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10 CFR 50.73

November 3, 2017
NRC-17-0070

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. 2017-005

Pursuant to 10 CFR 50.73(a)(2)(v)(D), DTE Electric Company (DTE) is submitting LER No. 2017-005, Non-Functional Mechanical Draft Cooling Tower Fan Brakes Leads to HPCI Being Declared Inoperable and Loss of Safety Function which is a Condition Prohibited by Technical Specifications and Loss of Safety Function.

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
Senior Vice President and CNO

Enclosure: Licensee Event Report No. 2017-005

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-17-0070**

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

**Licensee Event Report (LER) No. 2017-005
Non-Functional Mechanical Draft Cooling Tower Fan Brakes Leads to HPCI Being
Declared Inoperable and Loss of Safety Function**



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
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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 Information Services Branch (T-2 F43), 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.

1. FACILITY NAME Fermi 2	2. DOCKET NUMBER 05000 341	3. PAGE 1 OF 4
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4. TITLE
Non-Functional Mechanical Draft Cooling Tower Fan Brakes Leads to HPCI Being Declared Inoperable and Loss of Safety Function

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
09	09	2017	2017	005	00	11	03	17		05000
									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	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT Fermi 2 / Scott A. Maglio – Manager, Nuclear Licensing	TELEPHONE NUMBER (Include Area Code) (734) 586-5076
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
UNK	12VAC	INVT	Nova-Elect	Yes	N/A	N/A	N/A	N/A	N/A

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

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

At 1000 EDT on September 9, 2017, the Division 2 Mechanical Draft Cooling Tower (MDCT) fans were declared inoperable due to loss of output from the over speed fan brake inverter. The MDCT fans are required to support operability of the Ultimate Heat Sink (UHS) and the Emergency Equipment Cooling Water (EECW) system. The Division 2 EECW system cools the High Pressure Coolant Injection (HPCI) system room cooler. As a result, the non-functionality of the fan brakes lead to an unplanned HPCI inoperability. Since HPCI is a single train system designed to mitigate the consequences of a loss of coolant accident (LOCA), this event could have prevented the fulfillment of a safety function. The cause of the event was the failure of the Division 2 fan brake inverter.

Corrective Actions were taken to replace the inverter and returning the MDCT fans, the UHS, EECW and HPCI to service on September 9, 2017 at 2351 EDT. A failure modes evaluation was performed by the vendor with no direct cause of the failed output determined. The fan brake system is only required for a design basis tornado and there was no credible tornado threat during this event. The HPCI system is not required to mitigate a design basis tornado. The safety significance of this event is very low and there were no radiological releases associated with this event.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME Fermi 2	2. DOCKET NUMBER 05000- 341	3. LER NUMBER		
		YEAR 2017	SEQUENTIAL NUMBER 005	REV NO. 00

NARRATIVE

INITIAL PLANT CONDITIONS

Mode – 1
Reactor Power – 100 percent

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

DESCRIPTION OF THE EVENT

At 1000 EDT on September 9, 2017, the Division 2 Mechanical Draft Cooling Tower (MDCT) [CTW] fans [FAN] were declared inoperable due to loss of output from the over speed fan brake [BRK] inverter [INVT]. The brakes prevent the fans from experiencing over speed from a design basis tornado as described in Updated Final Safety Analysis Report (UFSAR) Section 9.2.5.2.2. The MDCT fans are required to support operability of the Ultimate Heat Sink (UHS) [BS]. The UHS is required to support operability of the Division 2 Emergency Equipment Cooling Water (EECW) system. The EECW system cools various safety related components, including the High Pressure Coolant Injection (HPCI) [BJ] system room cooler [CLR]. As a result, the non-functionality of the fan brakes lead to an unplanned HPCI inoperability based on the inoperability of the EECW to the HPCI room cooler. Following restoration of the brake inverter, HPCI was declared operable on September 9 at 2351 EDT. Therefore, the single train HPCI system was inoperable for approximately 14 hours. This report is being made pursuant to 10CFR50.73(a)(2)(v)(D) as a condition that could have prevented the fulfillment of a safety function needed to mitigate the consequences of an accident.

Technical Specification 3.7.2 requires the UHS reservoir to be operable in Modes 1, 2, and 3. The UHS operability requirements in Modes 4 and 5 are determined by the systems the UHS supports. The UHS reservoir is divided into two one-half capacity reservoirs, corresponding to Division 1 and Division 2. Each reservoir is the cooling source for that division's service water subsystems, including the service water for the Emergency Diesel Generators (EDGs) [[DG]]. A two-cell MDCT is located above each of the one-half capacity reservoirs. Each cell is equipped with a MDCT fan. Two MDCT fans above each one-half capacity reservoir are required for it to be considered operable. The "A" and "C" MDCT fans are in Division 1 and the "B" and "D" fans are in Division 2. The MDCT fans have a brake system to prevent overspeed from a design basis tornado as described in UFSAR Section 9.2.5.2.2. Thus the fan brakes are a design feature of the fans and their functionality impacts the operability of the MDCT fans and therefore the UHS.

The brake mechanism senses the speed of the motor and blades and uses nitrogen pressure to activate a brake system to slow the fan speed. The control power for this braking control module is powered by the R1700S011B (Division 2 Residual Heat Removal (RHR) MDCT Fans overspeed Brake Inverter). Without this inverter being energized, neither of the Division 2 MDCT fan brakes would perform their design function. Therefore, this inverter failure renders both of the Division 2 MDCT fans inoperable.

A past operability review was performed and concluded that the MDCT Brake Inverter Panel R1700S011B was discovered to be indicating no AC Volts or Amps during daily rounds on September 9, 2017 at 1000. An Operator records the output voltage daily and it was observed that the output voltage was within acceptable limits on September 8, 2017 at 0958. This measurement is consistent with the readings for the previous 4 days. Thus, the inverter was observed to be functioning 24 hours before discovery and the maximum possible period of inverter failure prior to discovery is approximately 24 hours.

A review verified that the Division 1 UHS and RCIC systems were operable during the possible period of inverter failure, as well as during the period when Division 2 UHS and HPCI were declared inoperable. Therefore, there was not a violation of Technical Specifications and Licensing Basis due to this condition. TS 3.7.2 Condition B allows for 72 hours of



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NARRATIVE

of UHS unavailability and TS 3.5.1 Condition E allows for 14 days of HPCI unavailability as long as the Reactor Core Isolation Cooling (RCIC) system [BN] is available.

Additionally, Note 1 of LCO 3.7.2 requires entering applicable Conditions and Required Actions of LCO 3.8.1 for EDGs. At the time when LCO 3.7.2 was entered (September 9, 2017 at 1000), LCO 3.8.1 was also entered. For the 24 hour period of potentially inoperability, LCO 3.8.1 was not entered; however, offsite power was available and all actions of LCO 3.8.1 would have been met.

SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

As described previously, the MDCT fan brakes are only required for a design basis tornado; they are not required for other design basis events. No tornado watches or warnings occurred during the time-frame when MDCT fan brakes were nonfunctional. Since there was no credible threat of a tornado the MDCT fans and associated UHS would have been capable of performing their intended functions throughout the period described above.

As discussed above the nonfunctionality of the Division 2 MDCT fan brakes could have prevented the HPCI system from fulfilling its safety function. However, the RCIC system remained available for high pressure injection in the event of an emergency. The Standby Feedwater [SJ] system was also available for high pressure injection. Additionally, the Automatic Depressurization System [JE] was available to reduce reactor pressure to within the capabilities of the low pressure Emergency Core Cooling Systems. HPCI could have been prevented from fulfilling its safety function as a result of the MDCT fan brake nonfunctionality for a possible maximum of 38 hours. The previous reading of the inverter occurred 24 hours prior to discovery and an additional 14 hours following discovery to replace the inverter and restore the MDCT fan and HPCI to Operable. TS 3.5.1 allows HPCI to be taken out of service for planned outages for up to 14 days. It is important to note that, although HPCI was considered inoperable due to the propagation of TS requirements for UHS and was therefore considered a loss of safety function in this LER, HPCI is not a system required for safe shutdown in the event of a tornado per UFSAR Table 3.3-2. HPCI is required for design basis accidents such as a loss of coolant accident (LOCA). Therefore, although HPCI was declared inoperable at the time, HPCI would have been capable of performing its intended LOCA function regardless of the inverter failure. As described in Regulatory Guide 1.117, design basis tornados are not postulated to occur simultaneously with a LOCA. Based on this discussion, the safety significance of this event is very low. There were no radiological releases associated with this event.

CAUSE OF THE EVENT

The cause of this event is due to a loss of output from the over speed fan brake inverter. A failure modes evaluation was performed by the vendor with no direct cause of the failed output determined.

Cause: Unknown
System: R1700 – 120 VAC Power Supplies and Distribution Cabinets
Component: R1700S011B
Manufacturer: Nova Electric

CORRECTIVE ACTIONS

The inverter was replaced and the MCDT was returned to service on September 9, 2017 at 2351 EDT. A failure modes evaluation was performed by the vendor with no direct cause of the failed output.



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NARRATIVE

PREVIOUS OCCURRENCES

Previous occurrences of HPCI inoperability due to non-functionality of the MDCT fan brake system were reported in LER 2016-06. However, the instances described in LER 2016-06 were associated with inadequate procedural guidance related to the fan brake systems and were all the result of problems with the nitrogen pressure supply. The condition described in this LER is not a result of inadequate procedural guidance and was not due to problems with the nitrogen pressure supply. Therefore, the corrective actions previously performed in LER 2016-06 could not have prevented the occurrence described in this LER as they could not have prevented the inverter from failing.