

Paul Fessler  
Plant Manager

Fermi 2  
6400 North Dixie Hwy., Newport, MI 48166  
Tel: 734.586.5325

**Detroit Edison**



10CFR50.73

June 7, 2000  
NRC-00-0043

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

References: 1) Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43

Subject: Licensee Event Report (LER) No. 00-009

Pursuant to 10 CFR 50.73(a)(2)(i)(B), Detroit Edison is submitting the enclosed LER No. 00-009. The LER documents a preventive maintenance activity on an Emergency Diesel Generator (EDG) in March 2000, which resulted in a Technical Specification allowed outage time being exceeded due to the use of the wrong oil in the EDG alternator bearings.

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,

A handwritten signature in dark ink, appearing to read "P. Fessler", written in a cursive style.

cc: J. Dyer  
A. J. Kugler  
M. A. Ring  
M. V. Yudasz, Jr.  
NRC Resident Office  
Region III  
Wayne County Emergency Management Division

**LICENSEE EVENT REPORT (LER)**

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

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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Fermi 2

DOCKET NUMBER (2)  
05000341

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TITLE (4)  
Emergency Diesel Generator Inoperable Due to Low Viscosity Oil in the Alternator Bearings

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
05	08	00	00	--0 0 9--	00	06	07	00	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)				
5	0	20.2201(b)		20.2203(a)(2)(v)	X 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)	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  
Sam Hassoun – Principal Licensing Engineer

TELEPHONE NUMBER (Include Area Code)  
(734) 586-4287

**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

**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 May 8, 2000, a review of past preventive maintenance activities determined that Emergency Diesel Generator (EDG) 11 had been inoperable for a period which exceeded the limiting applicable Technical Specifications (TS) allowed outage time of 7 days per TS 3.8.1, "AC Sources - Operating." EDG 11 was removed from service on March 1, 2000 for preventive maintenance. Maintenance activities were completed on March 4, 2000; however, subsequent evaluation determined that EDG 11 remained inoperable until April 2, 2000, when the Reactor was placed in Mode 4. During that time no TS Limiting Condition of Operation (LCO) was invoked because it was believed that EDG 11 was restored to its standby operation mode on March 4, 2000.

The cause of this event was a human error that resulted in filling both EDG 11 alternator bearings with low viscosity oil that did not meet the required oil specification. With the low viscosity oil, it could not be assured that EDG 11 would fulfill its design basis requirements. The use of the wrong oil was a result of less than adequate self-checking and error detection practices, and less than adequate labeling and controlling of oil containers on site.

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Initial Plant Conditions:

Mode 5 (Refueling)  
 Reactor Power 0 Percent  
 Reactor Pressure 0 psig  
 Reactor Temperature 99 Degrees Fahrenheit

Description of the Event:

On May 8, 2000, a review of past preventive maintenance (PM) activities determined that Emergency Diesel Generator [DG] (EDG) 11 had been inoperable for a period which exceeded the limiting applicable Technical Specifications (TS) allowed outage time of 7 days per TS 3.8.1, "AC Sources - Operating." Specifically, at 0315 hours on March 1, 2000, EDG 11 had been removed from its standby mode for preventive maintenance. Maintenance activities were completed at approximately 1840 hours on March 4, 2000; however, subsequent evaluation determined that EDG 11 had remained inoperable until 0853 hours on April 2, 2000 when the Reactor was placed in Mode 4 for the seventh refueling outage and TS 3.8.1 was no longer applicable. No TS Limiting Condition of Operation (LCO) had been invoked in the interim because it was believed that EDG 11 was restored to its standby operation mode at 1840 hours on March 4, 2000.

EDG 11 and EDG 12 are the Emergency Diesel Generators that supply onsite emergency AC electrical power to the Division 1 emergency loads. EDG 13 and EDG 14 are the Emergency Diesel Generators that supply onsite emergency AC electrical power to the Division 2 emergency loads. One division is capable of providing sufficient power to shut down and maintain the reactor in a safe condition after a postulated Loss of Coolant Accident (LOCA) or Loss of Offsite Power (LOOP). TS 3.8.2 "AC Sources - Shutdown" requires only one division of the EDGs to be operable. This requirement was met by Division 2 of the emergency AC power being operable as of 0853 hours on April 2, 2000.

During the 18-month preventive maintenance activities for EDG 11 conducted between March 1 and March 4, 2000, the alternator bearing oil was drained, flushed and refilled in accordance with the applicable procedure. On April 11, 2000, a quarterly chemistry sample analysis of EDG 11 alternator inboard and outboard bearing oil determined that the viscosity of the oil was out of specification. At that time, it was suspected that the wrong type of oil had been used during the March PM activities. In addition to the low, out of specification viscosity, test results indicated a high out of specification wear index for the inboard alternator bearing oil sample. On April 12, 2000, the alternator bearing oil was drained, flushed and refilled with the oil specified by the procedure. On April 13, 2000, 0548 hours, EDG 11 was returned to service. The oil was sampled after running the EDG on April 13, 2000 and the results were satisfactory. Oil in the other three EDG alternator bearings, and other EDG 11 equipment affected by the PM, was also sampled and found to be acceptable.

Between the time the alternator bearing oil was changed during EDG 11 PM work to the time the EDG was returned to service after the final oil change on April 13, 2000, EDG 11 accumulated approximately 11 hours and

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17 minutes of running time. It is suspected that, during this period, the EDG operated with the wrong type of oil in the alternator bearings. Based on the review of test results, both the bearing and the EDG manufacturers concluded that no significant damage to the bearing had occurred. This conclusion is supported by the normal vibration and bearing operating temperature data taken during EDG 11 runs performed in this period. The bearing and EDG manufacturers could not provide information to determine bearing expected life with the low viscosity oil; therefore, Detroit Edison determined that EDG 11 was inoperable due to the low viscosity oil in the alternator bearings.

TS 3.8.1 requires restoring both EDGs in one division to operable status within 2 hours from the time one or both EDGs in both divisions become inoperable. During the period of time in which EDG 11 was inoperable, EDG 13 and 14 were individually taken out of service several times for periods exceeding 2 hours. The longest period was approximately 3 days and 10 hours for EDG 13 PM starting on March 13, 2000. These conditions were outside the allowed outage time of 2 hours per TS 3.8.1. No TS LCO had been invoked at that time because it was believed that EDG 11 had been restored to its standby operation mode following its PM outage on March 4, 2000.

Cause of the Event:

The cause of this event was a human error that resulted in filling both EDG 11 alternator bearings with the wrong oil. Use of the wrong oil was the result of less than adequate self-checking and error detection practices, and less than adequate labeling and controlling of oil containers on site.

Oil is stored in 55-gallon drums in the warehouse. Requests for oil are obtained by filling and dispensing from smaller metallic containers as needed for each job. Labels are added to the smaller containers identifying the oil type and stock code number. These labels are normally wrapped around the handle which makes a portion of the label harder to read. Partially used oil containers are frequently left in the plant for future use.

Analysis of the Event:

Oil is used in the EDG alternator bearing to provide lubrication between the bearing moving parts. The oil forms a thin film between the rollers of the bearing and the bearing race. Minimum oil viscosity specification is provided to ensure that oil will form a sufficient film between the moving parts and avoid metal to metal contact which may result in premature wear of the bearing. The viscosity range for the oil normally used in the EDG alternator bearing is 175 to 231 centistoke (cSt) at 40 degrees Celsius. The oil samples taken from the EDG 11 alternator bearings on April 11, 2000 had a viscosity of 64 cSt for the inboard bearing and 99 cSt for the outboard at 40 degrees Celsius.

Although the viscosity was significantly lower than the acceptable value, vibration and bearing operating temperatures were normal during the approximately 11 hours and 17 minutes of EDG 11 running time with the low viscosity oil added to the bearings. This is an indication that no significant damage to the bearing had occurred. This conclusion was also supported by several Detroit Edison and vendor lubrication experts who also agreed that the bearings are very durable and would probably last seven days of full load operation but

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may incur some damage in the process. However, the experts and both the bearing and EDG manufacturers could not guarantee that the bearings would last for seven days of operation. Based on this, Detroit Edison determined that EDG 11 was inoperable with the low viscosity oil in the alternator bearings. Nevertheless, it is likely that EDG 11 would have operated for the 3 days and 10 hour period in which EDG 13 was out of service for preventive maintenance. This is based on lubrication expert opinion and the fact that the EDG operated for over 11 hours with no damage to the alternator bearings.

Therefore, this event had no adverse effect on the health and safety of the public since it is believed that EDG 11 was capable of running long enough to provide the necessary emergency AC power during a LOOP or LOCA had such a transient occurred while a Division 2 EDG was inoperable.

In addition to the other three EDGs, another alternate AC power source (Combustion Turbine Generator 11-1) [EK][TG] with black start capability connects with the 120 kV switchyard which provides offsite power [EK] for the Division 1 emergency loads. During the period in which EDG 11 was considered inoperable, between March 4 and April 2, 2000, a minimum of three out of these four sources (EDGs 12, 13 and 14 and CTG 11-1) were operable and available to supply essential loads at any time.

Corrective Actions:

The oil in EDG 11 alternator bearing housings was flushed and filled with new oil on April 13, 2000. The oil was then sampled and verified to have the proper viscosity. Oil in the other three EDG alternator bearings and other EDG 11 equipment was also sampled and found to have the proper viscosity.

All previously issued oil, regardless of its container and labels, has either been sampled and verified, or has been returned to the warehouse or the Oil Storage Area. Returned oil has been sampled and disposed of properly.

A new requirement has been instituted for all oil containers issued by the warehouse. Each container will have a special metal tag detailing the name of the lubricating oil product. This tag is in addition to the label normally affixed to the container.

The following guidelines were distributed to all site personnel on May 15, 2000 as part of a new policy for the control of storage, issuance and use of oil at Fermi 2:

1. All unused oil is to be returned to the warehouse or Oil Storage Area following use. The returned oil will be sampled and disposed of properly.
2. All oil to be added to any plant equipment, regardless of the quantity, must be issued by the warehouse. Prior to requesting oil, the oil type is to be determined from the site component database. Peer checking is to be utilized in determining the proper oil type.
3. Peer checking is to be utilized for the verification that the proper oil type is being added to the properly marked

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container during the issuance process. Oil transportation in a proper container, bearing a legible and correct label, is to be verified. Prior to adding oil to plant equipment, peer checking is to be utilized to verify that the correct oil is being added to the correct component.

4. The amount of oil required is to be accurately estimated before requesting oil in order to reduce the amount of waste and minimize the availability of leftover oil.

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 established priorities and processes of the Fermi 2 corrective action program.

Additional Information:

- A. Failed Components

None.

- B. Previous LERs On Similar Problems

No previous similar events involving equipment inoperability due to use of the wrong oil were identified.