

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/85028(DRS)

Docket No. 50-341

License No. NPF-33

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, MI

Inspection Conducted: May 21-24, 1985

Inspectors: Z. Falevits *C. C. Williams for*

6/21/85  
Date

R. Mendez *C. C. Williams for*

6/21/85  
Date

Approved By: *C. C. Williams*  
C. C. Williams, Chief  
Plant Systems Section

6/21/85  
Date

Inspection Summary

Inspection on May 21-24, 1985 (Report No. 341/85028(DRS))

Areas Inspected: Routine, announced inspection of licensee action on previous inspection findings and review of licensee as-built program and independent inspection. The inspection involved a total of 58 inspector-hours onsite by two NRC inspectors including 12 inspector-hours onsite during off shifts.

Results: Of the areas inspected, no violations or deviations were identified.

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## DETAILS

### 1. Persons Contacted

#### Detroit Edison Company

F. Agosti, Manager Nuclear Operations  
W. F. Colbert, Director Nuclear Engineering  
G. M. Trahey, Director NQA  
K. Earle, Supervisor Licensing  
L. Bregni, Licensing Engineer  
G. K. Sharma, Supervising Engineer  
S. P. Zoma, Principle Resident Engineer  
B. E. Wiekman, Supervisor M&M QA  
B. Szkotnicki, Equipment Performance Engineer  
E. Lusic, Consultant  
G. Preston, Operations Engineer  
W. M. Delaney, Nuclear Operations Engineer  
D. Alexander, Engineering Work Leader  
L. B. Collins, Systems Engineer  
L. A. Beyon, Electrical Workleader  
T. M. McKelvey, Electrical Workleader  
L. F. Wooden, System Engineer  
R. C. Anderson, System Engineer  
C. Morrison, I&C Engineer  
L. G. Ferguson, I&C Resident Engineer

Those identified above attended the exit meeting on May 24, 1984. In addition to the above persons, other licensee and contractor personnel were contacted during this inspection.

### 2. Licensee Action On Previous Inspection Findings

- a. (Closed) Open Item (341/85022-01(DRS)): This item identified C&IO engineering data sheet discrepancies and hardware deficiencies which have subsequently been addressed by the licensee as follows:
  - (1) Black, white and red conductors of cable 255856-2K terminated at thermocouple T41-TE-N138B, were found to be in agreement with lifted lead log dated April 23, 1984, but in disagreement with design drawings and the latest test data sheets. Discussions with the licensee indicated that the wires were lifted during implementation of PN-21 No. 55440, and erroneously interchanged during the retermination process. This appears to be an isolated case. Design drawings are being revised to agree with field installation, (Reference DER-005 and ABN 26091).
  - (2) Engineering data sheet ES006 which is being utilized by the C&IO test engineer to depict the configuration of the loop circuitry as it is being tested is optional and not a procedural requirement. The inspector indicated to the

licensee that since there is no present requirement to make sure that C&IO test engineers ensure that the latest loop schematic is yellow lined and checked to agree with test performed, the incorporation of data sheet ES006 into the procedure would be beneficial, reducing such errors in the future. The licensee indicated that they will consider this matter.

- (3) RTD instrument data sheets for instruments T46-N046A and T46-N046B indicated that the dual element RTD was tested in the field, but only a single element was found by the inspector to be installed. The licensee indicated that this appears to be a paperwork problem where the test engineer erroneously entered the wrong entry. This appeared to be an isolated case. Corrective action was taken that was adequate to correct this single occurrence.
  - (4) Panel H21-P534 contained a heat shrink application on the white conductor of cable 255814-1K. The licensee could not produce the applicable documentation indicating an approved repair and the required QC inspection for this heat shrink application. This appeared to be an isolated case. Since records could not be located, the licensee has committed to performing an insulation and continuity test on this conductor to assure its integrity.
  - (5) The main fuse in panel H21-P534 was observed to be inserted into the fuse holder clips on one side, while the other side of the fuse was observed to be just touching the fuse holder. Review of other selected panels did not disclose additional discrepancies of this kind.
  - (6) Division I and II cables were observed to enter the same local control rack on panels H21-P018 and H21-P021 without the benefit of isolation or barriers. This matter was further reviewed by the inspector and is documented in detail in Paragraph 3 of this report.
- b. (Open) Unresolved Item (341/85009-01(DRS)): During previous inspections the NRC inspector identified three examples in the HPCI system logic circuitry where non-1E Balance Of Plant (BOP) cables are electrically interfaced with divisional cables in safety and non-safety related circuits. Subsequently, at the request of the NRC inspector, the licensee performed an engineering evaluation whereby approximately 60 typical physical interfaces between BOP and 1E electrical cables in the circuitry were identified. The licensee performed an engineering analysis to justify the identified interfaces. The inspector reviewed the analysis and could not concur in many instances with licensee's method of analysis, justifications and conclusions.

During this inspection the inspector discussed this matter with the licensee's engineering and managerial staff. The inspector informed the licensee that their analysis was inadequate in that it did not comprehensively cover all possible interfaces and was not conclusive in its resolution. The licensee presented the inspector with FSAR

data to justify the BOP and divisional interfaces. Included in this data was a response to a Regulatory Guide 1.75 question from NRR relating to the FSAR that stated "...a complete study of Class 1E circuits and their interaction with all other circuits has proved that sufficient isolation and physical separation exists in Fermi 2 design to ensure safe operation." At the conclusion of this inspection the licensee had not located this study.

The licensee indicated that a more comprehensive analysis regarding the BOP and divisional interfaces will be performed. This analysis is scheduled to be completed and submitted to NRC RIII by the first week of June 1985. This analysis will include the total number of interfaces identified and will also arrange these interfaces in categories of typical interfacing circuits. Pending review and evaluation of this analysis by the NRC this item remains unresolved.

- c. (Closed) Unresolved Item (341/85016-02(DRS)): It was previously identified that Division I and Division II redundant cables associated with the Core Spray System were bundled together. The licensee's position was that the configuration was not in conflict with divisional separation and was acceptable based on the flexible conduit which covered cabled 220082-2C and 234409-2C (both Division II cables) as far as practically achievable inside the Division I core spray panel. The inspector had however, observed that the flexible conduit was cut away to allow cable 220082-2C to be connected at termination points A35, A36 and A37 while cable 220082-1C (Division I) is terminated at adjacent points A38, A39, A40 and A41. The conductors of these two cables are connected to portions of circuitry in the drywell high pressure and reactor level logic. Loss of the two cables would affect redundancy since the connections and circuitry perform the same redundant function. It was determined during subsequent reviews of the applicable drawings by the inspector that although, the present installation is not ideal, sufficient redundancy exists to perform actuation of the safety functions.

### 3. Independent Design Review of Separation Criteria Applications

- a. As indicated in Paragraph 2.b.(c) above, the inspector observed that Division I and Division II cables were entering the same local control rack on panels H21-P018 and H21-P021 without barriers or isolation. Further review by the licensee and the inspector indicated that the cables in question (Nos. 234651-1C, 234696-1C, 234751-2C and 234759-2C) have been downgraded to QA level II (BOP) cables. These cables are utilized in the RHR system for (sampling) valves E11-F079A and B and E11-F08A and B. A review of General Electric Master Parts List (MPL) dated May 21, 1980, indicated that these valves are classified as "A" (Active) valves, "...whose active performance is important to safety. In providing its safety function this item is active as it usually undergoes or causes a change of state; i.e., pump running, valves opening or closing."

Based on the foregoing the licensee was asked to clarify or verify the following concerns identified by the inspector:

- (1) Are the subject RHR valves correctly classified as QA-level-1 (safety-related)?
- (2) Are the subject RHR valves correctly classified as "Active" components in accordance with the GE MPL?
- (3) Was it appropriate to downgrade the divisional (safety-related) cables to these valves to QA Level II (BOP) cables?
- (4) If the response to (3) above is that this downgrading is acceptable, were the design requirements verified to have been met regarding the balance of plant (QA-level-II) cables installed in safety-related raceways from relay panels H11-P622 and H11-P623 to Division I and Division II redundant panels H21-P018 and H21-P021? This installation as observed by the inspector appears to result in an electrical connection between the redundant Divisions.

This is considered to be an unresolved item pending licensee action and NRC review (341/85028-01(DRS)).

#### 4. Review of Licensee As-Built Program

- a. The inspector reviewed the disposition of the "B" software items which are defined as items which require revisions to the design drawings to make them conform to the as-built configuration in the field. Five "B" software items were reviewed by the inspector. The result of the review are outlined below:
  - (1) DER 85-168, item 5 - This item identified incorrect terminal numbers at transformer T5B-3T as compared with connection diagram 6I721-2104-4. Revision "F" of this drawing incorporates this change and resolves this item.
  - (2) DER-85-169, item 5 - This item identified location of terminal blocks in MG set control panel that was in conflict with design drawing 6I721-2104-3. Revision "F" of this drawing incorporates the correct configuration and resolves this item.
  - (3) DER 85-153, item 1 - This item identified discrepancies between + and - of device G51-K404A and the 0 and + terminations as represented on drawing 4I721-2317-4. As-Built Notice (ABN) 2709-1 will incorporate this change into the drawing. The ABN was not posted against the drawing. Additional cases were also identified by the inspectors wherein the DER identified an ABN resolving the item; however, the applicable drawing does not have the ABN posted against it. It is expected that as the licensee's corrective action process is completed, drawings will have ABNs correctly posted against them.

- (4) DER-168, item 2 and DER-169, item 2 - These items identified a separation requirement originally noted on the internal wiring of connection diagrams 6I721-2104-3 and 4. The drawing note required that all internal wiring to the redundant divisional trip coils of the Anticipated Transient Without Scram (ATWS) mitigation system of the Recirculation Pump Trip (RPT) circuitry, be run in flexible conduit all the way to the final element; e.g., the field breaker assembly, since it is the final device whose failure can compromise the trip function. Drawings 6I721-2104-3 and 4 depict the internal and external wiring to the redundant trip coils and the electrical separation requirement for the RPT circuitry. These drawings also require that the electrical system be wired completely separate from the Reactor Protection System, from the sensor to the final element, which is the field breaker assembly. These breaker assemblies contain redundant trip coils to enhance the reliability of the trip function. The trip coils are to be electrically separated (including all internal wiring to the coil) from the redundant division in each assembly. This was not accomplished by the licensee during the original design of this system and was subsequently identified as a deficient item during the as-built walkdown program. The licensee's initial proposed corrective action to this item (classified as "B" software) was to rework the terminals of the breaker assembly to install internal flex conduit as required by the design drawing. Subsequently, a DECo field engineer changed the proposed corrective action to "use-as-is, remove note from the drawing." The licensee had completed a safety evaluation form 50.59 for this item. (This type of evaluation was only to be used for the "A" and "B" hardware items that were delayed beyond fuel load, because parts were not available (Reference letter EF2-104.947 dated March 20, 1985).) The inspector reviewed the 50.59 analysis and found its conclusions vague and inadequate to disposition this issue. Shorts of Division I and II internal wiring to the tripping coils could result in blown fuses of both power feeds and a loss of power to both redundant assemblies, disabling the trip function of both trip coils. In addition, since the power and fuses which feed and protect the Division I and II RPT circuits also feed and protect the Alternate Rod Insertion (ARI) solenoid valves circuitry, a loss of power or fuses will also result in a loss of ARI circuitry (Reference to licensee documents S/D 6I721-2105-16 and 17). Pending licensee action and comment, this item is considered unresolved (341/85028-02).
- (5) The following additional deficiencies were also noted by the inspector during the "B" software item review:
- (a) Reactor Recirculation System generator field breaker red and green position indicating lights on B31-P001A and B assemblies were observed to be missing or burned out. (Noncompliance 341/84062-03 previously identified 25 such cases.)

(b) Relay "K" in B31-P001A and B assemblies contained contact designations which were not in conformance with design drawing designations. Apparently some portions of connection diagrams 6I721-2104-3 and 4 had not been yellow lined during the as-built walkdown program.

(c) Connection diagram 6I721-2314-25 Revision C titled "Division I Rack H11-P917A" did not contain the presentation of the ground bus located in the rear portion of the rack.

Pending further review, this is considered an open item (341/85028-03(DRS)).

b. The inspectors reviewed As Built Notices (ABNs) which were issued against drawing errors and discrepancies in as-built documentation. Portions of the following ABNs associated with control panels or instrument racks were reviewed and verified against the applicable documentation:

<u>ABN</u>	<u>Panel</u>
2496-1	H11-P606
2383-1	H11-P606
2450-1	H11-P606
2451-1	H11-P609
2747-1	H11-P611
2403-1	H11-P622
2416-1	H11-P622
2238-1	H11-P021
2951-1	H21-P004

The following discrepancies and deviations were noted:

- (1) Field connections on terminal block AA, termination points 7 and 9 on rack H21-P004, were not connected per drawing 6I721-2282-24. If left uncorrected the discrepancy could have created a potential ground loop since the instrument circuit would have been grounded in two points. The discrepancy was previously identified by the licensee but not categorized as "A" or "B" software items. Instead, the licensee erroneously categorized the identified deficiency as "u" or unknown when it should have been classified as either an "A" or "B" item. The licensee had made a prior commitment to resolve all "A" and "B" hardware items, except those identified under the 10 CFR 50.59 review, before loading fuel. Subsequent to this finding, the licensee issued a PN21 to reterminate the applicable conductors. Additionally, the licensee has committed to reviewing all "u" and "m" (miscellaneous) status items and determine if they have been properly categorized.
- (2) Cable 245675-K was not labeled per drawing 6I721-2282-7. This item was previously dispositioned as use-as-is but is now in the process of being reworked per PN21-281153.

- (3) A cable jacket inside a junction box on rack H21-P004 was observed to be cut. The licensee's field engineering section has committed to requesting a PN21 and to investigate and effect a repair.

Pending further review, this is considered to be an open item (341/85028-04(DRS)).

5. Review of Licensee Corrective Action On LER-003

- a. On April 3, 1985, while fuel loading was in progress, the Division II 48/24VDC battery charger B-1 was determined to be inoperable by the licensee. At 8:05 a.m. on April 3, 1985, the Sequence of Events Recorder printout indicated a low voltage alarm signal from the 21B battery (23VDC). This caused an alarm annunciation in the control room. The battery continued to discharge until the battery voltage output was 17VDC. At that time the charger began to function during trouble shooting and voltage increased to 26VDC. This resulted in a full scram because of IRM "F" upscale since the shorting links in the RPS system had been removed during fuel loading. Subsequent trouble shooting failed to identify any reason for the charger malfunction. It has functioned normally since the event.

The licensee determined that the cause of the event was attributable to improper communication which led the control room operators to ignore the low voltage alarm. Review and discussions with licensee personnel disclosed that they concluded that the procedures were inadequate. The following procedures are being revised to preclude recurrence:

- (1) ARP 9D18 Revision 2 - Division I 48/24V Battery 21A Trouble.
- (2) ARP 10D67 Revision 2 - Division II 48/24V Battery 21B Trouble.
- (3) Procedure No. 20.30011 Revision 1 - Loss of 24/48VDC battery busses.
- (4) Procedure No. 23.310 Revision 3 - 48/24VDC Electrical System.

No violations or deviations were identified.

6. Open Items

Open 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 open item disclosed during the inspection is discussed in Paragraph 4.a.(5) and 4.b.

7. Unresolved Items

Unresolved items are matters about which more information is required in order to determine whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during this inspection are discussed in Paragraphs 3.a, and 4.a(4).



8. Exit Interview

The inspectors met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on May 24, 1985. The inspectors summarized the scope and findings of the inspection, which were acknowledged by the licensee. 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.