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Detroit Edison
A DTE Energy Company

10CFR50.73

December 20, 2000
NRC-00-0075

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. 00-010

Pursuant to 10CFR50.73(a)(2)(iv), Detroit Edison is hereby submitting the enclosed LER No. 00-010. This LER addresses the actuation of an Engineered Safety Feature (ESF). A suppression chamber to drywell vacuum breaker opened as a result of reduced drywell pressure when a temperature control valve failed open.

No new commitments are being made in this LER.

Should you have any questions or require additional information, please contact Mr. Norman K. Peterson of my staff at (734) 586-4258.

Sincerely,

William T. O'Connor, Jr.

cc: D. S. Hood
M. A. Ring
M. V. Yudasz, Jr.
NRC Resident Office
Region III
Regional Administrator, Region III
Wayne County Emergency Management Division

IE22

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(6-1998)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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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TITLE (4)
ESF Actuation of a Suppression Chamber to Drywell Vacuum Breaker

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 NAME	DOCKET NUMBER
										05000
11	24	00	00	--0 1 0--	0	12	20	00	FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	100		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Jerome Flint – Principal Licensing Specialist	(734) 586-5212

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
A	CC	TCO	F130	Y						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On November 24, 2000, at approximately 1236 hours, one of twelve suppression chamber to drywell vacuum breakers opened for approximately four minutes. The drywell pressure reduction and subsequent vacuum breaker opening was the result of P42-F400, Reactor Building Closed Cooling Water (RBCCW) Temperature Control Valve (TCV), controlling General Service Water (GSW) flow to the RBCCW Heat exchangers, failing in the open position. This resulted in a drywell temperature and pressure reduction and subsequent opening of the suppression chamber to drywell vacuum breaker. This is being reported in accordance with 10CFR50.73(a)(2)(iv), because the cycling of a suppression chamber to drywell vacuum breaker is considered to be an Engineered Safety Feature (ESF) actuation. The cause of this event was a previous misdiagnosis of a similar failure of the TCV positioner. This event is considered a Maintenance Rule Functional Failure. The air operator for the P42-F400, RBCCW TCV, was disassembled and the capscrew for the air operator shaft was torqued to the correct value and locktite was applied to prevent future loosening. P42-F400 was returned to service on December 5, 2000.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Initial Plant Conditions:

Mode	1
Reactor Power	100 Percent
Reactor Pressure	1023 psig
Drywell Pressure	15 inches (water column)
Suppression Chamber Pressure	15 inches (water column)

Description of the Event:

On November 24, 2000, at approximately 1236 hours, one of twelve suppression chamber to drywell vacuum breakers [VACB] opened for approximately four minutes. The drywell pressure reduction and subsequent vacuum breaker opening was the result of P42-F400, Reactor Building Closed Cooling Water (RBCCW) Temperature Control Valve (TCV) [TCV], controlling General Service Water (GSW) flow to the RBCCW Heat exchangers [HX], failing in the open position. This resulted in reduced cooling water temperature supplied to the drywell coolers and a resultant decrease in drywell temperature and drywell pressure and subsequent opening of the suppression chamber to drywell vacuum breaker.

When the RBCCW TCV failed open GSW flow through the plant increased, resulting in a lowering GSW pressure. The Control Room operators entered Abnormal Operating Procedure (AOP) 20.131.01, Loss of General Service Water, to restore GSW pressure. With the increased GSW flow, RBCCW heat exchanger outlet temperature decreased from approximately 70 degrees fahrenheit to 50 degrees fahrenheit. This reduction in RBCCW temperature resulted in the primary containment drywell coolers providing more than normal cooling. Drywell temperature decreased from 136 to 132 degrees fahrenheit. Drywell pressure decreased from 15 inches water column (wc) to 10.5 inches wc. As a result, suppression chamber to drywell vacuum breaker T2300-F400C opened, relieving pressure from the suppression chamber to the drywell. Control Room operators observed that T2300-F400C was no longer fully closed at approximately 1236 hours. At 1238 hours the failed RBCCW TCV was repositioned to recover RBCCW temperature. Drywell pressure quickly started to return to normal. The suppression chamber to drywell vacuum breaker, T2300-F400C, re-closed as designed when differential pressure was reduced at 1240 hours, approximately four minutes after opening. Subsequently, RBCCW temperature was placed in manual bypass control and the RBCCW TCV removed from service until repairs could be completed.

On November 24, 2000, at 1419 hours, a four-hour notification was made to the NRC in accordance with 10CFR50.72(a)(2)(i), because the cycling of a suppression chamber to drywell vacuum breaker is considered to be an Engineered Safety Feature (ESF) actuation.

Cause of the Event:

The cause of this event was an earlier misdiagnosis of a previous similar failure of the RBCCW TCV positioner. The failure mechanism involved a loosening of the RBCCW TCV air operator shaft capscrew. With the capscrew loose the air operator shaft was able to rotate far enough to disengage the RBCCW TCV positioner feedback linkage, causing the valve to fail full open. This provided increased cooling to the RBCCW system. The P42-F400,

RBCCW TCV, is an air operated 12 inch ball type valve with a Fisher Controls positioner.

Review of Operator logs and work request documentation determined there have been previous equipment problems involving the RBCCW TCV positioner. Following these previous repairs, on November 24, 2000 the air operator feedback linkage became disengaged ultimately resulting in the opening of T2300-F400C, one of twelve suppression chamber to drywell vacuum breakers. Vacuum breaker opening had not occurred on previous occasions likely because the GSW temperature was higher.

Analysis of the Event:

The suppression chamber to drywell differential pressure reached the setpoint for opening (0.19 psid) based on plant conditions existing at the time. This is much lower than the Technical Specification limit of 0.5 psid. Therefore, the vacuum breaker lifted appropriately and the plant response was as designed.

Twelve suppression chamber to drywell vacuum breakers are provided to limit negative differential pressure between the drywell and the suppression chamber during rapid depressurizations of the drywell. The safety analyses assume that these vacuum breakers are closed initially and are fully open at a differential pressure of 0.5 psid. The most recent surveillance shows that these vacuum breakers open at approximately 0.19 psid. Thus, this single vacuum breaker opening at approximately 0.19 psid adequately controlled the minor reduction in drywell pressure caused by the failed TCV, well within the analysis assumed differential pressure of 0.5 psid for all twelve vacuum breakers. The Limiting Condition for Operation of TS 3.6.1.8 requirement to maintain the vacuum breakers closed is provided to ensure that there is not excessive bypass leakage between the drywell and suppression chamber air space should a Loss of Coolant Accident occur. A two hour completion time is allowed to close an open vacuum breaker because of the low probability of an event that would pressurize primary containment. One vacuum breaker was open for only four minutes during this event, well within the two hour limit.

The NRC Significance Determination Process (SDP) was applied to this event. Applying a conservative bounding condition the event was characterized as having minimal impact on risk (Green) in Phase 1. If applied, the risk significance in Phase 2 would have been characterized as having minimal impact on risk due to the Event Estimated Likelihood Rating being less than three days coupled with the availability of Remaining Mitigation Capability Rating at the time of this event.

Corrective Actions:

This event is considered a Maintenance Rule Functional Failure. The air operator for the P42-F400, RBCCW TCV, was disassembled, the capscrew for the air operator shaft was torqued to the correct value and locktite was applied to prevent future loosening. P42-F400 was returned to service on December 5, 2000.

This event was documented in the Fermi 2 corrective action program. Further potential corrective actions relating to this event are being evaluated and will be developed and implemented commensurate with the established priorities and processes of this program. Activities being considered include inspecting a sample of air operated valve positioners with similar design and application to ensure their operating shaft does not rotate and ensuring maintenance inspection information exists such that valve positioner is inspected for rotation when other

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

maintenance is performed. Criteria used to select the sample population will likely include the operational impact that failure of the positioner could have and valves with previous maintenance in the area of the capscrew. Maintenance information will ensure the capscrew is torqued to the appropriate value and locktite is applied if a positioner shaft is found to rotate.

Additional Information:

A. Failed Components

Component: Air operated positioner for P42-F400, RBCCW TCV
Description: Air operated positioner with a mechanical feedback mechanism
Manufacturer: Fisher Controls
Type: 657-8-U

B. Previous LERs on Similar Problems

No similar LERs were identified within the past three years.