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Nuclear Operations

April 22, 1992
NRC-92-0036

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

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

2) Detroit Edison Letter to NRC, "Clarification of Diesel Generator Commitments", NE-85-0459, dated March 14, 1985

3) Detroit Edison Letter to NRC, "Diesel Generator Lubrication Analysis Program", RC-LG-85-0048, dated September 3, 1985

4) Detroit Edison Letter to NRC, "Consolidation of Outstanding Issues Concerning the Emergency Diesel Generators (EDG) Including Proposed Amendment to the Operating License for Fermi 2 Plant", VP-NO-87-0015, dated January 28, 1987

5) NRC Letter to Detroit Edison, "Amendment No. 12 to Facility Operating License No. NPF-43", dated December 16, 1987

Subject: Revised EDG Lubricating Oil Monitoring Program

The purpose of this letter is to provide details of the revised and enhanced EDG lubricating oil monitoring program at Fermi 2.

Detroit Edison established the EDG lubricating oil monitoring program at Fermi 2 according to the commitment made in Reference 2 and to comply with Fermi 2 Operating License Condition 2.C(10). Details of the program were provided in Reference 3. Subsequently, Reference 4 modified that program and the License Condition 2.C(10) was amended by Reference 5.

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The program is now being revised to improve its ability to provide early detection of engine bearing trouble and its cost effectiveness. The enclosure to this letter provides discussion of the revisions being made and details of the Fermi 2 EDG lubricating oil monitoring program.

The revised program will also be in full compliance with the Fermi 2 Operating License Condition 2.C.(10). Future changes to Fermi 2 EDG lubricating oil monitoring program not affecting compliance with the operating license condition will be maintained on site and records will be made available upon request to the NRC for any future inspection activities.

If you have any questions, please contact Mr. Girija S. Shukla at (313) 586-4270.

Sincerely,

Enclosure

cc: T. G. Colburn
A. B. Davis
R. W. DeFayette
S. Stasek

FERMI 2 EDG LUBRICATING OIL MONITORING PROGRAM

o INTRODUCTION

Detroit Edison established the EDG lubricating oil monitoring program at Fermi 2 according to the commitment made in Reference 2 and to comply with Fermi 2 Operating License Condition 2.C.(10). The program was discussed in Reference 3 and included the following:

1. Sampling the lubricating oil monthly, after temperature has stabilized during the engine's monthly start and load test.

2. Fermi's site lab performing "quick, gross indications of oil quality and associated engine wear", specifically the pentane insolubles and kinematic viscosity analyses.

3. Detroit Edison's Engineering Research Physical and Analytical Chemistry (ER-PAC) lab performing pentane insolubles and insoluble metals analyses, to indicate wear of a particular engine component.

4. Cleveland Technical Center, a commercial oil analysis lab, performing suspended metals analysis and other tests to indicate engine component wear or oil degradation.

5. Acceptance criteria, established and revisable by Detroit Edison, to trigger a bearing clearance check, if two consecutive monthly samples exceed the criteria.

6. Visual examination of lube oil filters upon removal, for metallic fragments larger than 1/16 inch, triggering bearing clearance check if excessive material is found.

7. Spectroscopic analysis of filter deposits, to indicate wear of a particular engine component.

Subsequently, Reference 4 modified that program, specifically deleting the commitment for visual inspection of EDG lube oil filters and spectroscopic analysis of the filter deposits, mentioned above as items No. 6 and 7, citing ineffectiveness for predicting bearing failures.

As a result, License Condition 2.C.(10) was modified in Reference 5 to read, in part, as follows:

(b) "DECo shall obtain and analyze, once each month, an engine lube oil sample from each EDG except when an EDG is unavailable for service. Should each of two consecutive samples analyzed identify foreign matter/deposits which exceed DECo established limits and which could degrade crankshaft bearing performance, DECO shall inform the NRC immediately, and within 15 working days following such notification, submit a report of analysis results and the detailed corrective action to be taken."

O REVISIONS TO ITEMS NO. 2 AND 3:

In addition to the analysis methods mentioned above, Fermi 2's site lab has performed quantitative ferrographic analysis of the oil samples for early indication of engine component wear. Similarly, Detroit Edison's Technical and Engineering Services (formerly ER-PAC) lab has performed both quantitative and qualitative ferrographic analysis. The ferrographic analysis indicates both the rate and type of wear occurring and can identify the specific component undergoing wear.

These additional ferrographic analyses have proven valuable in monitoring engine wear. The other methods previously committed to provided no reliable indication of increased wear. Since ferrographic analysis has proven to be more sensitive to engine wear, its indications are relied upon, while the pentane insolubles and insoluble metals analyses mentioned in items No. 2 and 3 are used as supportive information.

Because the pentane insolubles and insoluble metals analyses typically take 2-3 weeks to complete, the information their results might provide may be outdated. In contrast, the ferrographic analysis results are typically available within 3-4 days after sampling, allowing timely investigative or corrective actions to be taken. Furthermore, the pentane insolubles and insoluble metals analyses cost approximately $15,000 annually with no significant benefit attained from a safety perspective.

The quantitative ferrographic analysis performed on-site replaces the pentane insolubles mentioned in item 2 as a quick indication of engine wear. Ferrographic analysis is more sensitive and more informative than pentane insolubles, specifically quantifying wear particle concentrations rather than every insoluble in pentane including soot and non-metallics. Furthermore, ferrographic analysis is less expensive and less hazardous than highly flammable pentane.

Therefore, the pentane insolubles and insoluble metal analyses mentioned in Items No. 2 and 3 are being replaced by ferrographic analyses.

REVISION TO ITEM NO. 4:

The commercial oil analysis laboratory under contract at the time of program establishment was Cleveland Technical Center, as mentioned in item No. 4. After surveying the competition, Detroit Edison has selected a different vendor to perform the analyses to improve timeliness of results reporting and quality of work performed. Hence, Cleveland Technical Center is being deleted from item No. 4. This revision has no impact on the performance of suspended metal analyses and the commitment is maintained.

THE PROGRAM:

With these revisions in place, the intent of the lube oil monitoring program is unchanged - to detect incipient bearing damage. The ability to satisfy that intent has been improved in sensitivity, specificity, cost effectiveness and timeliness by these revisions. By detecting bearing wear early, corrective actions can be taken to maximize availability of the EDGs as an emergency AC supply source. These changes improve that detection capability.

The revised Fermi 2 EDG lubricating oil monitoring program will consist of:

1. Monthly sampling and analysis of lubricating oil from each EDG, except when an EDG is unavailable for service, after temperature has stabilized during the engine's monthly start and load test.

2. Utilizing quantitative ferrographic analyses as a quick indication of engine wear, and qualitative ferrographic analyses to indicate wear of a particular engine component.

3. Performing suspended metals analyses and other tests to indicate engine component wear or oil degradation.

4. Reviewing results against acceptance limits established by Detroit Edison. Providing corrective actions and immediate NRC notification if each of two consecutive samples analyzed identify foreign matter/deposits which exceed the limits and which could degrade bearing performances; and submitting a report to the NRC within 15 working days following notification with analysis results and details of corrective action.

The revised program will also be in full compliance with the Fermi 2 Operating License Condition 2.C(10).