Keith J. Polson
Site Vice President

DTE Energy Company
6400 N. Dixie Highway, Newport, MI 48166
Tel: 734.586.4849 Fax: 734.586.4172
Email: keith.polson@dteenergy.com

DTE Energy

10 CFR 50.73

January 23, 2017
NRC-17-0003

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. 2016-001-01

Pursuant to 10 CFR 50.73(a)(2)(v)(A) and (D), DTE Electric Company (DTE) is submitting Revision 01 to LER No. 2016-001, Turbine Stop Valve Closure and Turbine Control Valve Fast Closure Reactor Protection System Functions Considered Inoperable Due to Open Turbine Bypass Valves. This revision updates the cause of the event and corrective actions based on the results of a Failure Modes Analysis.

No new commitments are being made in this LER.

Should you have any questions or require additional information, please contact Mr. Scott A. Maglio, Manager – Nuclear Licensing, at (734) 586-5076.

Sincerely,

Keith J. Polson
Site Vice President

Enclosure: Licensee Event Report No. 2016-001-01

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-17-0003

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

Licensee Event Report (LER) No. 2016-001-01

NRC FORM 366 (06-2016) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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 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)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Fermi 2	05000 341	1 OF 4

4. TITLE

Turbine Stop Valve Closure and Turbine Control Valve Fast Closure Reactor Protection System Functions Considered Inoperable Due to Open Turbine Bypass Valves

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
									N/A	05000
01	06	2016	2016	- 001	- 01	01	23	2017	FACILITY NAME: N/A	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)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☑ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
100	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☑ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Fermi 2 / Scott A. Maglio – Manager, Nuclear Licensing	(734) 586-5076

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
X	IT	CON	A380	Y	N/A	N/A	N/A	N/A	N/A

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)*

At 1514 EST on January 6, 2016, while operating at 100 percent Reactor Thermal Power (RTP), the East and West Turbine Bypass Valves (TBV) automatically opened as expected for 3 minutes and 32 seconds in response to the number one High Pressure Turbine Stop Valve (TSV) drifting from full open to 25 percent open due to an actuator malfunction.

Per Technical Specification (TS) Bases 3.3.1.1, TBVs must remain shut while RTP is at or above 29.5 percent to consider all channels of the TSV closure and Turbine Control Valve (TCV) fast closure Reactor Protection System (RPS) functions operable.

Reactor Operators lowered RTP to 91.0 percent and at 1518 EST the TBV automatically closed and the TSV closure and TCV fast closure RPS functions were no longer considered inoperable. TS 3.3.1.1 requires that the TSV closure and TCV fast closure RPS functions be operable at or above 29.5 percent RTP. In this event, during the period of time while TBVs were open, reactor power was maintained above 91 percent and the RPS functions were confirmed to be enabled.

The actuator malfunction was caused by faulty connectors within the actuator. The faulty connectors were replaced.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Fermi 2	05000- 341	2016	- 001	- 01

NARRATIVE

Initial Plant Conditions

Mode 1
Reactor Power 100 percent

There were no structures, components, or systems that were inoperable at the start of the event that contributed to the event.

Description of the Event

At 1514 EST on January 6, 2016, while operating at 100 percent Reactor Thermal Power (RTP) the East and West Turbine Bypass Valves (TBV) [[V]] automatically opened as expected for 3 minutes and 32 seconds in response to the number one High Pressure Turbine Stop Valve (TSV) drifting from full open to 25 percent open due to an actuator malfunction.

Per Technical Specification (TS) Bases 3.3.1.1, TBVs must remain shut while RTP is at or above 29.5 percent to consider all channels of the TSV closure and Turbine Control Valve (TCV) fast closure Reactor Protection System (RPS) [JD] functions operable.

A failure analysis revealed that the valve actuator malfunction and TSV position drift was caused by faulty connectors [[CON]] within the actuator. Reactor Operators lowered RTP to 91.0 percent and at 1518 EST, the TBVs automatically closed and the TSV closure and TCV fast closure RPS functions were no longer considered inoperable.

TS 3.3.1.1 requires that the TSV closure and TCV fast closure RPS functions be operable at or above 29.5 percent RTP.

An event notification and follow up notification (No. 51755) were made to the NRC based on meeting the reporting criteria of 10 CFR 50.72(b)(3)(v)(A) and (D).

This event is reportable under 10 CFR 50.73(a)(2)(v), as an event or condition that could have prevented the fulfillment of the safety function of systems that are needed to: (A) shut down the reactor and maintain it in a safe shutdown condition and (D) mitigate the consequences of an accident.

In addition, since this event affected all channels of the TSV closure and TCV fast closure RPS functions, this event is reportable under 10 CFR 50.73(a)(2)(vii), as an event where a single cause or condition caused two independent channels to become inoperable in a single system designed to: (A) shut down the reactor and maintain it in a safe shutdown condition and (D) mitigate the consequences of an accident.

There were no radiological releases associated with this event.

Significant Safety Consequences and Implications

There were no significant safety consequences associated with this event. At no time during this event was there a potential for endangering the public health and safety.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Fermi 2	05000- 341	2016	- 001	- 01

NARRATIVE

Per Chapter 15 of the Fermi 2 Updated Final Safety Analysis Report (UFSAR), the TCV fast closure function is the primary scram signal for the generator load rejection event. For this event, the reactor scram reduces the amount of energy required to be absorbed and ensures that the Minimum Critical Power Ratio (MCPR) Safety Limit (SL) is not exceeded. TCV fast closure signals are initiated by the de-energization of the solenoid dump valve at each control valve. This function must be enabled at RTP greater than or equal to 29.5 percent.

Per Chapter 15 of the Fermi 2 UFSAR, the TSV closure function is the primary scram signal for the turbine trip event. For this event, the reactor scram reduces the amount of energy required to be absorbed and ensures that the MCPR SL is not exceeded. TSV closure signals are initiated from position switches located on each of the four TSVs. This function must be enabled at RTP greater than or equal to 29.5 percent.

Four Turbine First Stage Pressure (TFSP) transmitters [[PT]] are provided to initiate the automatic bypass of the TCV fast closure and TSV closure scrams, when the first stage pressure is below a preset fraction of rated pressure corresponding to approximately 29.5 percent of rated power.

The TBVs, if open at power levels above 29.5 percent RTP, may cause the TSV closure and TCV fast closure RPS functions to be inadvertently bypassed due to the diversion of steam flow away from the TFSP transmitters. In this event, during the period of time while TBVs were open, reactor power was maintained above 91 percent and the RPS functions were confirmed to be enabled. Therefore, there was no actual impact on safety.

Cause of the Event

The valve actuator malfunction and TSV position drift was caused by a failed Valve Control Module (VCM) servo driver to Unitized Actuator (UA) servo valve loop initiating a valve close position signal. The apparent cause was faulty connectors in the UA due to wear and fatigue. The contributing cause was circuit resistance measurement of the VCM to UA servo loop was not being performed.

Corrective Actions

The faulty connectors were replaced.

Additional corrective actions included: testing continuity of the servo valve circuit to identify and repair degraded conditions, developing a Preventative Maintenance (PM) task to address Extent of Condition on other modulating valves during refueling outages, and adjusting the maintenance frequency on the actuators to limit service time to 6 refueling outages.

This event was documented and evaluated in the Fermi 2 Corrective Action Program. All corrective actions have been completed.

Additional Information

A. Failed Component: UA connectors/wiring
Function: Route position demand signal to the servo valve
Manufacturer: Amphenol
Model Number: MS3106E14S-6P
Primary Failure Cause: Wear and fatigue

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Fermi 2	05000- 341	2016	- 001	- 01

NARRATIVE

B. Previous Licensee Event Reports (LERs) or Similar Events:

There are no previous similar events for UA connectors or wiring failing due to wear and fatigue.