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AEP
INDIANA
MICHIGAN
POWER

March 16, 2001

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Operating Licenses DPR-58 and DPR-74
Docket Nos. 50-315 and 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

LER 316/2001-001-00: "Plant Shutdown Due to Control Rod Bank Misalignment"

No commitments are identified in this submittal.

Should you have any questions regarding this correspondence, please contact Mr. Ronald W. Gaston, Manager, Regulatory Affairs, at 616/465-5901, extension 1366.

Sincerely,

Joseph E. Pollock
Plant Manager

/inj
Attachment

c: J. E. Dyer, Region III
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NRC Form 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

# LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001



| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Donald C. Cook Nuclear Plant Unit 2 | 05000-316 | 1 of 3 |

TITLE (4)

Plant Shutdown Due to Control Rod Shutdown Bank Misalignment

| EVENT DATE (5) | | | LER NUMBER (6) | | | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | | | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 01 | 23 | 2001 | 2001 | -- | 001 | -- | 00 | 03 | 16 | 2001 | FACILITY NAME | DOCKET NUMBER |

| OPERATING MODE (9) | 1 | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) | | | | | |
|---|---|---|---|---|---|---|---|
| POWER LEVEL (10) | 25 | 20.2201 (b) | 20.2203(a)(2)(v) | X | 50.73(a)(2)(i) | | 50.73(a)(2)(viii) |
| | | 20.2203(a)(1) | 20.2203(a)(3)(i) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(x) |
| | | 20.2203(a)(2)(i) | 20.2203(a)(3)(ii) | | 50.73(a)(2)(iii) | | 73.71 |
| | | 20.2203(a)(2)(ii) | 20.2203(a)(4) | | 50.73(a)(2)(iv) | | OTHER |
| | | 20.2203(a)(2)(iii) | 50.36(c)(1) | | 50.73(a)(2)(v) | | Specify in Abstract below or in NRC Form 366A |
| | | 20.2203(a)(2)(iv) | 50.36(c)(2) | | 50.73(a)(2)(vii) | | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| I. N. Jackiw, Compliance Engineer | (616) 465-5901, x 1602 |

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| | | | | | | | | | | |

| SUPPLEMENTAL REPORT EXPECTED (14) | | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|---|
| | YES (If Yes, complete EXPECTED SUBMISSION DATE). | X NO | | | | |

**Abstract** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 23, 2001, while troubleshooting the rod control system for shutdown bank "C" for failing to move on demand during testing, shutdown bank "D" as inserted eight steps. During the subsequent withdrawal action, the demand counter moved out eight steps but the rod position indication did not show movement. Technical Specification (T.S.) 3.1.3.5, states that all shutdown rods shall be limited in physical insertion as specified in the Core Operating Limits Report (COLR). The action statement of this T.S. allows for a maximum of one shutdown rod inserted beyond the insertion limit specified in the COLR. The insertion limit specified in the COLR for shutdown bank "D" is the the fully withdrawn position. When shutdown bank "D"' withdawal attempt failed and with all four shutdown bank 'D' rods beyond the COLR insertion limit, T.S. 3.1.3.5 could not be met and T.S. 3.0.3 was entered. T.S. 3.0.3 requires that, within one hour, actions shall be initiated to place the unit in Hot Standby within the next 6 hours. This LER is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(A), for completion of a plant shutdown required by the Technical Specifications.

The required unit shutdown was initiated on Janurary 23, 2001 at 0619 hours and T. S. 3.0.3 was exited at 1102 hours when the unit entered mode 3. Troubleshooting activities revealed that a terminal connection in the shutdown "CD" power cabinet was loose. This connection is in the signal path that would have prevented the generation of a full current signal to the rod lift coil, thus preventing demanded rod motion. The apparent cause for this event was determined to be an inadequate cleaning and inspection program that failed to ensure proper tightening of terminal connections. It was concluded that while the loose connection prevented positioning of shutdown bank "D", this condition would not have prevented the rods from inserting into the core in the event of a reactor trip thus, the shutdown margin was not affected. As such, there was minimal safety significance as a result of this event. Immediate corrective actions were implemented to inspect terminal board connections in all rod control cabinets in Unit 2. In addition, actions are being formulated to address the problems associated with loose electrical connections in the rod control system.

| FACILITY NAME (1) | DOCKET NUMBER(2) | LER NUMBER (6) | | | | | PAGE (3) |
|---|---|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | | | REVISION NUMBER | |
| Donald C. Cook Nuclear Plant Unit 2 | 05000-316 | 2001 | -- | 001 | -- | 00 | 2 of 3 |

TEXT *(If more space is required, use additional copies of NRC Form (366A)* **(17)**

**Conditions Prior to Event**

Unit 2 was in Mode 1 at 25% power.

**Description of Event**

On January 22, 2001 at 1948 hours, with the reactor at approximately 25% power, maintenance personnel began troubleshooting the control system for shutdown bank "C and D". This troubleshooting was initiated in response to a failure of shutdown bank "C" to respond to a demand for movement during performance of surveillance testing required by Technical Specification (T.S.) 4.1.3.1.2. As part of this troubleshooting activity, on January 23, 2001, shutdown bank "D" was inserted eight steps from fully withdrawn. Individual rod motion was observed on the Individual Rod Position Indications (IRPI) during insertion but not during the subsequent withdrawal attempt. Operations personnel then attempted to withdraw shutdown bank "D", four steps in one step increments, but were unsuccessful. There was no change observed in the IRPIs, confirming that shutdown bank 'D' had not moved.

Technical Specification 3.1.3.5 states that all shutdown rods shall be limited in physical insertion as specified in the Core Operating Limits Report (COLR) except for surveillance testing. The action statement of this T.S. allows for a maximum of one shutdown rod inserted beyond the insertion limit specified in the COLR. The insertion limit specified in the COLR for shutdown bank "D" is the fully withdrawn position. When the shutdown bank "D" withdrawal attempt failed and with all four shutdown bank "D" rods beyond the COLR insertion limit, T.S. 3.1.3.5 could not be met and T.S. 3.0.3 was entered. T.S. 3.0.3 requires that, within one hour, actions shall be initiated to place the unit in Hot Standby within the next 6 hours. Accordingly, a unit shutdown was commenced at 0619 hours, and was completed when the unit reached mode 3 at 1102.

In accordance with 10 CFR 50.72(b)(2)(i), a 4-hour ENS notification was made to the NRC at 0900 hours on January 23, 2001 as a condition that requires a plant shutdown. This LER is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(A), for completion of a plant shutdown required by the Technical Specifications.

**Cause of Event**

Following plant shutdown, further troubleshooting revealed that the terminal connection in the shutdown "CD" power cabinet was approximately two turns loose. This connection is in the signal path for the lift coil signal to the shutdown "CD" lift circuit firing card. A loss of continuity in this signal path prevented the generation of full current to the lift coil, thus preventing rod withdrawal.

The apparent cause for this event was determined to be an inadequate cleaning and inspection program that failed to ensure proper tightening of the terminal connection. The existing program was inadequate in that the Recurring Task Job Order for the program required only a visual inspection of wiring terminations in the control rod drive system cabinets. This method of inspection did not verify adequate tightness of the wiring terminations.

**Analysis of Event**

It was concluded that the loose connection affected the withdrawal of shutdown bank "D". During the troubleshooting activities, shutdown bank "D" was inserted eight steps and did not exhibit any indication of mechanical interference. The event would not have impacted the ability of shutdown bank "D" rods from inserting into the core in the event of a reactor trip thus, the shutdown margin was not affected. The insertion of shutdown bank "D" eight steps is within the practice of normal surveillance procedures. These surveillance procedures have had the appropriate reviews to show that there was minimal impact on the safety and accident analyses. There is significant design margin at 25% reactor power to the

| FACILITY NAME (1) | DOCKET NUMBER(2) | LER NUMBER (6) | | | | | PAGE (3) |
|---|---|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | | | REVISION NUMBER | |
| Donald C. Cook Nuclear Plant Unit 2 | 05000-316 | 2001 | -- | 001 | -- | 00 | 3 of 3 |

TEXT *(If more space is required, use additional copies of NRC Form (366A)* **(17)**

license and safety limits, which would not be compromised by this event. As such, there was minimal safety significance associated with this event.

**Corrective Actions**

Immediate corrective actions that were taken included tightening the loose connection and initiating an inspection of all terminal board connections in all Unit 2 rod control cabinets. This inspection required technicians to physically touch each wire rather than perform the inspection visually. During this inspection, six additional loose terminal board connections were discovered in the rod control cabinets. All the identified loose connections were tightened in accordance with appropriate work instructions. The Unit 1 rod control cabinet terminal connections were physically inspected during a unit shutdown that occurred on February 15, 2001. Loose connections were identified and tightened.

Actions are being formulated to address the problems associated with loose electrical connections in the rod control system.

**Previous Similar Events**

None