U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/87025(DRS)

Docket No. 50-341

Licensee: Detroit Edison Company 2000 Second Avenue Detroit, MI 48224

Facility Name: Enrico Fermi Nuclear Power Plant, Unit 2

Inspection At: Enrico Fermi 2 Site, Monroe, Michigan

Inspection Conducted: June 15-30, 1987

Inspectors: Zelig Falevits

for Zelig John Desiree R. Calhoun

Rowall Sard Approved By: Ronald N. Gardner, Chief

Plant Systems Section

License No. NPF-43

 $\frac{7/20/87}{Date}$ $\frac{7/20/87}{Date}$

7/21/87 Date

Inspection Summary

Inspection on June 15-30, 1987 (Report No. 50-341/87025(DRS)) Areas Inspected: Special safety inspection of licensee action on previous inspection findings, Licensee Event Report followup, review of ECCS room cooler motor adaptor failures, review of RHR pump motor termination box mounting failures, and training. (92705, 92701, 92702, 41400) Results: Of the five areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

Detroit Edison Company

*B. R. Sylvia, Group Vice President, Nuclear Engineering *F. E. Agosti, Vice President, Muclear Operations *W. S. Orser, Vice President, Nuclear Engineering *R. S. Lenart, Plant Manager, Nuclear Production *J. D. Leman, Director, Plant Safety *G. M. Trahey, Director, Quality Assurance *L. Bregni, Licensing Engineer *S. Cashell, Licensing Engineer *B. G. Catanses, Maintenance Engineer *J. F. Maliric, General Supervisor, Maintenance *C. R. Gelletly, General Supervisor, Nuclear Engineering *J. Rotondo, Supervisor, Maintenance Support *J. R. Green, Supervisor, Systems Engineering *P. Fessler, Supervisor, Planning and Scheduling *J. Contoni, Lead Engineer, Nuclear Engineering *J. P. Thorpe, Systems Engineer, Nuclear Systems *V. P. Zoma, Electrical Work Leader

L. K. Comstock

*S. Williams, Engineer, P&PE Electrical

USNRC

*W. Rogers, Senior Resident Inspector *C. Lewis, Co-Op

*Denotes those attending the exit meeting on June 18, 1987.

The inspectors also contacted other licensee and contractor personnel during the course of this inspection.

Licensee Action on Previously Identified Inspection Findings

- a. (Closed) Unresolved Item (341/84021-07(DRP)): This item concerned missing or improper labeling of electrical equipment. The inspectors reviewed the licensee's completed corrective actions relative to this issue and conducted a visual field inspection of a representative sample of electrical equipment. The following components were reviewed:
 - 4.16KV Switchgear R1400-S001C, Bus 64C
 - 480V Motor Control Center R1600-S002A, 72B-2A

- 480V Switchgear R1400-S036, Bus 72EA
- Switchgear Room DC Distribution Cabinet R1600-S065, 2PB2-15

The latest revisions of the following pertinent drawings were used:

- Single Line Drawing 6SD721-2500-3, Revision "L"
- Front Elevation Drawing 5SD721-2512-20, Revision "T"
- One Line Diagram 6SD721-2530-11, Revision "T"
- One Line Diagram 6SD721-2510-5, Revision "L"

One discrepancy between the field label designation and the drawing was noted on Distribution Cabinet 2PB2-15, Position 8. This discrepancy had been previously documented in Inspection Report No. 341/86038 as an Unresolved Item. Subsequent to this field inspection, the licensee took prompt corrective action to resolve the noted discrepancy. Drawing 6SD721-2530-1, Revision "V" was issued on June 19, 1987 to correct this error. This item is considered closed.

- b. (Closed) Unresolved Item (341/86038-01(DRS)): This item pertained to the licensee's failure to incorporate Engineering Change Requests (ECRs) into the latest design drawings. During this inspection the license indicated that as part of the corrective action a comprehensive review of ECRs was completed by Stone and Webster Engineers. Results indicated that out of 400 ECRs written against 850 drawings, 46 were identified as discrepant affecting 66 drawings. The licensee informed the inspectors that all discrepant ECRs would be corrected and incorporated into the drawings by July 15, 1987. This item is considered closed.
- c. (Open) Unresolved Item (341/87014-02(DRP)): This item concerned licensee failure to perform an adequate seismic and structural evaluation on originally installed termination box to motor adapters on ECCS room cooler motors. These adapters failed structurally. During the review of this issue additional concerns have been raised. For more details see Paragraph 4.
- d. (Closed) Violation (341/85010-01(DRP)): This item identified labeling deficiencies. The inspectors reviewed the licensee's corrective action and conducted a visual field inspection (see Item 2a). No nonconforming conditions were identified. This item is considered closed.
- e. (Closed) Unresolved Item (341/86026-07(DRP)): This item concerned failures of Rosemount Flow Transmitters. The inspectors examined the licensee's corrective and preventive actions taken to address this issue. The licensee imposed administrative controls on operations personnel requiring a check of all Rosemount trip units once per shift. During this inspection the licensee presented the inspectors with a failure analysis conducted by Rosemount which indicated that electrically conductive particles found in the transmitter cells could have shorted the capacitor plates to the

sensing diaphragm causing the transmitters to fail. An NRC inspection conducted by the Vendor Branch at the Rosemount plant identified (Inspection Report No. 99900271/8701) that the transmitter failures were also due to the accumulation of dirt in the sensing lines at the orifice on the valves upstream of the transmitters. The inspectors discussed this issue with the Vendor Branch inspector in NRR. No safety concerns were identified. This item is considered closed.

3. Licensee Event Report Followup

Through direct observations, discussions with licensee personnel, and review of records, the following event report was reviewed to determine whether immediate corrective action and corrective action to prevent recurrence had been accomplished in accordance with technical specifications.

(Closed) LER-86026 Revision 1, MCC Fire and Potential Loss of HPCI System.

In addition to the review criteria stated above, the LER was reviewed for potential violations of regulatory requirements. The results of that review identified a violation of 10 CFR 50, Appendix B (341/86028-01(DRS)). The inspector reviewed licensee corrective actions and actions to prevent recurrence and found them acceptable. No other violations or deviations were identified in this area.

4. Review of ECCS Room Cooler Motor Adapter Failures

- a. On March 13, 1987, during an inspection conducted by the licensee subsequent to the discovery of a broken adapter which caused a cooling unit motor to become separated from its termination box, the licensee noted that 11 adapters (Reliance P/N 607983-1A) on safety-related reactor building cooling unit fan motors had developed cracks or had failed. The adaptors were made of a semi-flexible rubber type material and were used to provide support and structural integrity between the motor housing and the termination box. Licensee investigation determined that the failure of the adapters was caused by motor vibration, overtightening of the mounting bolts, and the weight of the component it supported.
 - (1) The inspectors conducted a document review and visual field inspection of the motor termination boxes. The document review indicated that Field Modification Request FMR S-4034, dated May 1, 1982, was issued to replace the vendor supplied motor termination boxes for safety-related motors that required Raychem heat shrink insulation to be installed over the motor power terminations. The original supplied termination boxes were contoured while the replacement boxes were flat. The installed replacement boxes produced a gap at the mounting surface. Vendor supplied adapters made of a rubber brittle

material were used in this gap. Subsequently, these adapters cracked/failed leaving the motor termination boxes inadequately supported.

(2) On April 13, 1987, the licensee replaced the existing rubber adapters with newly designed and fabricated aluminum adapters (EDP-7278). The inspectors conducted a visual field inspection of the newly installed aluminum adapters. During this inspection, the inspectors noted that four of the 12 motor termination boxes were not rigidly attached to the motors (loose). The inspectors noted that the torque value specified by the licensee for the box mounting bolts was given as 15 inch 1bs. The inspectors questioned the basis and adequacy of this value. The licensee indicated that a design review would be conducted to address the inspectors concerns.

During the field inspection the inspectors noted that the "SGTS North Room ESS Cooling Unit T4160B016" contained a rubber like gasket adapter and the termination box was observed not to be rigidly attached to the Westinghouse motor. The inspectors informed the licensee of their concern relative to this deficiency which was observed on a motor supplied by a vendor other than Reliance. The licensee informed the inspectors that a review and inspection of all applicable safety-related motors would be conducted promptly to determine the rigidity of the motor junction boxes.

- (3) The inspectors informed the licensee of the following concerns pertaining to the review of the Reliance supplied motor adapters:
 - It appears that the original adapters had not received the required design review and approval.
 - Manufacturer certification or qualification records for the adapters were not available for review during this inspection.
 - The required torque values for the bolts attaching the termination box to the motor were not specified during the original installation.
 - 10 CFR Part 21 applicability was not addressed.

At the conclusion of the inspection the licensee promptly developed a plan to address the inspectors concerns. This item was previously identified as an unresolved item (341/87014-02(DRP)) in inspection report 50-341/87014. This item remains open pending further NRC review.

5. Review of RHR Pump Motor Termination Box Mounting Failures

a. On May 25, 1987, the licensee noted, during preventative maintenance activities, that the mounting bolts for the termination box for RHR "B" pump were sheared (specifically, four mounting bolts and two alignment bolts). The termination box was supported by only two alignment bolts (the termination box weighs 480 lbs.).

Deviation Event Report DER-87-184, dated May 26, 1987, describes the root cause of this failure as vibration induced fatigue of the bolts and welds, and over-torquing due to improper assembly. Licensee recommendations to resolve this problem included the use of a larger diameter bolt (1") at a torque value of 580 ft-1bs. Subsequently, Engineering Design Package EDP-7440, Revision 0, was issued to replace the bolts and torque the box to 290 ft-1bs. (WR-003A-052587). The licensee performed Design Calculation DC-0367, Revision 0, to investigate the failure mode and establish the adequacy of the corrective action implemented per EDP-7440. The calculation analysis contained a "best estimate" of the mounting bolts stresses "that is significantly affected by assumptions."

On June 10, 1987, Revision A of EDP-7440 was issued to change the mounting bolts for RHR Pumps A, B, C, and D from SAE GR5 to SAE GR7; to add carbon steel spacers in lieu of the rubber gaskets; to specify minimum installation torque values for all mounting bolts and change the torque value for the RHR "B" termination box mounting bolts to 600 ft-lbs.

At the conclusion of this inspection the licensee indicated that the torque value for the RHR "B" pump termination box mounting bolts would be changed again to approximately 150 ft-lbs.

The inspectors questioned the basis for changing the required torque value from 290 ft-lbs. to 600 ft-lbs. and finally to 150 ft-lbs. The inspectors requested that a copy of the latest torque design calculation be forwarded to the NRC for examination. The licensee acknowledged this request.

On June 9, 1987, while performing routine preventative maintenance, the licensee noted that three of the four motor junction box mounting bolts for RHR Pump A motor were broken. The motor junction box was held in place with only one bolt. Licensee investigation determined the failure mechanism to be bolts loosening and then failing due to fatigue. Licensee subsequent inspection of RHR Pump C found the four bolts holding the junction box to the motor to be finger tight.

DER-87-207 was subsequently issued to replace the bolts and torque them to 73 ft-lbs. and review the specific RHR motor design of the box attachments and of all ESF motors for potential premature failures. The inspectors reviewed the applicable documents, conducted interviews with licensee personnel, and performed a visual field inspection of the RHR, LPCS, and RHR Service Water (SW) pumps. The review indicated that specific torque values for the RHR and the LPCS pump termination box mounting bolts were not established, nor were the existing ones consistent. As a result of the mounting box failures, the licensee contacted G.E. and established a torquing value of 73 ft-lbs. for RHR A, C, and D pump box mounting bolts. The licensee also inspected the LPCS pump boxes and determined them to be rigidly mounted.

During the inspection of the RHR SW pumps located in the RHR complex. the inspectors noted that the RHR Diesel Generator SW Pump COO8 junction box was not rigidly attached to its motor. The inspectors informed the licensee that additional inspections were necessary to assess the condition of the motor junction box installations at Fermi. As a result of the junction box mounting failures and the additional deficiencies noted during this inspection, the licensee adopted an action plan to generically resolve this issue. On June 18, 1987, the licensee conducted a walkdown of all accessible large vertical motors and all small motors to verify the rigidity of the termination box mounting. The walkdown identified that altogether 17 motor termination boxes required immediate corrective action. In a June 30, 1987 telephone conversation between the licensee and the inspector, the licensee stated that the short term corrective action to correct the noted deficiencies would be completed by July 7, 1987; that the long term corrective action will include furnishing torque values for the remaining QA-I motors, and scheduling the work according to plant availability. In addition, the new torque values will be incorporated into the applicable maintenance procedures. This issue is considered unresolved pending licensee corrective action and NRC review (341/87025-01(DRS)).

b. During this inspection the inspectors noted that the temperature in the Division 2 Switchgear Room was 97°F while the setpoint on the thermostat was 86°F. This was due to an out of service air conditioning unit. The licensee in a letter dated June 18, 1987, stated that the cooling for each Switchgear Room is provided by two (2) 50 percent safety-related fan coil units and two (2) 50 percent nonsafety-related air conditioning units and that the design maximum temperature is 104°F. However, to provide satisfactory transformer life, the nonsafety-related A/C units were added to maintain a maximum continuous temperature of 86°F; the letter further stated that short term temperature excursions above 86°F (but less than 104°F) will have negligible affect on transformer life.

The licensee informed the inspectors that the air conditioning unit would be repaired and returned to service promptly.

No violations or deviations were identified.

6. Training

The effectiveness of the licensee training program was reviewed by the inspectors during the course of the inspection through discussions with licensee personnel and by the review of related documentation.

No violations or deviations were identified.

7. Unresolved Item

An Unresolved Item is a matter about which more information is required in order to ascertain whether it is an acceptable item, an Open Item, a deviation, or a violation. Unresolved Items identified during this inspection are discussed in Paragraph 5.a.

8. Exit Interview

The Region III inspectors met with licensee representatives (denoted under Paragraph 1) at the conclusion of the inspection on June 18, 1987. In addition, a final exit meeting was conducted telephonically on June 30, 1987. The inspectors summarized the purpose and findings of the inspection. The licensee acknowledged this information. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/processes as proprietary.