

Detroit  
Edison

William S. Orser  
Vice President  
Nuclear Operations

Fermi 2  
6400 North Dixie Highway  
Newport, Michigan 48166  
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10CFR50.73



Nuclear  
Operations

August 10, 1989  
NRC-89-0136

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

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

Subject: Licensee Event Report (LER) No. 89-016-00

Please find enclosed LER No. 89-016-00, dated August 10, 1989, for a reportable event that occurred on July 11, 1989. A copy of this LER is also being sent to the Regional Administrator, USNRC Region III.

If you have any questions, please contact Patricia Anthony at (313) 586-1617.

Sincerely,

Enclosure: NRC Forms 366, 366A

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

Wayne County Emergency  
Management Division

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## LICENSEE EVENT REPORT (LER)

|   |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
|---|--------|-----------|--|-------------------|-----------------|-------|------------------|-----------|----------------|---|----------------------|--|--|--|--|-------------------------------|--|-------|--|----------------------|--|------|--|
| FACILITY NAME (1)<br>Fermi 2  |        |           |  |                   |                 |       |                  |           |                | DOCKET NUMBER (2)<br>0 5 0 0 0 3 4 1 1 OF 0 5 |                      |  |  |  |  |                               |  |       |  | PAGE (3)<br>1 OF 0 5 |  |      |  |
| TITLE (4)<br>Residual Heat Removal Service Water Cooling Tower Fan Brake Inoperable<br>Due to Low Nitrogen Pressure |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| EVENT DATE (5)  |        |           | LER NUMBER (6)   |                   |                 |       | REPORT DATE (7)  |           |                | OTHER FACILITIES INVOLVED (8)                 |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| MONTH   | DAY    | YEAR      | YEAR   | SEQUENTIAL NUMBER | FEEDBACK NUMBER | MONTH | DAY              | YEAR      | FACILITY NAMES |   |                      |  |  | DOCKET NUMBER(S)                                       |  |                               |  |       |  |                      |  |      |  |
| 07  | 11     | 89        | 89   | 016               | 000             | 08    | 10               | 88        | N/A            |   |                      |  |  | 0 5 0 0 0 0 0 0 0 0                                    |  |                               |  |       |  |                      |  |      |  |
| OPERATING MODE (9)<br>1   |        |           | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8: (Check one or more of the following) (11) |                   |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| POWER LEVEL (10)<br>1,000   |        |           | 20.402(b)  |                   |                 |       | 20.405(c)        |           |                |   | 50.73(e)(2)(iv)      |  |  |  | 73.71(b)   |                               |  |       |  |                      |  |      |  |
|   |        |           | 20.405(a)(1)(i)  |                   |                 |       | 50.36(c)(1)      |           |                |   | 50.73(e)(2)(v)       |  |  |  | 73.71(c)   |                               |  |       |  |                      |  |      |  |
|   |        |           | 20.405(a)(1)(ii)   |                   |                 |       | 50.36(c)(2)      |           |                |   | 50.73(e)(2)(vii)     |  |  |  | OTHER (Specify in Abstract below and in Text, NRC Form 365A) |                               |  |       |  |                      |  |      |  |
|   |        |           | 20.405(a)(1)(iii)  |                   |                 |       | X 50.73(e)(2)(i) |           |                |   | 50.73(e)(2)(viii)(A) |  |  |  |  |                               |  |       |  |                      |  |      |  |
|   |        |           | 20.405(a)(1)(iv)   |                   |                 |       | 50.73(e)(2)(ii)  |           |                |   | 50.73(e)(2)(viii)(B) |  |  |  |  |                               |  |       |  |                      |  |      |  |
|   |        |           | 20.405(a)(1)(v)  |                   |                 |       | 50.73(e)(2)(iii) |           |                |   | 50.73(e)(2)(ix)      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| LICENSEE CONTACT FOR THIS LER (12)  |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| NAME<br>Patricia Anthony, Compliance Engineer   |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  | TELEPHONE NUMBER<br>AREA CODE<br>3 1 3 5 8 6 - 1 6 1 7 |  |                               |  |       |  |                      |  |      |  |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)  |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| CAUSE   | SYSTEM | COMPONENT | MANUFACTURER   | REPORTABLE TO NRC |                 | CAUSE | SYSTEM           | COMPONENT | MANUFACTURER   | REPORTABLE TO NRC                             |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| E   | B I    | B R K M   | Q 8 5  | Y                 |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| SUPPLEMENTAL REPORT EXPECTED (14)   |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  |       |  |                      |  |      |  |
| X YES (If yes, complete EXPECTED SUBMISSION DATE)   |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  | NO   |  | EXPECTED SUBMISSION DATE (15) |  | MONTH |  | DAY                  |  | YEAR |  |
|   |        |           |  |                   |                 |       |                  |           |                |   |                      |  |  |  |  |                               |  | 0 9   |  | 2 9                  |  | 8 9  |  |

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

On July 11, 1989, Division I of the Residual Heat Removal Service Water System was conservatively declared inoperable due to low nitrogen pressure for one of the mechanical draft cooling tower fan brakes. The nitrogen supplies the motive force for the brakes. The brakes were installed to protect the fans from overspeeding in the event of a design-basis tornado. During the investigation and repair of the condition, it was noted that control power to the brakes was being maintained in the AC supply position rather than the DC supply position as shown on the drawing.

Lack of nitrogen pressure would have prevented the brake from fulfilling its design function in the event a tornado had occurred. A review of the original analysis to determine if the brakes are actually necessary is being conducted.

The nitrogen supply was restored and a leaky hose replaced. The system operating procedure was revised and the power supply properly aligned.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

|                                  |  |                |                   |                 |          |    |     |
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| FACILITY NAME (1)<br><br>Fermi 2 | DOCKET NUMBER (2)<br><br>0 5 0 0 0 3 4 1 8 9 | LER NUMBER (6) |                   |                 | PAGE (3) |    |     |
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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: 100 percent  
Reactor Pressure: 998 psig  
Reactor Temperature: 519 degrees Fahrenheit

Description of Occurrence:

On July 11, 1989 at 1545 hours, the Residual Heat Removal Service Water System [(RHRSW)(BI)] Mechanical Draft Cooling Tower [(MDCT)(CWT)] Fan C, which provides cooling for the RHRSW, was conservatively declared inoperable due to the lack of nitrogen for the fan brakes. The brakes provide protection for the safety-related fans against a postulated tornado, one of the design basis natural phenomena. Nitrogen pressure supplies the motive power for application of the brakes and, therefore, is required for brake operation. A separate set of nitrogen bottles supply each fan independently. The plant entered the 72 hour Limiting Condition for Operation (LCO) 3.7.1.1.a.3. A leaking hose in the nitrogen system was replaced and nitrogen pressure was restored. The LCO was exited at 0512 hours on July 12, 1989.

During the investigation of the problem, it was noted that the power supply for the brakes was aligned to the AC supply, per procedure, rather than the DC supply. The design provides for control power from a 125 volt DC power supply through an AC/DC inverter and selector switch. The selector switch can connect to a balance of plant DC source or a class 1E 120 volt AC source which is powered by the Emergency Diesel Generators. If during a tornado, the brakes were powered from the AC supply, the brakes would be de-energized for a short period of time if off site power was lost while the Emergency Diesel Generators are loading. In the unlikely event all offsite power is lost and the tornado passes over the tower, the brakes would be unavailable during the period of time the Emergency Diesel Generators are loading. This could have allowed the fans to overspeed and be damaged. Therefore, aligning the brakes to the DC power supply, which is contained in a structure which has a low probability of being damaged, was determined to be desirable. The system operating procedure involved has been revised and the power supply aligned to the DC power.



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

|                                  |  |                |                      |                    |          |    |     |
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| FACILITY NAME (1)<br><br>Fermi 2 | DOCKET NUMBER (2)<br><br>0 5 0 0 0 3 4 1 8 9 | LER NUMBER (6) |                      |                    | PAGE (3) |    |     |
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Additionally, the review identified some design anomalies. Prior to licensing of the plant, the AC circuit was found to have an electronic interference problem which could potentially cause the brakes to be applied unnecessarily. The control circuit was modified to add auxiliary control relays. These new auxiliary relays were not QA1. Since the relays were not seismically qualified, they could be postulated to fail during a safe shutdown earthquake; leading to inadvertent application of the MDCT fan brakes temporarily. However, even under worst postulated meteorological conditions, there is ample time to release the brakes and restore the MDCT safety function following a seismic event. As an added precaution, operating procedures and operator training to accomplish this has been provided.

Additional anomalies include use of unqualified valves which can and will be dedicated by similarity analysis, the 130V DC BOP power supply and a unqualified DC inverter. From tornado design aspects, probability analysis shows that the design with these unqualified components is adequate and will perform its intended protection against a tornado event. Any failure of the power supply or inverter during an earthquake has no impact on the seismic qualification of the MDCT design. Therefore the present design is adequate for tornado protection and ample time exists for a corrective action, should brakes get applied following an earthquake.

Cause of Event:

The loss of nitrogen pressure was due to a leak in one of the hoses. There was a lack of awareness on the part of Detroit Edison of the necessity for maintaining the fan brakes in an operable status. Since this was not an identified limitation to operability, corrective actions were not always completed in a timely manner.

The line up of the power supply to the AC supply rather than the DC supply was specified in the system operating procedure, SOP 23.208 in revision 6, which was approved on January 14, 1985.

Analysis of Event:

The MDCT fans are required under certain conditions to provide for heat rejection cooling for the Residual Heat Removal complex water. Per Section 9.2.5.2.2 of the Fermi 2 Updated Final Safety Analysis Report, the fans are provided with a brake system to prevent overspeed from the design-basis tornado. With the brake system inoperable, a design-basis tornado could have damaged the

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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

fans such that they may not have been able to perform their function. The analysis which led to installation of the brakes is being reviewed and appears overly conservative, such that the brakes may not be needed to protect the fans from the design-basis tornado.

Following a design-basis tornado, the ultimate heat sink is capable of performing its safety function without the fans being operable for at least four hours. The operators could take several possible courses in order to provide alternate cooling. An example of one of these options would be to restore power and use the circulating water system and the main condenser to provide blowdown. In any case, the fans would be able to perform their design function with the brakes inoperable under all conditions except for possibly a design-basis tornado scenario.

The existing design for the MDCT fan brakes, when they are properly aligned to the BOP DC battery power source and when the nitrogen bottles are sufficiently charged, provides adequate tornado protection.

Corrective Actions:

The nitrogen hose that was leaking was replaced and nitrogen pressure restored in order to return the system to operable status. A revision was made to SOP 23.208 in order to specify that the power supply should be lined up from the DC supply.

A review is being performed of the original licensing basis and the validity of the assumptions used in those analyses to determine if the brakes are necessary to support the operability of the RHRSW during a design-basis tornado. This will be done by mid-September 1989. A supplemental LER will be submitted following this review. In the interim, a review of the operability of the system has been performed. It determined that the system is operable. As an added precaution, the abnormal operating procedure for earthquakes was revised to instruct the operators to check MDCT fan operation following an earthquake. The revision provides direction on how to manually release the brake, if necessary.

A Design Basis Task Force effort will be commencing in September 1989 which will review selected systems to identify problems and raise the consciousness of plant personnel to the licensing basis of the plant. Additionally, the current corrective action program captures identified problems and tracks them until all necessary action are completed.



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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| FACILITY NAME (1)<br><br>Fermi 2 | DOCKET NUMBER (2)<br><br>0500034189 | LER NUMBER (6) |                   |                 | PAGE (3) |    |    |
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TEXT (If more space is required, use additional NRC Form 305A's) (17)

## Previous Similar Events:

None.