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Nuclear
Operations

March 23, 1993
NRC-93-0036

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

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

Subject: Proposed Operating License Amendment - Emergency Diesel
Generator Engine Special Inspection Program

Pursuant to 10CFR50.90, Detroit Edison Company hereby proposes to amend Operating License NPF-43 for the Fermi 2 plant. The proposed change modifies License Condition 2.C.(10) to eliminate the Emergency Diesel Generator (EDG) main engine bearing special inspection requirements. Experience gathered performing these inspections has shown that reliable engine performance can be maintained without intrusive inspections. Elimination of these special inspection requirements will improve the EDG system availability and improve the use of Fermi 2 maintenance resources.

Detroit Edison has evaluated the proposed Technical Specifications against the criteria of 10CFR50.92 and determined that no significant hazards consideration is involved. The Fermi 2 Onsite Review Organization has approved and the Nuclear Safety Review Group has reviewed the proposed amendment and concurs with the enclosed determinations. In accordance with 10CFR50.91, Detroit Edison has provided a copy of this letter to the State of Michigan.

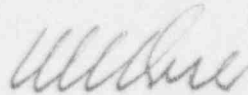
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If you have any questions, please contact Mr. Glen D. Ohlemacher at
(313) 586-4275.

Sincerely,



Enclosure

cc: T. G. Colburn
A. B. Davis
W. J. Kropp
M. P. Phillips
Supervisor, Electric Operators, Michigan
Public Service Commission - J. R. Padgett

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I, WILLIAM S. ORSER, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

William S. Orser

WILLIAM S. ORSER
Executive Vice President

On this 23rd day of March, 1993, before me personally appeared William S. Orser, being first duly sworn and says that he executed the foregoing as his free act and deed.

Rosalie A. Armetta

Notary Public



INTRODUCTION

On December 16, 1987, the NRC issued Amendment 12 to the Fermi 2 Operating License. This amendment relates to the Emergency Diesel Generator (EDG) Engine Special Inspection Program. This program stipulates the performance of two major activities.

They are:

1. Perform gap checks on each EDG after each automatic unlubricated engine start, or every six months, whichever occurs first.
2. Obtain and analyze, once each month, an engine lube oil sample from each EDG except when an EDG is unavailable for service.

The purpose of this letter is to request that the six month bearing gap check and the gap check after each automatic unlubricated start requirement be deleted. The performance of this activity over the past years (since 1987) has revealed no adverse bearing conditions.

The Special Inspection program was developed in response to problems encountered during the initial operation of the EDGs during 1985. In January 1985, EDG #11 tripped on a low lube oil pressure signal. Inspection of the engine revealed extensive bearing damage on the upper crankshaft bearings that resulted from inadequate lubrication during fast starts of the engine. The other three EDG's were inspected for similar damage. EDG #12 had several upper crankshaft bearings that were heavily scored. Some bearing material was found in the lube oil filter. The bearings on EDG #13 and EDG #14 that were inspected did not show signs of significant problems. Damage to EDG #11 and EDG #12 was repaired and after post-maintenance testing they were returned to service.

In November 1985, EDG #13 was shutdown due to a conspicuous noise change from within the engine. Subsequent inspection of upper and lower crankshaft bearings revealed the No. 3 upper connecting rod bearing had failed leading to failure of the No. 3 main bearing. EDG #11 was inspected (both upper and lower bearings) revealing heavy scoring on several upper crankshaft bearings. EDG #12 and EDG #14 upper and lower crankshaft bearings showed no signs of distress. After repairs to the two engines were completed, a Reliability Demonstration Test was successfully concluded prior to a declaration of operability of these engines.

A special inspection program was then developed to monitor for signs of bearing distress and to allow any additional corrective actions to

be formulated to prevent engine failure. This program was made part of the Fermi 2 Operating License, as described above, in Amendment 12.

In addition to the special inspection program, preventive measures were taken to minimize the probability of bearing failure. A modification to each Emergency Diesel Generator was made to allow slow starting of the engine for surveillance testing and/or manual starts. This modification allows for reduced stress on the engine and bearings during the start cycle and greatly enhances engine and bearing reliability. All intentional starts of the Fermi 2 EDGs are preceded by prelubrication. In addition, the lubricant type was changed to a brand that had exhibited good performance in nuclear standby service.

EVALUATION

Since the resolution of early bearing failure problems, Fermi 2 EDGs have performed reliably. This is evidenced by the following:

- o Through January 1993, the Fermi 2 EDG's have successfully completed the following number of valid consecutive tests without a failure:

EDG #11:	93	EDG #13:	112
EDG #12:	123	EDG #14:	59

The start/failure Criteria C.2.e of Regulatory Guide (RG) 1.108 is used to determine the success of a test.

- o Since 1987, there have been 4 valid failures of an EDG to start, again using Criteria C.2.e of RG 1.108. None of these failures were associated with the engine bearings or lubricating system nor did damage to the bearings result. Further, effective corrective actions have been taken in each case and there have been no recurring failure mechanisms.
- o The Fermi 2 EDGs, through January 1993, have successfully responded to 532 consecutive valid demands. These demands are start demands and load-run demands as defined in NUMARC 87-00, Rev. 1, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, Appendix D. Therefore, the Fermi 2 Emergency Diesel Generators exhibit trigger values of zero for the last 20, 50 and 100 demands under the NUMARC methodology for assessing overall EDG reliability.

The reliability of the Fermi 2 EDGs has also been evident during the special engine bearing inspection program. Since the issuance of Amendment 12, approximately 60 bearing gap inspections have been

performed, 22 of which have followed unrelubricated fast starts. These inspections have not revealed any signs of bearing distress on the upper or lower main bearings of any of the four EDGs. The bearings that are currently in service have been in service since 1986.

The reliability of the Fermi 2 EDGs is the result of an aggressive multi-faceted EDG maintenance program. This program includes periodic inspection and preventative maintenance, Lube Oil Analysis, and EDG operating parameter monitoring and evaluation.

The Fermi 2 TS require an 18-month inspection of each EDG in accordance with the manufacturer's recommendations. These recommendations include a comprehensive series of inspections and preventative maintenance, including engine main bearing gap inspection. A listing of the currently recommended 18 month tasks is attached as Table 1.

An EDG lube oil analysis program is also required by License Condition 2.C.(10). The current lube oil monitoring program is described in Detroit Edison's letter of April 22, 1992 (NRC-92-0036). The program gathers diagnostic information using ferrographic and other analysis techniques. This permits a non-intrusive evaluation of the material condition of the engine internals and incipient bearing failure. Oil sample analysis results are reviewed by the engineer responsible for the lubrication program to evaluate the condition of the lubricant and to provide an assessment of the material condition of the engine. He forwards the sample analysis results to the Emergency Diesel Generator System Engineer for further review and evaluation.

During the performance of engine runs of the Fermi 2 EDG's engine operating parameters are logged at regular intervals. The log sheets provide normal ranges, optimum values, minimum value or maximum value for each parameter. This allows on-the-spot evaluation of the performance of the engine and selected auxiliary equipment.

Currently, all Emergency Diesel Generator engines exhibit operating parameters that are indicative of good engine health. The currently monitored operating parameters are:

Fuel Oil Pressure	Jacket Cooling Water Temperature
Fuel Oil Filter DP	Jacket Cooling Water Pressure
Suction Air Inlet Pressure	Crankcase Vacuum
Scavenging Air Pressure	Air Cooler Outlet Water Temperature
Lube Oil Pressure	Intercooler Air Outlet Temperature
Lube Oil Temperature	Engine Speed
Lube Oil Filter DP	Jacket Coolant Expansion Tank Level
Lube Oil Strainer DP	Cylinder Exhaust Temperatures

Upon completion of the engine run, operating parameters are reviewed by Main Control Room personnel to verify proper performance of the engine and selected auxiliary equipment. The operating parameters (along with the completed surveillance test documents and the Start/Failure log) are forwarded to the Emergency Diesel Generator System Engineer for review and evaluation. The engineering evaluation is performed to accomplish two goals. They are:

1. Evaluation of the success of a valid engine start and load-run.
2. Evaluation of the engine operating parameters to permit assessment of satisfactory material condition of the engine.

Engine operating parameters and oil sample analysis results are then entered into an electronic data base. Periodically, or upon request, data points are retrieved from this historical file for review and evaluation by the System Engineer. Trend plots are generated to permit the identification of adverse trends to permit the development of corrective action plans to prevent failure. Currently, all Fermi 2 Emergency Diesel Generator operating parameter values and trends indicate that the engines are in good material condition.

The current EDG maintenance and performance monitoring program is described above. Program details are subject to change based upon operating experience and changing vendor recommendations.

Performance of the required bearing gap checks requires that the engine be taken out of service for approximately eight hours reducing the EDG availability. With two outages (at a six month interval) in a year, there will be an EDG unavailable 0.18% of the time due to this license condition. Additional unavailability could occur depending on the frequency of unrelubricated starts. In addition to increased EDG availability, the elimination of the special bearing inspection will allow these maintenance resources to be redirected toward other tasks.

In summary, the elimination of the special EDG bearing inspections required by License Condition 2.C.(10) is acceptable since:

- o Fermi 2 EDG's have demonstrated a high degree of reliability.
- o This reliability will be maintained by an aggressive and comprehensive maintenance program.
- o The inspections have not revealed bearing problems.
- o The change will result in increased EDG availability and more efficient utilization of maintenance resources.

SIGNIFICANT HAZARDS CONSIDERATION

In accordance with 10CFR50.92, Detroit Edison has made a determination that the proposed amendment involves no significant hazards considerations. To make this determination, Detroit Edison must establish that operation in accordance with the proposed amendment would not: 1) involve a significant increase in the probability or consequences of an accident previously evaluated, or 2) create the possibility of a new or different kind of accident from any accident previously evaluated, or 3) involve a significant reduction in a margin of safety.

The proposed change to eliminate the Special Emergency Diesel Generator (EDG) bearing inspection program contained in License Condition 2.C.(10) does not:

- 1) Involve a significant increase in the probability or consequences of an accident previously evaluated. The inspection program proposed for elimination has not detected any degradation in any EDG engine bearings. The Fermi 2 EDG's have been shown to be reliable and will be maintained reliable through effective performance monitoring and preventative maintenance. Therefore, the change does not adversely affect EDG reliability. The change increases the EDG availability by eliminating EDG out-of-service time which is required to perform these inspections. Therefore, the change does not involve a significant increase in the probability or consequences of a previously evaluated accident.
- 2) Create the possibility of a new or different kind of accident from any accident previously evaluated. This proposal does not affect the manner of EDG operation or, the design of the plant and does not involve a special test. No new or different accidents are created.
- 3) Involve a significant reduction in a margin of safety. Since EDG reliability is maintained and EDG availability is improved, safety margins are not reduced.

Based on the above, Detroit Edison has determined that the proposed amendment does not involve a significant hazards consideration.

ENVIRONMENTAL IMPACT

Detroit Edison has reviewed the proposed change against the criteria of 10CFR51.22 for environmental considerations. The proposed change does not involve a significant hazards consideration, nor

significantly change the types or significantly increase the amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed amendment meets the criteria given in 10CFR51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement.

CONCLUSION

Based on the evaluation above: 1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and 2) such activities will be conducted in compliance with the Commission's regulations and proposed amendments will not be inimical to the common defense and security or to the health and safety of the public.