William S. Orser
Executive Vice President
Nuclear Generation

Detroit Edison

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

10CFR50.73

Nuclear Operations

March 19, 1993
NRC-93-0026

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. 93-004

Please find enclosed LER No. 93-004, dated March 19, 1993, for a reportable event that occurred on February 19, 1993. 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
W. J. Kropp
M. P. Phillips
P. L. Torpey

Wayne County Emergency
Management Division

220140

IE22

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 OF 0 4

TITLE (4)

Automatic Reactor Shutdown on Turbine Trip Due to Loss of Condenser Vacuum

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 2	1 9	9 3	9 3	-	0 0 4	- 0 0	0 3	1 9	9 3		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)	9 8	20.405(a)(1)(i)	50.36(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 M. 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	

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 February 19, 1993, Circulating Water Pump number 3 was removed from service for performance of Preventive Maintenance [PM]. Electrical Maintenance personnel were to perform procedure 35.318.017, "Inspection and Testing of Multi-Contact Auxiliary Relays". An electrician located and connected his test equipment to the incorrect relay which resulted in the loss of 4160 VAC bus 69J. Circulating Water Pumps number 1 tripped and 2 de-energized, and their discharge valves de-energized in the open position. Circulating Water Pumps 4 and 5 continued to operate. However, their discharge was partially re-directed through Circulating Water Pumps 1 and 2 in the opposite direction. Because of inadequate cooling water, Condenser pressure began to increase. The Main Turbine tripped on high Condenser pressure. At 2102 hours, an automatic Reactor Protection System shutdown was initiated by the Main Turbine control valve fast closure trip signal. The Reactor shutdown and all safety systems responded properly.

The root cause of this event was determined to be personnel error. The electrician did not verify that he was on the proper relay before connecting and energizing his test equipment. The General Supervisor of electrical maintenance discussed the importance of self checking and verification with electrical maintenance personnel. An accountability meeting was held. Training for electricians on self checking and trip relays will be reviewed.

Initial Plant Conditions:

Operational Condition: 1 Power Operation
Reactor Power: 98 Percent
Reactor Pressure: 1034 psig
Reactor Temperature 540 degrees Fahrenheit

Description of Event:

On February 19, 1993, Circulating Water Pump number 3 was removed from service for performance of Preventive Maintenance [PM]. Electrical maintenance [utility non-licensed] personnel were to perform procedure 35.318.017, "Inspection and Testing of Multi-Contact Auxiliary Relays". The electrical panel containing relays for the 4160 volt 69J Bus was opened and a drop light was placed in front of the panel. An electrician examined the relays [RLY] within the panel for the anti-pumping relay 52XX. The electrician located a 130 VDC undervoltage trip string relay 4NY94 and assumed 4NY94 was 52XX. The electrician connected his test equipment to 4NY94. As the electrician applied test voltage to 4NY94, he heard breakers opening. The electrician reduced the applied voltage and stopped the PM. 4160 VAC bus 69J and its associated 480 VAC switchgear bus 72J and Motor Control Center [MCC] 72J-2A were de-energized.

The tripping of bus 69J breakers took place, as relay 4NY94 was connected in parallel and test voltage was applied with other bus 69J undervoltage trip string relays. The trip string relays picked up except for 3NY94. This relay failed to pickup because the test potential voltage applied was not of sufficient magnitude. The electrician reduced the applied voltage before pickup was reached. Relay 3NY94 is the undervoltage trip string relay for breaker J5 which provides power for Circulating Water Pump number 2. Therefore, because the breaker for Circulating Water Pump number 2 did not open an automatic swap over of normal electrical feed to alternate electrical feed could not occur and an attempted manual swap over was prevented. Circulating Water Pumps [P] number 1 tripped and number 2 de-energized. The discharge valves [ISV] for Circulating Water Pumps 1 and 2 which would have normally gone closed were de-energized in the open position because power was lost to 480 VAC MCC 72J-2A. Circulating Water Pumps 4 and 5 were still operating. However, their discharge was partially re-directed through Circulating Water Pumps 1 and 2 in the opposite direction.

Power monitoring undervoltage relays XN27 and ZN27 which activated on loss of bus 69J were damaged by high currents drawn through the contacts. The test equipment power supply acted as a load that was powered through the undervoltage relay output contacts. This power supply had a capacitor which discharged and then re-charged to the polarity being applied to it from the 130 VDC system causing the high current condition.

Condenser [SD] pressure increased with the partial loss of circulating water. Approximately one and one half minutes later the Main Turbine Generator [TG] tripped on high Condenser pressure. At 2102 hours, an automatic Reactor Protection System [(RPS)(JC)] shutdown was initiated by the Main Turbine control valve fast closure trip signal. The Reactor shutdown and all safety systems responded properly. Reactor water level decreased to level 3 and the appropriate isolations occurred (e.g., Drywell floor and Drywell equipment drain sumps isolated). At 2107 hours, bus 69J was re-energized. At 2110 hours, the Reactor water level 3 was cleared.

Cause of the Event:

The root cause of this event was determined to be personnel error. The electrician did not verify that he was on the proper relay before connecting the test equipment.

Analysis of the Event:

The Condenser high pressure signal caused the Main Turbine trip. The turbine control valve fast closure resulted in an automatic Reactor shutdown. Closure of the turbine control valves can add positive reactivity to the core as the Reactor system pressure rises. The turbine control valve fast closure trip anticipates the pressure, neutron flux, and heat flux increase that could result from fast closure of the turbine control valves and automatically shuts down the Reactor. Following the Reactor shutdown signal all control rods fully inserted and all safety systems functioned as designed. This event is bounded by Updated Final Safety Analysis Report section, "Turbine Generator Trip".

Corrective Actions:

Relay 3NY94 was checked to verify its operation. Relays XN27 and ZN27 were replaced.

Training for electricians on self checking and trip relays, their general philosophy operation and testing, will be reviewed during initial and continuing training for electrical maintenance. This training will be conducted during second quarter of 1993.

A Human Performance Enhancement System investigation was performed.

An Accountability Meeting was held with plant management and personnel involved. The cause of the event and the corrective actions were discussed.

The General Supervisor of electrical maintenance discussed the importance of self checking and verification with the electrician involved and other electricians in the maintenance group.

As an enhancement, all "94" trip relays in the 4160 VAC 69J bus positions will be labeled. This will be done at the next scheduled maintenance shutdown of each of the associated Circulating Water Pumps.

Previous Similar Events:

None.