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DTE Energy

10 CFR 50.73

May 5, 2015
NRC-15-0055

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555-0001

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

Subject: Licensee Event Report (LER) No. 2015-003

Pursuant to 10 CFR 50.73 (a)(2)(iv)(A), DTE Electric Company (DTE) is submitting LER No. 2015-003, Oscillation Power Range Monitor Upscale Reactor Scram during Single Loop Operation.

No commitments are being made in this LER.

Should you have any questions or require additional information, please contact Mr. Christopher R. Robinson of my staff at (734) 586-5076.

Sincerely,

Vito A. Kaminskas

Enclosure

cc: NRC Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Michigan Public Service Commission
Regulated Energy Division (kindschl@michigan.gov)

**Enclosure to**
**NRC-15-0055**

**Fermi 2 NRC Docket No. 50-341**
**Operating License No. NPF-43**

# LER 2015-003, Oscillation Power Range Monitor Upscale Reactor Scram during Single Loop Operation

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

# LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

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**4. TITLE**

Oscillation Power Range Monitor Upscale Reactor Scram during Single Loop Operation

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |
| 03 | 19 | 2015 | 2015 | 003 | 00 | 05 | 05 | 2015 | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |

| 9. OPERATING MODE | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)* | | | |
|---|---|---|---|---|
| 1 | ☐ 20.2201(b) | ☐ 20.2203(a)(3)(i) | ☐ 50.73(a)(2)(i)(C) | ☐ 50.73(a)(2)(vii) |
| | ☐ 20.2201(d) | ☐ 20.2203(a)(3)(ii) | ☐ 50.73(a)(2)(ii)(A) | ☐ 50.73(a)(2)(viii)(A) |
| | ☐ 20.2203(a)(1) | ☐ 20.2203(a)(4) | ☐ 50.73(a)(2)(ii)(B) | ☐ 50.73(a)(2)(viii)(B) |
| | ☐ 20.2203(a)(2)(i) | ☐ 50.36(c)(1)(i)(A) | ☐ 50.73(a)(2)(iii) | ☐ 50.73(a)(2)(ix)(A) |
| **10. POWER LEVEL** | ☐ 20.2203(a)(2)(ii) | ☐ 50.36(c)(1)(ii)(A) | ☑ 50.73(a)(2)(iv)(A) | ☐ 50.73(a)(2)(x) |
| | ☐ 20.2203(a)(2)(iii) | ☐ 50.36(c)(2) | ☐ 50.73(a)(2)(v)(A) | ☐ 73.71(a)(4) |
| 74 | ☐ 20.2203(a)(2)(iv) | ☐ 50.46(a)(3)(ii) | ☐ 50.73(a)(2)(v)(B) | ☐ 73.71(a)(5) |
| | ☐ 20.2203(a)(2)(v) | ☐ 50.73(a)(2)(i)(A) | ☐ 50.73(a)(2)(v)(C) | ☐ OTHER |
| | ☐ 20.2203(a)(2)(vi) | ☐ 50.73(a)(2)(i)(B) | ☐ 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A |

**12. LICENSEE CONTACT FOR THIS LER**

| LICENSEE CONTACT | TELEPHONE NUMBER *(Include Area Code)* |
|---|---|
| David G. Coseo - Supervisor, Nuclear Compliance | (734) 586-4273 |

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

| 14. SUPPLEMENTAL REPORT EXPECTED | 15. EXPECTED SUBMISSION DATE | MONTH | DAY | YEAR |
|---|---|---|---|---|
| ☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☑ NO | | | | |


ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On March 19, 2015 at 0702 EST the reactor protection system at Fermi 2 initiated an automatic reactor scram on Oscillation Power Range Monitor (OPRM) Upscale following the manual trip of the north reactor recirculation pump due to a cooling water leak. The reactor protection system performed as expected and all control rods were fully inserted into the core. Reactor water level reached a low of approximately 126 inches above top of active fuel and was restored and maintained in the normal operating band by the feedwater and control rod drive systems. No safety relief valves actuated and reactor pressure was controlled by the main turbine bypass valves. Plant systems responded to the scram as designed and all reactor parameters were maintained within design limits following the event.

The cause of the automatic reactor protection system scram on OPRM Upscale was the neutron flux oscillations following the large core flow reduction and lowering feedwater temperature after the trip of a reactor recirculation pump. This event was documented and evaluated in the Fermi 2 Corrective Action Program. The associated root cause evaluation is in progress and may identify additional corrective actions which will be tracked and implemented by the corrective action program.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a critical reactor scram.

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**NARRATIVE**

Initial Plant Conditions:

Mode 1
Reactor Power 74 percent

Description of the Event:

On March 19, 2015, at 0647 hours, the Fermi 2 annunciators indicated a cooling water leak in the drywell. The Reactor Building Closed Cooling Water (RBCCW) system [[CC]] was isolated and both divisions of the Emergency Equipment Cooling Water (EECW) system were started. Approximately four minutes later signs of Division 1 EECW pump cavitation were observed indicating that the leak affected the north (A) reactor recirculation pump [[AD]] cooling. The north (A) reactor recirculation pump was tripped at 0652 to prevent motor damage from loss of cooling and the reactor transitioned to single loop operation.

Due to the reduction in reactor [[AC]] power from 100 percent to approximately 61 percent following the reactor recirculation pump trip, the heater drains system [[SJ]] stopped pumping forward. The loss of forward pumping heater drains led to a power increase to approximately 74 percent due to reduced feedwater temperature. At 0652 hours the reactor entered the Exit region of the power to flow map where core instability is possible.

While initiating actions to insert control rods [[AC]] to reduce reactor power in accordance with Abnormal Operating Procedures (AOP), Oscillation Power Range Monitor (OPRM) [[IG]] channels 2 and 3 detected power oscillations and initiated an automatic reactor protection system [[JC]] scram at 0702 hours. At the time of the scram, reactor power was approximately 74 percent and core flow was approximately 45 percent. The OPRM system performed as designed by providing an OPRM Upscale trip based on the Period Based Detection Algorithm when the oscillation magnitudes exceeded the OPRM amplitude and confirmation count setpoint.

In response to the scram signal, all control rods fully inserted. Reactor water level reached a low of approximately 126 inches above top of active fuel and was restored and maintained in the normal operating band by the feedwater and control rod drive systems. Plant procedures were appropriately utilized to complete scram recovery actions. No Safety Relief Valves (SRV) or other safety systems actuated and reactor pressure was maintained by the main turbine bypass valves. Plant systems responded to the scram as designed. All reactor parameters were maintained within design limits following the scram.

The automatic OPRM upscale scram event is reportable under 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in the automatic actuation of the reactor protection system and a reactor scram. A four hour non-emergency notification (Event Number 50903) was made to the NRC Operations Center at 1051 on March 19, 2015 in accordance with 10 CFR 50.72(b)(2)(iv)(B) for an actuation of the reactor protection system.

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**NARRATIVE**

Significant Safety Consequences and Implications:

The OPRM Upscale function provides compliance with GDC 10 and GDC 12 of 10 CFR 20, Appendix A, by providing protection from exceeding the fuel Safety Limit Minimum Critical Power Ratio (SLMCPR) due to anticipated thermal-hydraulic neutron flux oscillations.

A General Electric (GE Hitachi Nuclear Energy) evaluation of the event confirmed that the SLMCPR was protected throughout the event by the OPRM reactor trip.

This event posed no significant safety implications because the reactor protection and safety related systems functioned as designed following the automatic reactor trip. All reactor parameters were maintained within design limits following the scram.

Therefore, this event did not pose an actual threat to the health and safety of the public.

Cause of the Event:

The cause of the automatic reactor protection system scram on OPRM Upscale was the neutron flux oscillations following the large core flow reduction and lowering feedwater temperature after the trip of a reactor recirculation pump.

Corrective Actions:

Immediate corrective actions have been taken including a revised Abnormal Operating Procedure (AOP) for reactor recirculation pump trip to reprioritize steps to insert control rods, a revised Reactivity Management Shift Reactivity Briefing Checklist to identify events that have a high probability for flux instability and Just in Time Training (JITT) for all operating crews on the OPRM scram lessons learned.

This event was documented and evaluated in the Fermi 2 Corrective Action Program. The associated root cause evaluation is still in progress and may identify additional corrective actions. These actions will be tracked and implemented by the corrective action program.

Additional Information:

A. Failed Component:

None

B. Previous Licensee Event Reports (LERs) on Similar Problems:

There are no similar previous events within the past five years.