

Detroit
Edison

William S. Orser
Senior Vice President

Fermi 2
5400 North Dixie Highway
Newport, Michigan 48166
(313) 586-5201



Nuclear
Operations

10CFR50.73

April 11, 1991
NRC-91-0048

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. 91-004

Please find enclosed LER No. 91-004, dated April 11, 1991,
for a reportable event that occurred on March 12, 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) 586-1682.

Sincerely,

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

9104170157 910411
PDR ADOCK 05000341
S PDR

100647

LF22
11

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fermi 2 DOCKET NUMBER (2) 050003411 OF 04 PAGE (3)

TITLE (4) Manual Scram 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) |
| 03 | 12 | 91 | 91 | 004 | 00 | 03 | 04 | 1191 | | 050000 |

| OPERATING MODE (9) | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11) | | | | | | | | | |
|--------------------|--|--|-------------------|--|------------------|--|---------------------|--|--|--|
| 1 | 20.402(b) | | 20.406(a) | | X | | 60.73(a)(2)(iv) | | 73.71(b) | |
| POWER LEVEL (10) | 6.5 | | 20.406(a)(1)(i) | | 60.36(a)(1) | | 60.73(a)(2)(v) | | 73.71(c) | |
| | | | 20.406(a)(1)(ii) | | 60.36(a)(2) | | 60.73(a)(2)(vi) | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) | |
| | | | 20.406(a)(1)(iii) | | 60.73(a)(2)(i) | | 60.73(a)(2)(vii)(A) | | | |
| | | | 20.406(a)(1)(iv) | | 60.73(a)(2)(ii) | | 60.73(a)(2)(vii)(B) | | | |
| | | | 20.406(a)(1)(v) | | 60.73(a)(2)(iii) | | 60.73(a)(2)(ix) | | | |

LICENSEE CONTACT FOR THIS LER (12)

NAME Joseph Pendergast, Compliance Engineer TELEPHONE NUMBER 313 586-1682

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 |
|-------|--------|-----------|--------------|-------------------|-------|--------|-----------|--------------|-------------------|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) X NO EXPECTED SUBMISSION DATE (15)

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

On March 12, 1991, at 0509 hours, the Off-Gas system sand filter differential pressure high alarm annunciated. At 0615 hours, operations personnel found a broken Moisture Separator Reheater (MSR) relief valve manifold drain line to the condenser, common to both the east and west MSR relief valve manifolds. The drain line was failed at the heat affected zone of a weld. There is no isolation valve between the location of the break and the condenser. At 0623 hours, the reactor was manually scrambled due to an impending loss of condenser vacuum. At 0636 hours, reactor pressure and level stabilized and the scram was reset.

The piping system failure occurred at a socket-welded elbow and initiated at the toe of the weld in the heat affected zone. Two pipe supports, one on each side of the failure location, had broken U-bolts. Failure of the pipe support U-bolts allowed unacceptable cyclic pipe displacements which led to the pipe failure. The piping system and supports were repaired and additional temporary supports were added to the piping system to reduce line movement.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

| | | | | | | | |
|----------------------------------|--|----------------|-------------------|-----------------|----------|--|--|
| FACILITY NAME (1) Fermi 2 | DOCKET NUMBER (2) 0 6 0 0 0 3 4 1 9 1 | LER NUMBER (6) | | | PAGE (3) | | |
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | | |
| | | — 0 0 4 | — 0 0 | 0 2 | OF 0 4 | | |

TEXT (If more space is required, use additional NRC Form 368A's) (17)

Initial Plant Conditions:

Operational Condition: 1 (Power Operation)
Reactor Power: 90 to 65 percent
Reactor Pressure: 985 psig
Reactor Temperature: 535 degrees Fahrenheit

Description of Event:

On March 12, 1991, at 0509 hours, the Off-Gas (WF) system sand filter (FLT) differential pressure high alarm (PA) annunciated. In response to the alarm, at 0615 hours, operations personnel found a broken Moisture Separator Reheater (MSR) (SB) relief valve manifold drain line to the condenser. The break was in the portion of the drain line common to both east and west MSR relief valve manifolds. The drain line had failed at the heat affected zone of a weld. There is no isolation valve between the location of the break and the condenser (SG); consequently operators were unable to stop the vacuum leak.

At 0608 hours, condenser vacuum reached 1.4 psia. In accordance with the Abnormal Operating Procedure, operations personnel began reducing reactor power by reducing coolant flow with the Reactor Recirculation system (AD). Power was reduced from 90 percent to approximately 65 percent.

At 0623 hours, the reactor (RCT) was manually scrammed due to an impending loss of condenser vacuum. Low reactor water level (Level 3) isolation signals for the Drywell Sump (WK), Transverse Incore Probes (JD), and Shutdown Cooling (BO) systems were received. At 0624 hours, the Emergency Operating Procedures (EOPs) were entered due to the Reactor Water Level 3 condition.

At 0636 hours, reactor pressure and level stabilized and the scram signal was reset. Operations personnel exited the EOPs at 0642 hours.

Cause of Event:

The cause of the loss of condenser vacuum was a separation in the 1 1/2 inch Nominal Pipe Size (NPS) Moisture Separator Reheater (MSR) relief valve manifold drain line. This line is a common continuous drain from the east and west MSR relief valve manifolds which join

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-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

| | | | | | | | |
|----------------------------------|-------------------------------------|----------------|-------------------|-----------------|----------|----|----|
| FACILITY NAME (1) Fermi 2 | DOCKET NUMBER (2) 0500034191 | LER NUMBER (6) | | | PAGE (3) | | |
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | | |
| | | 0 | 04 | 0 | 03 | OF | 04 |

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

together prior to entering the main condenser. The relief valve manifolds are adjacent to each MSR and, along with the electro-mechanical relief valve on the MSR shell, protect the shell side of the MSR's from over-pressurization. The continuous drain on each manifold prevents condensate from gathering, which could damage the relief valves and/or downstream piping if the relief valves were to lift.

The portion of the drain line that failed was 1 1/2 inch NPS, schedule 80, type 304 stainless steel. The piping design conditions are 300 psig at 425°F. The failure occurred at a socket-welded elbow and initiated at the toe of the weld in the heat affected zone. Two pipe supports, one on each side of the failure location, had broken L-bolts as a result of excessive vibration. Failure of the pipe support U-bolts allowed unacceptable cyclic pipe displacements which subsequently led to weld failure. The control valves are located near the relief valve manifold and are followed by a long discharge line to the condenser. Flashing flow, possibly aggravated by improperly sloped sections of piping, was the source of piping excitation.

Analysis of Event:

The MSR relief valve manifold drain line is required to operate during normal plant conditions found during power generation. The system is not required for safety purposes nor is it required to operate after a postulated design basis accident. Failure of this line led to a loss of condenser vacuum over time. The loss of condenser vacuum condition subsequently necessitated a manual scram in anticipation of a turbine trip due to low main condenser vacuum. All safety systems functioned normally as required following the insertion of the reactor scram.

Corrective Actions:

The piping system and supports were repaired and additional temporary supports were added to the piping to reduce line movement. During the second refueling outage, additional permanent pipe supports are planned for installation. In addition, any line slope anomalies will be investigated and dispositioned. Alternatively, system thermal and hydrodynamic flow characteristics will be reviewed to determine if the

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-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Fermi 2

0 5 0 0 0 3 4 1 9 1 - 0 0 4 - 0 0 0 4 OF 0 4

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

source of piping excitation can be effectively reduced or eliminated by rerouting the drain line or adding restricting orifices. Other drain configurations will be examined to determine if similar problems could develop elsewhere.

Previous Similar Events:

There are no previous Licensee Event Reports on this subject.