

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fermi 2	DOCKET NUMBER (2) 0 5 0 0 0 3 4 1	PAGE (3) 1 OF 0 4
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TITLE (4) Malfunction of Reactor Pressure Regulator Transfer Feature Results in Automatic Reactor Trip

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)																																																			
10	18	86	86	040	010	10	13	87	N/A		0 5 0 0 0																																																			
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">OPERATING MODE (9)</td> <td colspan="10">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)</td> </tr> <tr> <td colspan="2">1</td> <td>20.402(b)</td> <td>20.405(c)</td> <td><input checked="" type="checkbox"/></td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> </tr> <tr> <td colspan="2">POWER LEVEL (10)</td> <td>20.405(a)(1)(i)</td> <td>50.35(c)(1)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(v)</td> <td>73.71(c)</td> </tr> <tr> <td colspan="2">0 1 8</td> <td>20.405(a)(1)(ii)</td> <td>50.38(c)(2)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(vii)</td> <td rowspan="4">OTHER (Specify in Abstract below and in Text, NRC Form 366A)</td> </tr> <tr> <td colspan="2"></td> <td>20.405(a)(1)(iii)</td> <td>50.73(a)(2)(i)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(viii)(A)</td> </tr> <tr> <td colspan="2"></td> <td>20.405(a)(1)(iv)</td> <td>50.73(a)(2)(ii)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(viii)(B)</td> </tr> <tr> <td colspan="2"></td> <td>20.405(a)(1)(v)</td> <td>50.73(a)(2)(iii)</td> <td><input type="checkbox"/></td> <td>50.73(a)(2)(ix)</td> </tr> </table>												OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)										1		20.402(b)	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)	POWER LEVEL (10)		20.405(a)(1)(i)	50.35(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(c)	0 1 8		20.405(a)(1)(ii)	50.38(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)			20.405(a)(1)(iii)	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)			20.405(a)(1)(iv)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)			20.405(a)(1)(v)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)
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LICENSEE CONTACT FOR THIS LER (12)

NAME Lewis P. Bregni, Compliance Engineer	TELEPHONE NUMBER AREA CODE 3 1 3 5 8 6 - 5 3 1 3
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

At 1929 hours on October 18, 1986 Fermi 2 was in OPERATIONAL CONDITION 1 (POWER OPERATION), operating at 930 psig, 535 degrees Fahrenheit, and 18 percent reactor power. During troubleshooting of the reactor pressure regulator transfer feature an automatic actuation of the Reactor Protection System (RPS) and a reactor trip were received. The RPS actuation resulted from a pressure transient induced low reactor vessel water level condition which followed the regulator transfer malfunction.

The cause of the pressure transient which followed the regulator malfunction and caused this event could not be determined. The malfunction has been concluded to have occurred because the regulator transmitters were not required to be calibrated to closely enough matched outputs. As corrective actions the transmitters were calibrated and retested, and the calibration folders for the transmitters have been changed to ensure that they are calibrated to closer tolerances and that their outputs are closely matched. Also, the transmitter cabinets have been labeled with precautions, locking of the transmitter cabinets and lowering of the regulator loop differential signal annunciator setpoint is being investigated, and regulator parameters are being monitored. No failed components or systems contributed to this event.

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

At 1929 hours on October 18, 1986 Fermi 2 was in OPERATIONAL CONDITION 1 (POWER OPERATION), operating at 930 psig, 535 degrees Fahrenheit, and 18 percent reactor power. During troubleshooting of the reactor pressure regulator (RG) transfer feature an automatic actuation of the Reactor Protection System (RPS) (JC) and a subsequent reactor trip were received. At the time of the event the main turbine (TA) was off-line and the pressure regulators were being used to control reactor pressure by controlling steam flow through the steam bypass system (JI).

Prior to the event, it was noted that selection of the number 2 pressure regulator could not be achieved during Demonstration testing of the reactor pressure regulator transfer feature. As a result of the inability to transfer pressure regulator control, troubleshooting efforts were initiated to determine the cause of the pressure regulator operational difficulty.

During the troubleshooting activities another attempt was made to select the number 2 pressure regulator. Although the pressure regulator did transfer and take control of reactor pressure, the transfer did not occur until approximately twenty minutes after the transfer was initiated, at 1913 hours. When the transfer occurred the steam bypass valves unexpectedly began to modulate open to the 40 percent position.

Opening the steam bypass valves caused reactor pressure to decrease, and resulted in a swell induced increase in reactor vessel water level. In response to the decrease in reactor pressure, control room operators (licensed, utility) took manual control of the reactor flow limiter at 1920 hours. At 1925 hours, the main turbine, the reactor core isolation cooling (RCIC) (BN) turbine, and the reactor feed pump turbine (SJ) were automatically tripped as a result of the high reactor water level condition.

The concurrent trip of the reactor feed pump and the increase in reactor pressure due to flow limiter operation caused reactor water level to decrease. Standby feedwater pumps were started at 1925 hours and 1927 hours in order to limit the shrink in reactor vessel water level. At 1929 hours, an automatic RPS actuation and a reactor trip were received because of the low reactor water level condition.

The outboard main steam isolation valves (MSIV's) (SB) were closed at 1931 hours, and the inboard MSIV's were closed at 1942 hours in order to control plant cooldown rate after the trip. The reactor trip breakers were reset at 1933 hours.

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

Selection of reactor pressure regulators is made by depressing pushbuttons in the main control room. Depressing the pushbutton associated with a pressure regulator will place that regulator in control, and will apply a bias signal to the output of the other pressure regulator. The bias alters the value of the error between the setpoint control pressure and turbine pressure for the non-controlling regulator channel.

The pressure regulator control logic selects the controlling regulator based on the relative magnitude of this error signal. In order to provide a smooth transfer of pressure control, the bias which is applied to the non-controlling pressure regulator is dissipated over an approximate 10 second time interval. When the error signal for each of the pressure regulators is matched reactor pressure control is permitted to automatically transfer to the selected pressure regulator.

Operation of the regulator transfer feature requires that the unbiased transmitter outputs are closely matched. When the pressure regulator transmitters were calibrated prior to this event they were set in accordance with procedure such that they each provided an output reading within a specified tolerance of a setpoint. The calibration tolerance which was stated in the procedure is consistent with vendor recommendations on transmitter accuracy.

When the pressure regulator transfer was initiated prior to this event the bias signal dissipation feature compensated the signal from the number 2 pressure regulator. However, since the transmitters were at opposite extremes of the calibration setpoint band at the time of this event, and the allowable transmitter calibration tolerance was larger than the bias signal could compensate for, the regulator error signals were never matched and regulator transfer was impeded.

The regulator transmitters are of a strain gauge type and are sensitive to temperature variations. As a result, the regulator transmitters are located within individual insulated boxes within a common cabinet. These boxes provide a constant temperature controlled environment for the transmitters.

An investigation into the cause of this event concluded that the pressure regulators eventually transferred because of troubleshooting activities that were being performed during this event. At the time of the transfer both the transmitter cabinet doors and the transmitter boxes had been opened. Because of the timing of these activities and their probable temperature effects on the transmitters it is believed that they caused the output of the transmitters to vary enough that the automatic regulator transfer was completed.

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

This event was caused by the pressure transient induced low reactor vessel water level condition which initiated the RPS actuation. The cause of the pressure transient could not be determined. A contributing cause to this event was the malfunction of the reactor pressure regulator transfer feature.

An investigation conducted after the event concluded that the malfunction probably occurred because the pressure regulator transmitters were not calibrated to have closely enough matched output readings. This event was not contributed to by any personnel errors, or any components, structures, or systems that were inoperable at the start the event.

As corrective actions, an investigation into the cause of this event was conducted, the regulator transmitters were calibrated and retested, and the calibration folders for the transmitters have been changed to ensure that they are calibrated to closer tolerances and that their outputs are closely matched. Additionally, the transmitter cabinets have been labeled with precautions, locking of the transmitter cabinets and lowering of the regulator loop differential signal annunciator setpoint is being investigated, and pressure regulator parameters (GETARS) are being monitored on a temporary basis.

All Engineered Safety Features (JE) and reactor protective features performed as designed during this event. Had these features not performed as expected, various Emergency Core Cooling Systems (ECCS) and redundant safety features were available in order to ensure the integrity of all fission product barriers. This event did not affect the safe operation of the plant or the safety of the public.

Previous events involving a malfunction of a reactor pressure regulator have been reported in Licensee Event Reports 85-068 and 85-033. There have been no previous reports for Fermi 2 which involved a plant trip that was caused by a pressure regulator transfer malfunction.

Detroit
Edison

Robert S. Lenart
Plant Manager

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

10CFR50.73

January 31, 1987
NP870087



Nuclear
Operations

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

Gentlemen:

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

Subject: Transmittal of Licensee
Event Report 86-040-01

Please find enclosed LER No. 86-040-01, dated January 31, 1987, for a reportable event that occurred on October 18, 1986. As indicated below, a copy of this LER is being sent to the Administrator Region III.

If you have any questions, please contact us.

Sincerely,

Lo-LSL

R. S. Lenart
Plant Manager

Enclosure: NRC Forms 366, 366A

cc: J. R. Eckert
J. G. Keppler
W. G. Rogers
J. J. Stefano

Wayne County Emergency
Management Division

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