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10 CFR 50.73

August 28, 2015  
NRC-15-0078

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. 2015-004

Pursuant to 10 CFR 50.73 (a)(2)(v)(C), DTE Electric Company (DTE) is submitting LER No. 2015-004, Secondary Containment Declared Inoperable Due to Reverse Rotation of Normal Exhaust Fan during Post-Maintenance Testing.

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  
Site Vice President

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-15-0078**

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

**LER 2015-004, Secondary Containment Declared Inoperable Due to Reverse Rotation of  
Normal Exhaust Fan during Post-Maintenance Testing**

**LICENSEE EVENT REPORT (LER)**(See Page 2 for required number of  
digits/characters for each block)

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.

**1. FACILITY NAME**

Fermi 2

**2. DOCKET NUMBER**

05000 341

**3. PAGE**

1 OF 3

**4. TITLE**

Secondary Containment Declared Inoperable Due to Reverse Rotation of Normal Exhaust Fan during Post-Maintenance Testing

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
07	07	2015	15	004	00	08	28	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			<input type="checkbox"/> 20.2201(b)		<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)	
			<input type="checkbox"/> 20.2201(d)		<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
			<input type="checkbox"/> 20.2203(a)(1)		<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
			<input type="checkbox"/> 20.2203(a)(2)(i)		<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
10. POWER LEVEL  100			<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)	
			<input type="checkbox"/> 20.2203(a)(2)(iii)		<input type="checkbox"/> 50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		<input type="checkbox"/> 73.71(a)(4)	
			<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(5)	
			<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)(C)		<input type="checkbox"/> OTHER	
			<input type="checkbox"/> 20.2203(a)(2)(vi)		<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)		Specify in Abstract below or in NRC Form 366A	

**12. LICENSEE CONTACT FOR THIS LER**

## LICENSEE CONTACT

Christopher R. Robinson - Manager, Nuclear Licensing

## TELEPHONE NUMBER (Include Area Code)

(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
A	VA	FAN		N					

**14. SUPPLEMENTAL REPORT EXPECTED**☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

On July 7, 2015 at approximately 1435 EDT, during Post-Maintenance Testing (PMT) of the Reactor Building Heating Ventilation and Air Conditioning (RBHVAC) System with the Standby Gas Treatment System (SGTS) operating, Secondary Containment (SC) pressure exceeded Technical Specification (TS) limits for approximately 41 seconds. At 1436 EDT, SC pressure was restored to within the TS limit of less than or equal to -0.125 inches water column.

The cause of the event was reverse rotation of the RBHVAC center exhaust fan due to reversed electrical leads. Personnel responsible for oversight and execution of the PMT did not appropriately consider the possibility and adverse effects of prolonged reverse rotation. As a result, a normal post-installation test activity (i.e., a motor "bump-check" for rotation) was deviated from and produced unintended consequences. Corrective actions to improve decision-making and clarify work instructions are planned.

There were no radiological releases associated with this event.

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

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 [Infocollections.Resource@nrc.gov](mailto:Infocollections.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.

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**NARRATIVE**

Initial Plant Conditions

Mode: 1

Reactor Power: 100 percent

**Description of the Event**

On July 7, 2015 Post-Maintenance Testing (PMT) was being performed on the non-safety-related Reactor Building Heating Ventilation and Air Conditioning (RBHVAC) [[VA]] center exhaust fan [[FAN]] motor after replacement. A portion of the PMT consisted of briefly cycling power to the fan to check for proper exhaust fan rotation. The PMT plan used the RBHVAC System Operating Procedure (SOP) to start the center RBHVAC supply and exhaust fans with a contingency to have the safety-related Standby Gas Treatment System (SGTS) [[BH]] running. Operators planned to manually trip the center RBHVAC fans if an abnormal Secondary Containment (SC) [[NH]] pressure response was observed.

In preparation for the PMT, the safety-related SGTS was started at 1328 EDT and both the east and west RBHVAC supply and exhaust fans were secured at 1335 EDT. At 1435 EDT after starting the center supply and exhaust fans, SC differential pressure exceeded the Technical Specification (TS) Surveillance Requirement (SR) pressure of -0.125 inches water column (WC). The RBHVAC center fans were secured with SC differential pressure at approximately +0.1 inches WC. SC pressure continued to increase after securing the center RBHVAC fans and was positive for about 24 seconds, reaching a maximum of approximately +0.28 inches WC.

At 1436 EDT with RBHVAC shutdown and SGTS running, the SC differential pressure returned to within the TS SR of less than or equal to -0.125 inches WC. The TS SR for SC pressure boundary was not met for approximately 41 seconds.

The loss of SC function is reportable under 10 CFR 50.73(a)(2)(v)(C) as an event or condition that could have prevented the fulfillment of a safety function needed to control the release of radioactive material. An 8-hour event notification (EN 51202) was made to the NRC based on meeting the reporting criteria of 10 CFR 50.72(b)(3)(v)(C).

There were no radiological releases associated with this event.

**Safety Consequences and Implications**

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

The specified safety function of the SC is to contain, dilute, and hold up fission products that may leak from primary containment following a Design Basis Accident (DBA). In conjunction with operation of the SGTS and closure of certain valves whose lines penetrate the SC, the SC is designed to reduce the activity level of the fission products prior to release to the environment and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be OPERABLE, or that take place outside primary containment. It is possible for the pressure in the control volume to rise relative to the environmental pressure (e.g., due to pump and motor heat load additions.). To prevent ground level exfiltration while allowing the SC to be designed as a conventional structure, the SC requires support systems to maintain the control volume pressure at less than the external pressure. For the SC to be considered OPERABLE, it must have adequate leak tightness to ensure that the required vacuum can be established and maintained.

During this particular event, the SC was pressurized to a maximum value of 0.28 inches WC for approximately 41 seconds. In Chapter 15 of the Fermi 2 UFSAR, RBHVAC is assumed lost at the onset of a LOCA concurrent with a Loss of Offsite Power. As a result, calculations show that the SC would be pressurized until the SGTS restores vacuum. For this particular licensee event, the SC vacuum degraded when the non-safety-related center RBHVAC exhaust fan operated in the reverse direction. The structural integrity (i.e., leak tightness) of the SC was re-confirmed when the safety-related SGTS restored vacuum to greater than 0.125 inches WC.

(continued on the next page)

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

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**NARRATIVE**

If the DBA LOCA for SC concurrent with a Loss of Offsite Power had occurred during the time when SC pressure was between 0.28 and -0.125 inches WC, the SC was sufficiently leak tight such that the SGTS would still have established and maintained vacuum greater than the TS required value.

The radiological consequences of the DBA LOCA for SC contained in Chapter 15 of the Fermi 2 UFSAR result in doses that are below 10CFR50.67. The SC is assumed to be at a pressure of -0.125 inches WC at the onset of the LOCA. For this particular event, had the DBA LOCA for SC actually occurred, the increase in magnitude of radiological dose as a result of increased draw-down time from starting at 0.28 vice -0.125 inches WC, would be minimal and negated by several very conservative assumptions in the existing analysis (e.g., 100% exfiltration from SC during the first 15 minutes of drawdown with SGTS in operation, 10% exfiltration from SC with SGTS in operation throughout the remaining 30 day duration of the accident, no holdup time in SC throughout the 30 day duration of the accident, and all exfiltration and filtered releases are at ground level). These conservative assumptions are not reflective of actual plant conditions and configuration.

This qualitative evaluation performed by the Fermi 2 Licensing and Engineering staff concludes that no actual loss of safety function occurred. This LER is required because the reporting threshold is "could have" prevented fulfillment of a safety function, which was valid at the time that SC was declared INOPERABLE.

**Cause of the Event**

The cause of the event was reverse rotation of the RBHVAC center exhaust fan due to reversed electrical leads. Personnel responsible for oversight and execution of the PMT (i.e., Senior Reactor Operators, Maintenance Supervisors and Technicians) did not appropriately consider the possibility and adverse effects of prolonged reverse rotation. As a result, a normal post-installation test activity (i.e., a motor "bump-check" for rotation) was deviated from and produced unintended consequences.

**Corrective Actions**

Corrective actions to improve decision-making and clarify work instructions are planned. The Fermi 2 corrective action program documents the causal analysis for this event.

**Previous Occurrences**

LER 2013-001 involved a loss of SC function due to an RBHVAC system equipment malfunction. The cause of that event was related to improper damper sequencing.

LER 2013-003 involved a loss of SC function due to an RBHVAC system equipment malfunction. The cause of that event was related a RBHVAC system trip caused by the lack of steam flow through a heating coil due to inadequate draining of the downstream steam trap.

LER 2015-001 involved a loss of SC function due to an RBHVAC system trip caused by a valid actuation of a freeze protection device.

None of the referenced occurrences involved the same underlying concern or reason as this event, such as the same root cause, failure, or sequence of events.

**Additional Information**

Failed Component: The Center RBHVAC Exhaust Fan was unable to perform its required function due to being installed and operated in a manner that allowed rotation in the reverse direction. Therefore, it pressurized SC instead of evacuating it.