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10CFR50.73



Nuclear
Operations

March 29, 1993
NRC-93-0027

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. 93-005

Please find enclosed LER No. 93-005, dated March 29, 1993, for a reportable event that occurred on February 25, 1993. A copy of this LER is also being sent to the Regional Administrator, USNRC Region III.

If you have any questions, please contact Elizabeth A. Hare, Compliance Engineer, at (313) 586-1427.

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

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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 6																																																																				
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EVENT DATE (5)									LER NUMBER (6)									REPORT DATE (7)									OTHER FACILITIES INVOLVED (8)																																																													
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On February 25, 1993, a Shift Technical Advisor (STA) replaced a burned-out indicating lamp for a 130 VDC power circuit (circuit #31) on a local panel in the relay room. As he was screwing the replacement lamp into the socket, the lamp shattered as it contacted the socket base. A short in the new lamp caused a fault that blew the upstream feeder positive and negative circuit fuses resulting in a loss of power to seven 130 VDC branch circuits, specifically causing closure of the Primary Containment Pneumatic Supply Outboard Isolation Valve T49-F468. All affected systems responded to the loss of power as designed. Division II Emergency Equipment Cooling Water System was declared inoperable. The fuses were replaced, the circuits were re-energized and all systems were restored in approximately 1 hour and 24 minutes.

During subsequent investigation, an engineering review of the circuit design indicated that the fuse in circuit #31 was inappropriately selected for fuse coordination at high fault current. A faster acting fuse would have prevented opening of the upstream feeder circuit fuses and would have prevented valve T49-F468 from closing.

Plant personnel will be cautioned on the replacement of control power indicating lamps. Also, the design of safety related control power distribution circuits will be reviewed for proper fuse coordination.

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-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.

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

Initial Plant Conditions:

Operational Condition: 1 (power operation)
Reactor Power: 98 Percent
Reactor Pressure: 1033 psig
Reactor Temperature: 540 degrees Fahrenheit

Description of Event:

On February 25, 1993, a Shift Technical Advisor (STA) (non-licensed) performing his rounds in the relay room noted that there was no light indication [(JI)(IL)] on the 130 VDC power at circuit #31 on the local panel. He checked the indicating lamp's condition and found that it was burned out. Circuit #31 provides control power for the logic associated with the Division II Emergency Equipment Cooling Water [(EECW)(CC)] System. Division II EECW was in its normal standby condition.

After completing his rounds at 1700 hours, the STA returned to the relay room to replace the burned-out lamp. As he was screwing the replacement lamp into the socket, the lamp shattered as it contacted the socket base. Additional indicating lights for other 130 VDC branch circuits on the same panel deenergized.

A short in the new lamp caused a fault that blew the upstream feeder positive and negative circuit fuses (FU) resulting in a loss of power to seven 130 VDC branch circuits. This loss of power impact included the Division II Primary Containment Pneumatic Supply System (LK) and the Division II EECW System.

Upon opening of the upstream feeder fuses, power was lost to the solenoid valve for the Primary Containment Pneumatic Supply Outboard Isolation Valve (ISV) T49-F468 circuit #27. This loss of power caused valve T49-F468 to close. Closure of this valve is considered an Engineered Safety Feature (ESF) actuation. The upstream feeder fuses were replaced and power was restored to circuit #27 at approximately 1800 hours. The supply to Division II drywell pneumatics was then restored.

Loss of power in branch circuit #31 resulted in loss of control power for Division II EECW. All automatic start features and automatic

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motor operated valve repositioning features for Division II EECW were inoperable. The operating crew recognized this and manually started Division II EECW by starting the pumps and positioning the appropriate valves at approximately 1708 hours. The systems supplied by Division II EECW were previously being cooled by the non-safety related Reactor Building Closed Cooling Water [(RBCCW)(CC)] System. The lamp socket for circuit #31 was damaged beyond repair. The socket was electrically removed from the circuit and power was restored to circuit #31 at approximately 1824 hours. Division II EECW was then declared operable.

Between the time that Division II EECW was manually started and the time that the system was declared operable (approximately 1 hour and 24 minutes), Division II EECW was operating in a degraded configuration. All automatic valve isolations within EECW were non-functional.

By design, in order to prevent exceeding the cooling capabilities of the EECW System, several non-safety related loads are required to automatically isolate (via motor operated valves) during certain accident conditions. The High Pressure Coolant Injection [(HPCI)(BJ)] System relies on ambient cooling from an essential room cooler that uses Division II EECW. Thus, for this time frame with Division II EECW operating in a degraded condition, the HPCI System was declared inoperable as required by plant Technical Specification.

Cause of Event:

A faulty new indicating lamp in branch circuit #31 resulted in a short circuit within the panel at the instant the new lamp was installed. The 5 amp fuse in branch circuit #31 did not open as expected. The upstream 15 amp feeder circuit fuses opened resulting in a loss of power to seven branch circuits. Due to this loss of power, all systems and components performed as expected. A subsequent engineering review of the circuit design indicated that the branch circuit fuse (5 amp) is improperly sized. The branch circuit fuse should be a faster acting fuse to assure that the short circuit fault currents do not interrupt the entire string of branch circuits by blowing the upstream feeder circuit fuses. The ESF actuation isolation of T49-P468, would not have occurred if a fuse with the proper fuse characteristics was installed in circuit #31. Only loss of control power for the Division II EECW logic would have occurred.

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ESTIMATED 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.

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Analysis of Event:

Actuation of the T49-F468 solenoid valve that caused the ESF actuation had no safety consequences with regards to the Primary Containment Isolation Valve function [(PCIV)(JM)(JE)] or the Division II containment Pneumatic System. Closure of this valve was not caused by an ESF actuation signal. The PCIV operated in its designed manner to ensure primary containment integrity. The accumulators and check valves within the containment pneumatic system assure adequate pneumatic capacity is retained for the Low Low Set Safety Relief Relief Valves (SRV). This portion of the event was reported under 10 CFR 50.72(b)(2)(ii), though more than 4 hours after event.

The RBCCW system is designed to provide cooling water to the RBCCW and EECW heat loads during normal operation. The EECW system is designed to provide adequate cooling water supply to essential plant equipment upon loss of offsite power, high drywell pressure or failure of the RBCCW system. Operations manually started the Division II EECW pumps. However, due to the loss of automatic valve isolation capabilities within EECW, the system was incapable of automatic isolation of non-essential loads and declared inoperable. While Division II EECW was operating in a degraded configuration, the associated systems that depend on Division I EECW were operable and ADS was operable.

Operations requested an operability review of HPCI. The preliminary review concluded that the event was reportable under 10 CFR 50.72(b)(2)(iii). During a subsequent Engineering analysis, it was determined that the HPCI System would have functioned as designed with the Division II EECW System operating in a degraded configuration. The resultant room ambient temperatures would not have challenged the ability of the HPCI System to mitigate the consequences of an accident.

No other engineered safety features were affected by this event. Based upon the availability of adequate cooling system, the health and safety of the public and safety of the plant were ensured.

Corrective Actions:

The lamp socket for circuit #31 was damaged beyond repair. The socket was electrically removed from the circuit and the 5 amp fuse was

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replaced with the same type. The upstream feeder positive and negative 15 amp fuses were also replaced. The design change for replacement of this 5 amp fuse has been issued. The design change will be implemented as system availability allows but not later than the end of the upcoming fourth refueling outage.

Investigation into why the two upstream feeder fuses opened and not the branch circuit #31 fuse, identified that the coordination between the fuses was not proper. Additional corrective action included review of other fuses that have the same potential coordination problem. Twenty additional fuses have been identified. These circuits will be further evaluated to determine if fuse replacement is warranted. Design changes will be issued as necessary by July 31, 1993.

Proper fuse coordination will assure that a fault in a single branch circuit will not result in a loss of power to other branch circuits. As part of the long term corrective action, a design change to minimize or eliminate the consequences of lamp faults will be evaluated.

Plant personnel will be cautioned on the replacement of control power indicating lamps. This event will be part of continued training for the appropriate site personnel. This will be completed during the 1993 training cycle.

Previous Similar Events:

There were three LERs previously reported.

In LER 90-007, a faulty indicating lamp caused a fuse which supplied 120 VAC Balance of Plant (BOP) power to the Control Center Heating Ventilation and Air Conditioning (CCHVAC) radiation monitor trip relays (RLY) to open. The Division I CCHVAC automatically shifted to recirculation mode in response to loss of power to the radiation monitor. Implementation of EDP 11115 corrected the power supply problem.

In LER 89-026, the failure of a lamp filament when it was being tightened caused the event. This drew an excessive current which opened the fuse. A modification to the logic was evaluated for

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the feasibility of eliminating the interdependence between the CCHVAC logic and resulted in the initiation of EDP 11115.

In LER 88-017, the replacement of a burned out lamp caused the fuse opened and CCHVAC shifted to the recirculation mode. The corrective action was to replace the indicating lamp since it was found that the glass was not securely fastened to the base of the lamp. This allowed the filament wires to short together while turning the lamp during the process of replacing the lamp.

Failed Component Data:

The indicating lamp is a standard commercially available 6 watt 120 VAC incandescent type lamp with a candelabra screw base made by General Electric (6S6-120 V).