Stanley G. Catola
Vice President
Nuclear Engineering and Services

Detroit Edison

Fermi 2
6400 North Dixie Highway
Newport, Michigan 48166
(313) 586-4000

10CFR50.73

Nuclear Organization

February 15, 1991
NRC-91-0010

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. 91-001

Please find enclosed LER No. 91-001, dated February 15, 1991, for a reportable event that occurred on January 16, 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) 586-1683.

Sincerely,

S. Catola

Enclosure: NRC Forms 366, 366A

cc: A. B. Davis
J. R. Eckert
R. W. DeFayette
W. G. Rogers
J. F. Stang

Wayne County Emergency
Management Division

IE22
1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

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

TITLE (4) Transistor Degradation in Trip Unit Causes High Pressure Coolant Injection System Isolation

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)
										0 5 0 0 0
0 1	1 6	9 1	9 1	--- 0 0 1	— 0 0	0 2	1 5	9 1		0 5 0 0 0

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)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	8 0	20.405(a)(1)(i)	50.55(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	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)	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	TELEPHONE NUMBER
	AREA CODE
Joseph Pendergast, Compliance Engineer	3 1 3 5 8 6 - 1 6 8 2

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	PDITL	R 3 6 9	YES							

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

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

On January 16, 1991, at 1530 hours, the High Pressure Coolant Injection (HPCI) inboard steam supply valve, E41-F002, unexpectedly closed during surveillance 44.020.219, "NSSSS HPCI Turbine Exhaust Diaphragm Pressure Division I Functional Test." The surveillance was stopped, a Limiting Condition for Operation (LCO) was entered with the HPCI system and the associated containment isolation valves were declared inoperable.

The HPCI isolation resulted from a malfunction of transistor Q8 on a Rosemount 510DU trip unit. The trip unit supplies an isolation signal to valve E41-F002.

The failed Rosemount 510DU trip unit was replaced with a Rosemount 710DU trip unit, as recommended in General Electric Service Information Letter (SIL) 520, "Transistor Degradation in Rosemount 510DU Trip Units." The recommendations of the SIL were being evaluated at the time of this event. The HPCI system was declared operable, and the LCO was removed at 2312 hours, on January 16, 1991.

Initial Plant Conditions:

Operational Condition: 1(Power Operation)
Reactor Power: 80 Percent
Reactor Temperature: 540 degrees Fahrenheit
Reactor Pressure: 975 psig

Description of the Event:

On January 16, 1991, at 1530 hours, the High Pressure Coolant Injection (HPCI) (BJ) inboard steam supply valve (ISV), E41-F002, unexpectedly closed during surveillance 44.020.219, "NSSSS HPCI Turbine Exhaust Diaphragm Pressure Division I Functional Test." The surveillance was stopped, a Limiting Condition for Operation (LCO) was entered with the HPCI system and the associated containment isolation valves were declared inoperable.

The trip relay (RLY), E41K204C, was energized although the trip unit indicated normal. The trip unit, E41-N655C, had failed and was keeping relay E41K204C energized. Isolation logic was unexpectedly completed for the HPCI steam supply valve, E41-F002, by energizing contact E41K204A during performance of the surveillance. The isolation logic requires both contacts E41K204C and E41K204A to be closed for isolation to occur. The HPCI pump suction valve (ISV), E41-F042, had also received an isolation signal, however it was closed prior to the surveillance.

The failed Rosemount 510DU trip unit was replaced with a Rosemount 710DU trip unit. The HPCI system and isolation valves were declared operable, and the LCO was removed at 2312 hours, on January 16, 1991.

Cause of the Event:

The root cause of the HPCI isolation was a malfunction caused by resistive leakage across the Darlington Transistor 2N6296/Q8 for the Rosemount 510DU trip units. This failure was the same type of failure described in General Electric Service Information Letter (SIL) 520, "Transistor Degradation in Rosemount 510 DU Trip Units."

Analysis of the Event:

In the event of a postulated accident scenario requiring the actuation of HPCI for water injection into the reactor vessel, the system would have been able to perform its' safety function. Also an actual/valid high steam pressure signal would have caused an isolation. In the case where the full isolation signal already existed at the time of the postulated accident, the operator would have been required to manually reset the isolation (after removal of the test signal) and manually initiate HPCI. In this case, the Reactor Core Isolation Cooling (BN) system would also have been available for use as a reactor water make-up system.

The logic of the isolation valves requires both contacts, E41K204A and E41K204C, to be closed for closure/isolation to occur. The closure of these valves is annunciated in the control room. Therefore, operations personnel were aware of the valve closure/isolation when it occurred and initiated the appropriate corrective actions.

Corrective Actions:

The E41N655C Rosemount 510DU trip unit was replaced with a 710DU trip unit as recommended in SIL 520. The recommendations of the SIL, which was received in August 1990, were being evaluated under the Fermi corrective action (DER) program at the time of this event.

General Electric (GE) Nuclear Energy Division recommended that GE BWR owners examine their plants' Rosemount Model 510DU Trip Units to determine the date code that appears on the Darlington Transistor. If a date code lower than "8052" is found, GE recommended that either of the following corrective actions be implemented:

- Replace the Rosemount 510DU trip unit with a Rosemount Model 710DU Trip Unit.

- Replace the suspect transistor using replacement kit number 50710-0001 available from Rosemount.

Fermi 2 will be evaluating the application of these trip units in various systems during the second refueling outage. This activity requires field inspection of the trip units. Based upon our review of these system applications, any further actions, such as transistor or trip unit replacement, will be considered as appropriate.

Notification under 10CFR21 on the Rosemount Model 510 Trip/Calibration Units has been issued by Rosemount Incorporated.

Previous Similar Events:

There have been no previous Licensee Event Reports (LER) concerning the malfunction of Darlington Transistors. There was one previous LER, 88-024, which described the isolation of the HPCI steam line during the performance of a surveillance.

Failed Component Data:

- Rosemount Model 510DU trip unit
- Manufacture's Part/Model Number 510DU237020
- Darlington Transistor 2N6296/Q8