U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-315/89020(DRS)

Docket No. 50-315 License No. DPR-58

Licensee: Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43216

Facility Name: D. C. Cook Nuclear Plant, Unit 1

Inspection At: Bridgman, MI 49106

Inspection Conducted: May 22-25 and July 7, 1989

Inspector: H. A. Walker H. A. Walker 8/9/89
Date

Approved By: F. J. Jablonski, Chief H. A. Walker for 8/9/89
Maintenance and Outages Section Date

Inspection Summary

Inspection on May 22-25 and July 7, 1989 (Report No. 50-315/89020(DRS))
Areas Inspected: Routine, unannounced inspection of licensee maintenance to correct recent incidents of overspeed on Unit 1 Emergency Diesel Generators. Selected portions of Inspection Procedures 62700 and 93702 were used.
Results: A violation with two examples was identified with failure to follow procedures. An unresolved item was identified in action to assure inspection and test requirements were met and a weakness was identified in root cause analysis.

DETAILS

1. Persons Contacted

American Electric Power Service Corporation (AEPSC)

**P. Barrett, Quality Assurance Manager
G. Hines, Emergency Diesel Generator Engineer
P. McCarty, Senior Quality Assurance Engineer

Indiana Michigan Power Company

W. Smith, Jr., Plant Manager
*T. Beilman, Instrument & Control Superintendent
*P. Carteaux, Maintenance Engineering Supervisor
*J. Droste, Maintenance Superintendent
*J. Moline, Maintenance Compliance Coordinator
T. Postlewait, Technical Engineering Superintendent
*J. Rutkowski, Assistant Plant Manager

U.S. Nuclear Regulatory Commission (USNRC)

B. Jorgensen, Senior Resident Inspector
*R. Sutphin, Resident Inspector (Acting)

*Indicates those who attended the exit meeting on May 25, 1989.

**Indicates those persons at American Electric Power in Columbus, Ohio who participated in the exit by phone.

2. Inspection Details

2.1 Background and Inspection Methodology

This inspection was conducted to review action taken by the licensee to resolve overspeed problems which had been encountered on Unit 1 AB and CD Emergency Diesel Generators (EDG). Both EDGs failed due to overspeed conditions after work, which was required by the 18 month inspection, was performed during the Unit 1 refueling outage.

The inspection was performed by reviewing maintenance records and other documents related to the EDG overspeed problems, and discussing the documents and actions with licensee personnel. Additional information was provided by a number of telephone calls subsequent to the onsite review, the latest being on July 7, 1989.

2.2 Unit 1 CD Diesel Failure

On April 10, 1989, while performing the required 18 month inspection of Unit 1 CD EDG, the engine speed exceeded upper speed limits and the electrical overspeed trip failed. This resulted in excessive vibration

and possible damage to the diesel engine and emergency generator. An extensive disassembly and inspection of both the diesel and the generator was undertaken to determine the extent of the damage and the required repair. Job orders covering this work were reviewed by the inspector and the results of this review are discussed later in this report.

Previous to the failure, adjustments had been made to the engine fuel linkage and fuel pumps to balance cylinder loading. Improper adjustment of the linkage and fuel pumps was determined by the licensee as the cause of the overspeed. A number of discussions were held between the licensee and the NRC as to the possible involvement of the engine governor as a cause or contributor to the overspeed. After much discussion, the licensee agreed to conduct a number of tests to ensure proper operation of the governor. The tests were conducted, however, results appeared to be inconclusive.

2.3 AB Diesel Failure

On May 18 and 19, a short time after work on the CD diesel had been completed, overspeed problems were encountered on Unit 1 AB diesel. In these incidents, the overspeed trip functioned as designed and prevented engine damage. These overspeed incidents were determined to be the result of an improperly functioning governor and a replacement governor was installed in the AB diesel. After installation of the replacement governor, AB diesel would not start. Repairs were made to the replacement governor by a vendor representative and the diesel started and operated satisfactorily.

After a number of overspeed failures on Unit 1 AB diesel, the licensee determined the governor was defective; the governor was replaced and returned to the supplier for repair. The inspector was told in a subsequent telephone conversation that the vendor could find nothing wrong with the returned governor. The problem was then considered to be an improper adjustment of the installed governor. The licensee's troubleshooting and analysis apparently was not successful in determining the actual cause of the failure as an improper adjustment.

After installation of the replacement governor, the AB diesel would not start. A vendor representative from Woodward Governor was brought onsite and consulted about the matter. The problem with the replacement governor was determined to be internal to the governor. Through discussions with the Woodward representative, the inspector learned that the replacement governor was actually a governor manufactured for use with a Cooper diesel rather than for use with a Worthington diesel, which is installed at the D. C. Cook plant. The vendor representative modified the governor internally so it could be used with the Worthington diesel. A review of appropriate records and the governor established that the part number on both the governor, the purchase order and receiving records was correct for the Worthington diesel. This appeared to be a supplier problem with equipment identification. A review of part numbers on the other diesels indicated that one governor contained a part number for a Cooper diesel even though it was functioning on the Unit 1 CD diesel.

2.3.1 Job Order Review-AB Diesel

761725-perform the 18 month inspection of the 1 AB emergency diesel.

A004018-correct 1 AB emergency diesel governor linkage.

A007279-test and install the spare governor on 1 AB emergency diesel.

No problems were identified.

2.3.2 Job Order Review-CD Diesel Work

761729-perform 18 month inspection of the 1 CD emergency diesel.

A010531-perform minor repairs on 1 CD generator exciter.

A010542-perform electrical tests on the spare diesel rotor.

A010547-perform post maintenance testing on the 1 CD emergency diesel.

A review of these job orders disclosed the following problems:

° Job Order 761729

The inspector noted that rework and additional inspection, required as a result of the 1 CD diesel generator overspeed, was completed using this job order. This work was extensive and included replacement of the diesel main bearings and the generator rotor. It appeared that appropriate procedures were used in performing this work since additional procedures such as Procedure No. 12MHP5021.032.017, "Emergency Diesel Engine Main Bearing Removal, Inspection and Installation," Revision 2, were completed and included in the work package. The scope of the package had not changed, however, and control to ensure the use of proper instructions for the additional work appeared to be lacking. In reviewing PMI-2290, "Job Orders," Revision 8, the inspector noted that Paragraph 4.4.3 required that "all work performed via a job order must be within the scope of work indicated on the order form." The scope of Job Order 761729 was not revised to include the additional work. This failure to work within the scope of JO 761729 as required by Procedure PMI-2290 is considered to be a violation of 10 CFR 50, Appendix B, Criterion V (315/89020-01A).

Although the failure to revise the job order scope did not appear to impact the work in this particular instance, future incidents involving failure to revise the job order scope could result in inadequate or improper work instructions. Failure to provide this control could result in improper or incomplete work.

Also, the inspector noted that the measurement of main bearing clearance for No. 4 bearing required by Paragraph 7.2.1 of Procedure 12MHP4030.STP.046, "Emergency Diesel Generator System 18 Month Inspection," Revision 1, was recorded as .09. The acceptance criteria specified in the procedure was .007 to .014. The recorded value was more than six times the maximum allowed value. This recorded deviation was not noted by licensee personnel prior to engine start or on subsequent reviews and therefore, there was no assurance that inspection requirements were met. Based on discussions with the licensee, it appeared that the value was improperly recorded. In addition, because of the overspeed problem, the bearing was changed and new measurements were taken. These measurements were well within the specified tolerances. Due to the bearing change, no hardware problems were evident, however, it appeared that additional management attention should be provided in this area as future incidents of this type could result in significant hardware damage. This matter is unresolved pending review during a subsequent inspection (315/89020-02).

- Job Order A010547

The inspector noted that the job order had not been signed by Operations indicating the required notification prior to starting work. Although the operating logs indicated the control room operators were aware of the test when it was necessary to run the diesel, there is no evidence that Operations was notified prior to starting the required maintenance. Paragraph 4.4.2 of procedure PMI-2290 required that "when specified, individuals performing work will obtain the approval of the Unit Supervisor, the Assistant Shift Supervisor or the Shift Supervisor prior to starting work." This approval requirement was specified on Job Order A010547. Failure to obtain the required operations approvals prior to starting work as required by procedures is considered to be another example of a violation of 10 CFR 50, Appendix B, Criterion V (315/89020-01B).

3. Conclusion

Based on the results of this inspection, the inspector concluded:

- As evident above, there were several examples of failure to follow procedures. Even though these incidents did not appear to affect the involved hardware, there appeared to be a need for management emphasis and action to assure compliance with procedures.

- In both the Unit 1 AB and CD diesel overspeed problems, proper root cause was not determined. It appeared that inadequate training in diesel operation and technology were contributing factors in failure to determine root cause.

- Review of inspection and test records was weak as evidenced by the incident where a recorded measurement far exceeded the acceptance criteria but was not detected before the engine was started, or during subsequent reviews.

4. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during this inspection is identified in Paragraph 2.3.2.

5. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) on May 25, 1989, and summarized the purpose, scope and findings of the inspection. This exit was supplemented by telephone conversations on May 26 and July 7, 1989. The inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any documents or processes as proprietary.