

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-315/92020(DRP); 50-316/92020(DRP)

Docket Nos. 50-315; 50-316

License Nos. DPR-58; DPR-74

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

Facility Name: Donald C. Cook Nuclear Power Plant, Units 1 and 2

Inspection At: Donald C. Cook Site, Bridgman, MI

Inspection Conducted: October 28, 1992 through December 2, 1992

Inspectors: J. A. Isom
D. J. Hartland

Approved By: *Edward A. Schweibing*
B. L. Jorgensen, Chief
Reactor Projects Section 2A

12-11-92
Date

Inspection Summary: Inspection from October 28, 1992, through December 2, 1992. (Report Nos. 50-315/92020(DRP); 50-0316/92020(DRP))

Areas Inspected: Routine unannounced inspection by the resident inspectors of: plant operations; reactor trips; engineering and technical support; reportable events; and safety assessment/quality verification.

Results: No violations or deviations were identified.

The inspection disclosed strengths in the licensee's command and control of unit operations during Unit 2 turbine generator vibration troubleshooting evolutions. In addition, the licensee's safety evaluation and root cause determination of reportable events reviewed during this inspection was a noted strength. Lastly, the licensee's ground detection program, as demonstrated by the actions taken to identify and clear the Unit 1 AB bus ground, was also a strength.

The inspection disclosed weaknesses in the licensee's follow-up of corrective actions to the reportable events reviewed by the inspector during this period. The inspector will review the licensee's corrective action program to determine if this is a more wide spread problem.

One new inspection followup item was identified and is discussed in paragraph 5.b.

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DETAILS

1. Persons Contacted

- A. A. Blind, Plant Manager
- * K. R. Baker, Assistant Plant Manager-Production
- L. S. Gibson, Assistant Plant Manager-Projects
- * J. E. Rutkowski, Assistant Plant Manager-Technical Support
- B. A. Svensson, Executive Staff Assistant
- T. P. Beilman, Maintenance Superintendent
- P. F. Carteaux, Training Superintendent
- D. C. Loope, Radiation Protection Superintendent
- L. J. Matthias, Administrative Superintendent
- T. K. Postlewait, Design Changes Superintendent
- J. R. Sampson, Operations Superintendent
- P. G. Schoepf, Project Engineering Superintendent
- * J. S. Wiebe, Safety & Assessment Superintendent
- L. H. Vanginhoven, Site Design Superintendent
- * G. A. Weber, Plant Engineering Superintendent
- * J. T. Wojcik, Chemistry Superintendent
- M. L. Horvath, Quality Assurance Supervisor

The inspector also contacted a number of other licensee and contract employees and informally interviewed operations, maintenance, and technical personnel.

*Denotes some of the personnel attending the Management Interview on December 8, 1992.

2. Plant Operations (71707, 71710, 42700)

The inspector observed routine facility operating activities as conducted in the plant and from the main control rooms. The inspector monitored the performance of licensed Reactor Operators and Senior Reactor Operators, of Shift Technical Advisors, and of Auxiliary Equipment Operators including procedure use and adherence, records and logs, communications, and the degree of professionalism of control room activities.

The inspector reviewed the licensee's evaluation of corrective action and response to off-normal conditions. This included compliance with any reporting requirements.

The inspector noted the following with regard to the operation of Units 1 and 2 during this reporting period:

a. Unit 1 Summary of Operation:

At the beginning of the inspection period, the licensee had the unit in MODE 1, preparing to parallel it to the grid following the refueling outage that began on June 22, 1992.

At 1:05 a.m., on October 28, 1992, the licensee paralleled the unit to the grid. At 2:52 a.m. the reactor tripped from 16 percent power due to a main turbine thrust bearing trip. Details are provided in paragraph 3 of this report. The licensee returned the unit to service on October 28, 1992, and brought it to 100 percent power on November 15, 1992.

The licensee reduced unit power to 55 percent on November 20, 1992, for Unit 2 circulating water pump start-up and monitoring/clean up of zebra mussels in the intake bay. The licensee returned the unit to 100 percent power on November 23, 1992, and continued to operate the unit at full power through the remainder of the inspection period.

b. Unit 2 Summary of Operation:

At the beginning of the inspection period, the licensee had the unit in MODE 5 with the main generator rotor removed for inspection and repair at a vendor facility. After return of the rotor to the site, the licensee placed the unit in MODE 2 at 8:34 p.m. on November 21, 1992. However, the shift management determined that the mode change was in violation of the surveillance requirements for the steam generator (SG) stop valves, as specified in Technical Specification (TS) 3.7.1.5. As a result, the licensee entered TS 3.0.3 and declared an Unusual Event (UE) at 12:21 a.m. the following morning. The licensee re-entered MODE 3 and terminated the UE at 12:32 a.m. The inspector will conduct a special inspection as followup to this event, and the conclusions will be documented in a subsequent report (50-315/92022(DRP); 50-316/92022(DRP)).

After successful testing of the SG stop valves, the licensee returned the unit to MODE 2 on November 30, 1992, and was operating the unit in MODE 1 at approximately 8 percent power at the end of the inspection period while troubleshooting continued on the turbine generator vibration problems.

c. Unit 2 Reactor Head Vent Leak:

The inspector's review of the leak from the Unit 2 reactor coolant system (RCS) head vents found that the leakrate was well within the T.S. limits for unidentified leakrate of 1 gallon per minute (gpm), and that the leakrate appeared to have stabilized. Since the RCS head vent was initially found leaking during one of the containment walkdown tours, the system engineer has measured the leakrate on about a weekly basis. The last leakrate measurement on December 3, 1992, was .028 gallons per minute (110 milliliter per minute). The RCS head vent provides a vent path to remove non-condensable gas or steam from the RCS under accident conditions.

The licensee has issued a temporary modification 2-92-030 entitled "Temporary Tygon Hose on Hydrogen Vent Tail Pipe" to direct leakage into the refueling cavity. The licensee plans to monitor the leakrate from the tygon hose every two weeks. In addition, the operators are measuring the leakrate indirectly through their daily leakrate calculations.

d. Conduct of Unit 2 Turbine Generator Testing:

The inspector observed several evolutions of Unit 2 turbine generator testing conducted to identify sources of continued high vibration levels on the turbine generator. The inspector noted that the command and control exercised by the unit supervisor during the testing was good. Additionally, the inspector found that the special test procedure, "Turbine Generator Startup and Hi Vibration Testing," **02-OHP SP.101, Revision 0, August 22, 1992, used for turbine generator testing was well written.

e. Unmonitored Releases During SG Sparging

On November 6, 1992, the licensee made a four-hour NRC notification after it was determined that unmonitored releases had been made since November 1, 1992.

The licensee discovered the release flowpath during a Unit 2 SG sparging evolution when it noted that pressure in the No. 2 waste decay tank was decreasing unexpectedly. The licensee performed the sparging to ensure proper mixing of chemicals added to the secondary side of the steam generators while the generators were in wet layup. Both the gas decay tanks and the steam generators tie into a common nitrogen supply header. In the past, the generators were normally vented to atmosphere via the power operated relief valves (PORVs), which are equipped with radiation monitors and, therefore, are monitored pathways. However, at the time of the event, the PORVs were unavailable and the MSIV dump valves were used as vent paths.

The licensee determined that there were two primary causes of this event. First, the licensee determined that valve 2-N-156, nitrogen supply isolation to the No. 2 waste gas decay tank, was not properly seated and was leaking by. Second, valve 2-N-155, nitrogen supply header isolation valve to the waste gas decay tanks, was inadvertently left open when the No. 2 tank was pressurized with nitrogen a few days prior to the event. As a result, a mixture of nitrogen and radioactive gas was subsequently released to the atmosphere via the unmonitored SG vent path.

The licensee reviewed the waste gas decay tank pressure recorder charts and determined that a total duration time of 5 hours and 9 minutes of unmonitored releases had occurred. The licensee performed some conservative calculations that took no credit for nitrogen dilution and determined that the total radioactivity



released was well below regulatory limits. The inspector will evaluate licensee corrective action as follow up to the Licensee Event Report (LER) that will be issued to document the event.

No violations, deviations, unresolved, or inspection followup items were identified.

3. Reactor Trips(s) or ESF Actuation (93702)

Unit 1 Reactor Trip Due to Misaligned Turbine Thrust Bearing Wear Detector

At 2:53 a.m., on October 28, 1992, soon after the licensee paralleled Unit 1 to the grid for the first time following the refueling outage, a turbine/reactor trip from 16 percent power occurred. The trip occurred due to a misalignment of the main turbine bearing wear detector. All automatic protection systems responded as designed.

During the refueling outage, the detector was removed and reinstalled to support other work activities on the high pressure turbine. However, the job order directing the work on the turbine did not contain specific instructions to perform post installation testing on the detector. In addition, during testing of the associated trip circuitry on October 4, 1992, an I&C crew supervisor and system engineer became aware that the detector was misaligned. However, they agreed at that time that the adjustment to the detector would be performed at a later date, but prior to plant startup, during the main turbine electrohydraulic control (EHC) system lineup. No action request was generated, nor was the EHC lineup job order updated to include the instructions to adjust the detector. The EHC system lineup was later canceled because no problems had been identified with that system during the outage. As a result, the thrust detector was never adjusted prior to plant startup.

During preliminary followup, the inspector noted that a similar Unit 1 turbine trip occurred in 1986. Also, a Unit 2 reactor trip occurred in 1990 due to an erroneous actuation of a main feedwater pump thrust bearing wear trip device. The inspector will evaluate corrective actions to these events in relation to this most recent occurrence as followup to the LER issued to document this event during the next routine inspection period.

No violations, deviations, unresolved, or inspection followup items were identified.

4. Engineering and Technical Support (37828)

The inspector monitored engineering and technical support activities at the site and, on occasion, as provided to the site from the corporate office. The purpose of this monitoring was to assess the adequacy of these functions in contributing properly to other functions such as operations, maintenance, testing, training, fire protection, and configuration management.

Ground on 250 VDC System:

The inspector investigated the operability of Unit 1 250 VDC "AB" battery in a grounded condition. The inspector found that the licensee's 250 VDC system was designed to operate normally in the presence of one or more grounds, down to zero resistance, on the same polarity. This design is made possible because the 250 VDC system at the D. C. Cook plant is an ungrounded system.

The 250 VDC system is a Class 1E power system which provides a reliable source of continuous power for supply and control of plant safety systems. Included in the safety systems are the reactor trip system, engineered safety features, and auxiliary support features. The inspector found that the licensee's corporate engineering staff had already addressed the justification for operation of either unit of the D. C. Cook Nuclear Plant in the presence of 250 VDC grounds in a September 12, 1988, memorandum from B. D. Mclean to B. A. Svensson.

The inspector also found that the licensee was satisfactorily meeting the commitments resulting from a violation in an NRC DRS Inspection Report (Nos. 50-315/88016(DRS); 50-316/88-018(DRS)). The violation was issued when the licensee had failed to identify and correct a ground on the Unit 1 CD battery system for a period of eight months. In response to this violation, the licensee revised the "Location 250 VDC Grounds" procedure 2-OHP-4021.082.012 to require each shift to log ground voltage indications when a ground exists, and to require writing a Condition Report if the ground exists for more than 48 hours. The inspector verified that the operators had met their commitments.

Additionally, the inspector found that the actions to identify and clear the ground for the Unit 1 AB Bus were satisfactory. The ground was first identified on November 7, 1992, and it was cleared on November 13, 1992, when the ground was identified to be caused by the East main feedwater pump condenser vacuum low circuit. The ground was cleared by the Instrument and Control Technician who removed the alarm relay from its socket. The inspector's discussion with the licensee Project Engineer found that the engineer was knowledgeable of the plant DC electrical system and the inspector noted that his investigation into the cause for the ground was a strength.

No violations, deviations, unresolved, or inspection followup items were identified.

5. Reportable Events (92700, 92720)

The inspector reviewed the following Licensee Event Reports (LERs) by means of direct observation, discussions with licensee personnel, and review of records. The review addressed compliance to reporting requirements and, as applicable, that immediate corrective action and appropriate action to prevent recurrence had been accomplished.



a. (Closed) LER 315/91009-LL: Inoperable Fire Damper Not Properly Compensated For Due To Personnel Error

This LER is being closed based on adequate licensee safety evaluation and root cause determination. However, the inspector identified weaknesses with the licensee corrective actions, including failure to verify that required actions were completed prior to problem report close-out.

On September 27, 1991, the licensee discovered that the clip that attaches the CO2 pop-off chain to a damper located in the Unit 1 reactor cable tunnel was broken and the chain wired to the CO2 piping, rendering the fire damper inoperable for an indeterminate period of time. The purpose of the clip was to keep the damper in the open position until a CO2 actuation occurs, at which time the clip would be forced from the damper by the CO2 discharge pressure and the damper would close. With the clip wired to the CO2 piping, the damper would not have closed until the fusible link in the hold-open chain melted. The licensee's evaluation concluded that, although the suppression system was not designed to allow for a loss of CO2 through the open damper, there would have been sufficient concentration to control the fire until the fire brigade would arrive.

The licensee determined that the cause of the event was personnel error. The last documented time that the clip was verified to be properly installed was in June 1990, during performance of the 18 month inspection required by TS 4.7.10. Since that time, it appears that someone had discovered that the clip had become detached and erroneously wired it to the CO2 piping.

As long-term corrective action, the licensee required that all personnel except those primarily assigned to office duties receive training on the required actions to be taken when an inoperable fire damper is discovered, as documented in PMI 2270, "Fire Protection." The inspector noted that the corrective action did not include training on what constitutes an operable damper. In addition, during a spot check of applicable plant department training records to verify that the training was performed, the inspector discovered that operations personnel were given credit for receiving the training by completing Nuclear General Employee Training (NGET). The inspector discovered that the PMI 2270 requirements are covered during initial NGET training, but are not addressed during the required annual requalification training. Therefore, qualified operations personnel did not receive the specific training required by the LER corrective action. However, the inspector did find that the Maintenance and Plant Engineering departments had satisfactorily completed the training required by the LER. The inspector also noted that the licensee closed out the problem report package after mandating the corrective action, but prior to verifying that the actions were satisfactorily completed by the applicable departments. As part of the followup

item identified in Paragraph 5.b of this report, the inspector will review the licensee's corrective action program to determine if lack of a requirement to verify completion of required actions before closure of a problem report is evident in other problem reports or LERs in the next routine resident inspection report.

- b. (Closed) LER 50-316/91010-LL: Reactor Protection System Actuation Due to Low-Low Steam Generator Level When Steam Pressure Increased from Main Turbine Control Valve Closure.

The inspector closed this based on adequate licensee safety and root cause evaluation. However, the inspector identified weakness in the licensee's failure to implement corrective actions identified by the root cause evaluation.

On November 15, 1991, Unit 2 reactor tripped as a result of low-low steam generator water level (SGWL) in steam generator (SG) No. 21. The low-low SGWL was caused by SGWL shrink phenomenon when all high and low pressure turbine control valves shut to the turbine generator. The control valves went shut when an Instrumentation and Controls (I&C) technician inadvertently depressurized the turbine hydraulic oil system when an isolation valve could not be fully shut to isolate a section of the turbine hydraulic oil system which was to be vented. In its investigation into the trip, the licensee found that the isolation valve could not be fully shut because the valve had worn threads on the stem.

The licensee made repairs to the isolation valve and committed to review the work control process to identify any enhancements that can be added to reduce the probability of an unplanned actuation occurring from similar activities in the future.

The inspector reviewed the licensee's investigation which was conducted to determine whether similar events had occurred in the past and to determine whether any enhancement to the work control process was warranted. The inspector noted that the investigation concluded that improvement in the work control process in the Instrumentation and Control (I&C) area warranted further review. However, the inspector's discussion with the Maintenance Department personnel could not verify whether improvements in the work control process were implemented or, if not implemented, the reasons for not implementing the improvements. The licensee's decision on whether to implement the work control process improvements for the I&C area or the basis for not implementing these improvements identified in the investigation will be reviewed by the inspector as an inspection followup item (Item 50-315/92020-01; 50-316/92020-01).

No violations, deviations, or unresolved items were identified. One inspection followup item was identified.

6. Safety Assessment/Quality Verification (37701, 38702, 40704, 92720)

The effectiveness of management controls, verification, and oversight activities, in the conduct of jobs observed during this inspection, was evaluated. The inspector reviewed the following safety review conducted by the licensee:

PNSRC Review and Investigation into Unit 2 Turbine Trip:

The inspector noted during review of LER 50-316/91010, "Reactor Protection System Actuation Due To Low-Low Steam Generator Level When Steam Pressure Increased from Main Turbine Control Valve Closure," that the review conducted by the Plant Nuclear Safety Review Committee (PNSRC) for the problem report written for this turbine trip was a strength. The Chairman of the PNSRC had expressed a concern that this event appeared similar to previous unit trips and system disturbances where an appropriate level of action was not taken to identify and protect against possible problems. The PNSRC committee concurred that a possible trend existed and decided that a study should be performed to determine if measures could be taken in the job planning process to prevent future events from occurring. A commitment was made to complete the study and implement enhancements by March 30, 1992.

The inspector's review of the licensee's investigation found that the investigation was thorough and well done. The investigation concluded that improvement in the work control process in the Instrumentation and Control (I&C) area warranted further review. The licensee's decision on whether to implement the work control process for the I&C area and if not, the basis for not implementing these improvements is an inspection followup item discussed in paragraph 5.b of this report. The investigation concluded:

- * : Review of trend indications shows a rate decrease in overall events has occurred, apparently due to the reduction of non-major/potential and non-Instrumentation and Control (I&C) related events.
- * Events related to equipment factors have remained relatively constant.
- * Previous preventive actions have served to reduce the total number of incidents, but the reductions are primarily in non-major events, not related to I&C and not involving equipment response factors.

Additionally, the study concluded that preventive actions taken for major/I&C/equipment events were primarily changes in design or activities related to the specific type of equipment and problem involved. While this measure improves the chances that the specific event does not recur for that particular equipment problem, it cannot

identify the numerous assorted problems that may occur during various work activities that develop in the future. Also, the reviewer concluded that when effective preventive actions were taken in the non-major/non-I&C/non-equipment related categories, frequencies of these events decreased. In these areas, the reviewer found that review of work standards, identification of weak areas, development of sound requirements, and documentation and training of those requirements were performed.

No violations, deviations, unresolved, or inspection followup items were identified.

7. Inspection Followup Items

Inspection followup items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. An inspection followup item disclosed during the inspection is discussed in paragraph 5.b.

8. Management Interview

The inspector met with licensee representatives denoted in paragraph 1 on December 8, 1992, to discuss the scope and findings of the inspection. In addition, the inspector also 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 such documents or processes as proprietary.