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BBS Ltr 78-1270

September 28, 1978

James G. Keppler, Director
 Division of Inspection and Enforcement - Region III
 U.S. Nuclear Regulatory Commission
 799 Roosevelt Road
 Glen Ellyn, Illinois 60137

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Dear Mr. Keppler:

This letter updates and concludes the Dresden Units 2 and 3 diesel generator reliability study outlined in the reports sent to you on March 3, 1978 and April 10, 1978.

The resolution of each of the items which were considered in our investigation is summarized in the attachment. All but two of the corrective actions which we have undertaken have been completed. The modification to provide automatic sequencing of the air start motors during the starting cycle of the diesels is expected to be completed by February 1979. Raising the overspeed trip setpoint of the diesels will be completed before December 31, 1978.

Since the last report there have been two valid starting failures of the Unit 2 diesel generator, two of the Unit 2/3 diesel generator, and none with the Unit 3 diesel generator. The two failures of the Unit 2 diesel generator to start resulted from an overspeed trip and from a failure of an air start motor. One failure of the Unit 2/3 diesel generator was caused by a trip of the cooling water pump. The second failure to start occurred just recently and is under investigation. We have determined that the overspeed trip setpoint of the diesels should be raised to minimize the likelihood of a repetition of this failure mode, and these adjustments will be made before December 31, 1978. The air start motor problem should be resolved when the multiple air start modification is completed in February, 1979. We have already completed the modification to provide an alternate source of cooling water for the HPCI/LPCI room coolers, other than from the diesel cooling water pumps, and that modification should significantly prolong the life of those pumps.

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As a result of our corrective action program which began last December, the reliability of the diesel generators has improved in 1978. We anticipate continued improvement in their performance upon the completion of the remaining two corrective actions.

Sincerely,

Arthur M. Roberts
for B.B. Stephenson
Station Superintendent
Dresden Nuclear Power Station

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RESULTS OF DRESDEN DIESEL GENERATOR RELIABILITY STUDY

This report summarizes the major results of the reliability study. Others can be found in the previous reports.

1. Multiple Start Attempt Modification.

This modification will allow automatic restart attempt if the pinion gears fail to engage to start the engine. The modification has been designed and approved and the required materials are being purchased. It is expected to be completed by February, 1979.

2. Air Start Piping Modification to Allow Blowdown.

This modification allows blowdown of the starting air piping to prevent accumulation of moisture and dirt inside the pipe. The modification has been completed and the piping is being blown down during every surveillance test.

3. Governor Modification to Allow Idling

The manufacturer recommended that the engine be run at idle before and after a surveillance test. However, this would involve a very complicated modification on the governor which could, in our opinion, decrease the governor reliability. For example, the proposed modification would involve reinstallation of governor limit switches which were removed because of previous erroneous operation. Also, it is not clear that the past diesel generator problems were caused by lack of idling and we do not expect any major problem over the life time of the engine to result from our present operating practice. Therefore, this proposal has been rejected.

4. HPCI/LPCI Room Cooler Modification

This modification involves supplying the room coolers with service water during normal operation, thereby significantly reducing the running time of the diesel generator cooling water pumps. This will greatly increase the pump life. The work has been completed.

5. Cooling Water Pump Bearing Problems

The diesel generator cooling water pumps have tripped several times due to bearing damage. In order to correct the problem the following actions have been taken:

- a. Use service water to supply HPCI/LPCI room coolers instead of the cooling water pumps.
- b. Wye strainers have been installed in the bearing cooling lines such that the water entering the bearing is clean. Also the strainers can be blown down during surveillance test to prevent the strainers being plugged.

Results of Dresden Diesel Generator Reliability Study (cont'd)

- c. The bearing will be inspected every year and will be changed if it is found to be deteriorated.

6. Review of Preventive Maintenance Program.

The program has been carefully reviewed and is found to be quite adequate. Several changes have been made after the review in order to increase the reliability of the diesel generator operation:

- a. Inspections of air line strainer, turbo charger air box and after cooler drain air box and starting air solenoid valve have been changed from the monthly inspection to the quarterly inspection. The station learned from experience that these components were always in good condition when they were inspected. Also, too frequent inspection can actually decrease the reliability of these components. For example, the air start solenoid valves failed twice because the wire connecting lugs became loose after many inspections during which the lugs were removed.
- b. Check wire connectors in the engine control panel quarterly instead of annually.
- c. Zinc electrolyte rods have been installed in diesel heat exchangers and will be inspected annually. This will increase the heat exchanger life.
- d. Cooling water pump bearings will be inspected annually.
- e. Overshooting and overspeed setpoint will be measured annually.

7. Procedure Change for One-Hour Surveillance Run

The duration of the diesel generator surveillance test has been increased from half an hour to one hour as recommended by the manufacturer in order to improve the engine life and its reliability.

8. Capacitor Lifetime Study

Several failures in the past were caused by defective capacitors. A detailed study of capacitor life has been conducted which also included the temperature effect on the lifetime. It was found that the capacitors installed in the diesel generators have about a lifetime of eight years. Therefore the current five year replacement program should be adequate.

9. Study to Determine Components Affected by Start-Stop Operation.

After careful consideration of our consultant's recommendations (MPR Associates, Inc.), the station decided not to proceed with this study since it is not apparent that any precise results could be reached.

10. Diesel Fuel Oil Day Tank Overflow Piping Change.

This change will prevent water from being inadvertently forced into the day tanks. The work has been completed on all diesel generators.

11. Loose Wire Investigation.

Wire connectors will be checked and tightened during quarterly maintenance.

12. A Technical Staff person is assigned to closely follow the diesel generator operational reliability.

13. In addition to the above items, the Station has also installed a fuel oil low point drain at each diesel generator and a D/G cooling water pump trip alarm in the Control Room. The alarm will make the operator aware of any cooling water pump trip immediately and the drain will allow the station to take a more representative fuel oil sample and to drain contaminated fuel oil if necessary.