 1 OF 5
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4. TITLE
Reactor Scram Due To Loss of Condenser Vacuum

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	02	2002	2002	- 004	- 00	11	14	02	FACILITY NAME	DOCKET NUMBER
										05000
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)				
	20 2201(b)	20 2203(a)(3)(ii)	50 73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)	
10. POWER LEVEL 100	20.2201(d)	20 2203(a)(4)	50 73(a)(2)(iii)	50.73(a)(2)(x)	
	20.2203(a)(1)	50 36(c)(1)(i)(A)	X 50 73(a)(2)(iv)(A)	73 71(a)(4)	
[REDACTED]	20 2203(a)(2)(i)	50 36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73 71(a)(5)	
	20 2203(a)(2)(ii)	50 36(c)(2)	50 73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A
	20 2203(a)(2)(iii)	50 46(a)(3)(ii)	50.73(a)(2)(v)(C)		
	20 2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50 73(a)(2)(v)(D)		
	20 2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)		
	20 2203(a)(2)(vi)	50 73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)		
20 2203(a)(3)(i)	50 73(a)(2)(ii)(A)	50 73(a)(2)(viii)(B)			

12. LICENSEE CONTACT FOR THIS LER

NAME Jerome Flint – Principal Specialist, Licensing	TELEPHONE NUMBER (Include Area Code) 734-586-5212
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	KE	P	IO75	Y	X	KE	ISV	P340	Y

14. SUPPLEMENTAL REPORT EXPECTED		15. EXPECTED SUBMISSION DATE			
X	YES (If yes, complete EXPECTED SUBMISSION DATE).	NO	MONTH	DAY	YEAR
			05	21	2003

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 2, 2002, at 1453 hours, the reactor scrambled from 100 percent power. Condenser pressure increased when Circulating Water Pump (CWP) 2, one of four running CWPs, failed. Condenser pressure exceeded the main turbine trip setpoint. The main turbine tripped, resulting in a reactor scram. Prior to the scram at 1452 hours the Circulating Water Header Low Pressure annunciator was received. The Condenser Pressure High annunciator was received and control room operators (licensed, utility) entered the Abnormal Operating Procedure for Loss of Condenser Vacuum. The main turbine automatically tripped causing a reactor scram on main turbine stop valve closure. All safety systems responded as expected. All rods fully inserted into the core. Reactor level decreased below Level 3, resulting in expected isolation signals. After the reactor scram, condenser vacuum recovered. Reactor level was recovered with the Feedwater/Condensate System. No Emergency Core Cooling Systems initiated and no Safety Relief Valves lifted. The cause of the event was a failure of CWP 2. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), as an event that resulted in manual or automatic actuation of any systems listed in paragraph (a)(2)(iv)(B), i.e., actuation of the Reactor Protection System including reactor scram or reactor trip.

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

Initial Plant Conditions:

Mode 1 (Power Operation)
 Reactor Power 100 Percent
 Reactor Pressure 1023 psig
 Reactor Temperature 537 Degrees Fahrenheit

Description of the Event

On October 2, 2002, at 1453 hours, the reactor scrammed from 100 percent power. Condenser pressure increased when Circulating Water Pump (CWP) 2 (P), one of four running CWPs, failed. Condenser pressure exceeded the main turbine trip setpoint. The main turbine (TA) tripped, resulting in a reactor scram.

Prior to the scram at 1452 hours the Circulating Water Header Low Pressure annunciator (ANN) was received in the control room. CWP 2 was observed running with reduced amperage. The Condenser Pressure High annunciator was received and control room operators (licensed, utility) entered the Abnormal Operating Procedure for Loss of Condenser Vacuum. As operators were preparing to reduce reactor power, the main turbine automatically tripped causing a reactor scram on main turbine stop valve closure. All safety systems responded as expected. All rods fully inserted into the core. Reactor level decreased below Level 3 (approximately 173 inches above the top of active fuel) as expected, resulting in Primary Containment Isolation (JM) of Group 13, Drywell Sumps (WK). Primary Containment Isolation Groups 4, Residual Heat Removal Shutdown Cooling and Head Spray (BO), and 15, Traversing Incore Probe System (IG), received isolation signals, but were already isolated per normal lineup. After the reactor scram condenser vacuum recovered allowing continued use of the main condenser (SG) as a heat sink. Reactor level was recovered with the Feedwater/Condensate System (SG, SJ). No Emergency Core Cooling Systems initiated and no Safety Relief Valves lifted.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), as an event that resulted in manual or automatic actuation of any systems listed in paragraph (a)(2)(iv)(B), i.e., Reactor Protection System (RPS) (JC) including reactor scram or reactor trip.

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

Cause of the Event

The turbine trip/reactor scram on main turbine stop valve closure was due to high condenser pressure. The cause of the high condenser pressure was failure of CWP 2. When CWP 2 stopped pumping (motor still running), a reverse flowpath was established from the Circulating Water System discharge header back to the Circulating Water Reservoir resulting in reduced Circulating Water System discharge pressure and flow to the main condenser. This resulted in main condenser pressure increasing to the main turbine trip setpoint. Subsequent to the turbine trip/reactor scram, steam flow to the main condenser was reduced to within the remaining Circulating Water System flow capability. Condenser vacuum quickly recovered.

Following the scram, initial closure of the CWP 2 discharge valve (ISO) failed to trip CWP 2 as designed. The discharge valve close pushbutton was held in the close position by the operator, tripping CWP 2. It was later determined the CWP 2 discharge valve motor operator shear pin had broken, allowing the valve motor operator to provide closed indication. The CWP 2 discharge valve remained open.

Routine periodic monitoring of vibration levels is performed on the CWPs. The vibration levels for CWP 2 were observed slowly trending up over time. In August 2002, an increase in vibration levels on CWP 2 was noted and entered into the site corrective action program. The trend in vibration and specific vibration levels of August 2002 were reviewed and discussed with the Circulating Water System Engineer. A Preventative Maintenance (PM) activity requiring pump overhaul for CWP 2 was rescheduled so that CWP 2 would be the next CWP undergoing this PM. Observed vibration levels were low enough there was no immediate concern with continuing to operate CWP 2.

The observed low CWP 2 motor amperage during the event was consistent with a CWP motor running uncoupled from its pump. The apparent cause of failure of CWP 2 was a separation of the motor (MO) and pump between the motor and impeller. The root cause will be determined when CWP 2 is disassembled.

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

Analysis of the Event

This report is required by 10 CFR 50.73(a)(2)(iv)(A) because of the unplanned actuation of reportable systems. Specifically, the reactor protection system was actuated as a result of a turbine trip on main turbine stop valve closure due to high condenser pressure.

A scram from turbine trip is an analyzed transient for which the plant is designed. All systems responded as expected. All rods fully inserted into the core. Reactor water level was maintained above the top of active fuel by the Condensate/Feedwater Systems and pressure was maintained below design by the Turbine Bypass Valves. Reactor water level decreased below Level 3 (approximately 173 inches above the top of active fuel) as expected, but above level 2 (approximately 110 inches above the top of active fuel) resulting in Primary Containment Isolation of Group 13, Drywell Sumps. Primary Containment Isolation Groups 4, Residual Heat Removal Shutdown Cooling and Head Spray, and 15, Traversing Incore Probe System, received isolation signals, but were already isolated per normal lineup. No Emergency Core Cooling Systems initiated and no Safety Relief Valves lifted.

The failure of the CWP 2 discharge valve to fully close allowed circulating water reverse flow from the Circulating Water System discharge header back to the Circulating Water Reservoir, but there was sufficient Circulating Water System pressure and flow to maintain condenser vacuum after the turbine trip/reactor scram.

The Updated Final Safety Analysis Report (UFSAR) contains "Loss of Condenser Vacuum at Two Inches Per Second" as part of the accident analysis. The transient that actually occurred was much less significant than that described in the UFSAR in that the Main Turbine Bypass Valves and Main Steam Isolation Valves did not isolate. Condenser vacuum recovered immediately after the turbine trip. Safety Relief Valves were not required to open. There was no discharge of normal coolant activity into the suppression pool.

This event did not affect the ability of systems required to maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident. Based on the preceding, it is concluded that there was no adverse impact on safety as a result of this event.

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

Corrective Actions

The discharge valve for CWP 2 was closed and the remainder of the Circulating Water System restored to normal prior to startup.

Vibration levels were taken on all remaining CWP's. No other pumps indicated any adverse trends in vibration. Circulating Water Pump 2 will be disassembled for repair and determination of the pump failure mode.

PM and Corrective Maintenance for all CWPs was reviewed and those items performed that will enable the Circulating Water System to run trouble free until RF09. Items included replacement of motor air filters, oil samples, repacking pump seals on CWP 4, and oil replacement for CWP 3.

CWP 2 was rescheduled to the first available opportunity for its overhaul PM.

Corrective actions will be developed and implemented commensurate with established priorities and processes of the Fermi 2 corrective action program. This event is documented in the Fermi 2 corrective action program in CARD 02-16210.

Additional Information

A. Failed Components

Component: Circulating Water Pump 2
 Description: Single stage centrifugal pump, 180,000 gallons per minute design
 Manufacturer: Ingersoll Rand
 Type: Model number 89APH

Component: Circulating Water Pump 2 Discharge Valve
 Description: Motor Operated Valve
 Manufacturer: Henry Pratt Co.
 Type: 78 inch Butterfly

B. Previous LERs On Similar Problems

LER 93-004, "Automatic Reactor Shutdown on Turbine Trip Due to Loss of Condenser Vacuum" describes an event where a personnel error caused a loss of electrical power to two CWP's and their discharge valves.