U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/84-45(DRS)

Docket No. 50-341 License No. CPPR-87

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: October 1-5, 1984

Inspector(s): A. S. Gautam — 11/16/84 Date

Z. Falevits — NOV 16. 1984 Date

Approved By: C. C. Williams, Chief, Plant Systems Section — 11/16/84 Date

Inspection Summary

Inspection on October 1 thru 5, 1984 (Report No. 50-341/84-45(DRS))
Areas Inspected: Licensee action on previously identifed items; allegation regarding power cable ratings and sizes of starters; as built electrical installations to the latest drawings; design considerations of Class 1E instrumentation; and, thermal overload as built versus design. The inspection involved a total of 70 inspector hours onsite by two NRC inspectors.
Results: One item of noncompliance was identified. (Failure to assure that design documents and as-built conditions are in mutual agreement.)

DETAILS

1. Persons Contacted

Detroit Edison Company (DECo)

W. H. Jens, Vice President Nuclear Operations
F. E. Agosti, Manager Nuclear Operations
R. S. Lenart, Superintendent
S. E. Martin, Licensing Engineer
J. E. Cohen, Licensing Engineer
E. R. Bosetti, Supervisor Engineer
L. Began, Work Leader Electrical
L. Collins, Systems Engineer
W. Street, Supervising Engineer
D. Brooke, Electrical Supervisor
T. S. Nickelson, Startup Engineer
S. J. Booker, Technical Engineeer Supervisor
M. J. Gavin, General Supervisor
S. P. Zoma, Principal Resident Engineer
G. K. Sharma, Supervising Engineer - I&C
*L. P. Bregin, Licensing Engineer

*Denotes those not present at exit interview on October 5, 1984.

2. Licensee Action on Previous Inspection Findings

a. (Closed) Noncompliance (341/84-17-01D): This item addressed the licensees failure to follow established procedures in that work was performed on a valve prior to the issuance of an approved field modification request (FMR). The inspectors verified that the final installation does meet the specified requirements and that a noncompliance report was issued to document and control this deficiency. This item is closed.

b. (Closed) Open item (341/84-17-08): This item addressed missing identification tags on the instrument lines LT-B21-L006 and LT-B21-L008. These tags have since been installed and documented per work orders PN 970789 and 970790. This item is closed.

c. (Closed) Unresolved Items (341/83-07-02, 04, 07 and 08): These items addressed the licensee's failure to establish and implement adequate procedures for issuing and controlling changes to design documents. The inspector reviewed a sample of 52 drawings, 35 DCNs, 14 DCRs, 17 ABEs, 13 FMRs and 3 EDPs for verification of implementation of design document control procedures. Documents were reviewed at the document control center, control room, start up electric tech. office and the Bechtel field office for correct revisions and posting of the latest outstanding as well as incorporated changes.

Two design changes DCR E4380 and DCR E3981 were found posted with incorrect revisions. The discrepancies were corrected and the personnel immediately trained to avoid recurrence. In view of the

number of documents reviewed and the organization of the licensee's computerized (ARMS) design document control system, these errors were considered an isolated case and not a breakdown in established procedures. The above items are closed.

d. (Open) Open item (341/84-17-02): This item had inadvertently been used to identify two separate issues. One issue concerned discrepancies in the incorporation of FMRs into design drawings. This issue has not yet been addressed by the licensee and remains open.

The second issue addressed the allowance of less than 1" between redundant divisional conduits, and was identified in Section III paragraph 1.b.(1) of NRC Inspection Report No. 50-341/84-17. During this review, the inspector observed that the licensee had identified and listed applicable redundant divisional conduits in the plant having a separation of less than 1", and had issued field design change request TS1-03-T requiring field modifications to applicable conduits. In view of the progress made and commitment of the licensee to correct this discrepancy this issue is considered closed.

e. (Open) Unresolved item (341/84-17-06): This item addressed concerns regarding the qualification of GE instrumentation to Class 1E requirements. Further review of GE instrumentation was performed at the licensee's Troy office where past licensee QA audits of GE were reviewed to help reach a conclusion. Based on the new documentation reviewed, it could not be verified if GE had in fact performed any inprocess monitoring of their subtier suppliers and whether qualification testing had been performed by the supplier on the applicable equipment. Pending further verification of qualifying documentation this item remains open.

f. (Closed) Unresolved Item (341/84-35-01(DRS)): This item is being escalated to an item of noncompliance. For additional details see paragraph 6.

3. Review of Licensee's As-Built Program (Module 37051)

The inspector reviewed implementation of the licensee's as built design document program for timely access, storage and retrievability of field documents required by plant operations and maintenance personnel for the safe operation of the plant.

Motor Control Center (MCC) 72E-5A and associated conduits, trays and cables were reviewed against as built drawings.

Four MCC positions were selected 3A, B, C and D. Components of the MCC reviewed included disconnect switches, fuses, control transformers overload elements, contact blocks and cable terminations.

Three conduits entering the MCC were reviewed for size, identification and routing per layout drawings 6E721-2838-11C, Revision C and 6E721-2838-11R Revision 0. Tray sections having cables entering the MCC were reviewed for identification, location and routing per 6E721-2801-06, Revision V.

Cables 216900-2C, 216901-2C, 218560-2C, 218561-2C and 201689-2P were reviewed for routing in the MCC and termination at appropriate terminal points. Cable routing and termination was verified against cable routing sheets section 15 page 1. Revision 0, Section 24, page 67, Revision P, and Section 25, page 24, Revision P. Cable routing and terminations in MCC 72E-5A were also verified against schematics 6I721-2781-06, Revision C (Position 3C), 6SD-721-2531-23, Revision 0 (Position 3D) and 6I721-2311-29, Revision D (Position 3A).

No discrepancies were found with the exception of the following observations:

a. Cable 216900-2C was found terminated deviant to as built drawing 6I721-2311-29, Revision D (Pos. 3A). A nonconforming report NCR 84-1083 (still open) was written on May 2, 1984 to control this condition for proper termination of this cable.

b. Position 3B of the MCC was shown as a spare on the MCC 72E-5A frontal elevation drawing 5SD-721-25-12-5A, Revision Q. However, the position cover in the field had a nameplate showing a feed to outboard valve V10-2003. This condition is being controlled by a program where the licensee is reviewing equipment nameplates for similar discrepancies.

c. During review of as built documents, it was observed that the as built program had not yet been implemented in the control room. The Licensee reported that it planned to post one half size prints of vital drawings as well as aperture cards in the control room and that they were in the process of implementing their as built program in the control room.

d. During a review of MCC 72E-5A, it was also observed that excessive debris had accumulated in the equipment, apparently due to painters working in the area. It was observed that adequate measures were not being taken to protect the equipment. The licensee issued a nonconformance report 84-1632 on October 4, 1984, to correct this condition in accordance with Spec. 3071-55, Revision 1, paragraph 4-02.8.1.

4. <u>Review of Design Considerations Used For Class 1E Instrumentation (Module 52054)</u>

This review was performed in conjunction with a review for verification of Class 1E qualification (Unresolved item 341/84-17-06) of GE instrumentation. The purpose of this review was to verify design considerations against actual instrument settings necessary for the required operation of selected Class 1E instrumentation, and further verify the qualification of installed instrumentation to these requirements.

Instrumentation associated with the high pressure coolant injection system (HPCI) was selected as the HPCI pump discharge is monitored through the summation of two inputs pump discharge flow and turbine speed.

The instrumentation loop reviewed, monitored the discharge flow and speed of the HPCI turbine to control a throttle valve restricting the input to

the turbine, as shown on Drawing 6M721-2035 Revision 0 and 6M721-2043, Revision K. Instrument data sheets 234A9309TG sheets 1 thru 30 were reviewed for design parameters defined in design spec data sheets #22A1362AR.

The instruments chosen are listed below:

FY-K601: GE square root converter (SQRT) input 10-50 MA, output 10-50 MA, rated accuracy ±0/2 ma, receives signal from flow transmitter N008, monitors pump discharge flow.

FXE N008: GE flow transmitter, pump discharge flow rated accuracy ±30 gpm, diff water head 349" H_2O @ 68°F @ 6000 gpm.

FIC-K615: GE flow indicating controller. Receives signal from SQRT K601. Signal to signal converter, rated accuracy 30 gpm.

FIC-K616: GE flow indicating controller. Amplifies signals. Rated accuracy 30 gpm.

Since the current preoperational testing of the HPCI turbine was incomplete, actual settings of the instruments could not be verified against design considerations. This shall be followed up during subsequent reviews, and the qualification in terms of design considerations shall be addressed relative to unresolved item 341/84-17-06.

5. Allegation

a. Concern (RIII-84-A-0116 Item 6c)

An anonymous alleger in a letter to a local newspaper indicated the following concerns: "A problem with undersized power cables used to operate 480V alternating current motor operated valves which are nuclear safety-related was not reported to the NRC.... Nor was a similar problem with undersized starters...reported."

b. NRC Followup

(1) The inspector interviewed the design engineer who has been performing sizing calculations of power cables and starters, and the preoperational test engineers who perform the tests on the power cables and starters to assure design requirements are met and that test results conform to specifications and drawings. The test engineers indicated that they could not identify any specific instances of undersized cables or starters, and that if a problem was identified it would be identified and appropriately dispositioned. They have indicated that a comprehensive verification program to assure that all AC power cables are properly sized had been completed in 1983, and results indicated that out of approximately 1000 AC cables reviewed three (3) were found undersized and were replaced.

(2) Licensee's criteria for sizing cables feeding motor operated valves and continuous duty motors is as follows:

(a) The ampacity of the cable is at least 125% of the full load current of the motor.

(b) Cable size is derived from ampacity charts shown on Design Instruction DI50. Consideration is given to assure that voltage drop under full load amperes (FLA) will not exceed 3% of the source voltage (480V).

(c) Voltage drop under locked motor current will not exceed the allowable limit to start the motor (20% of motor voltage rating for intermittent duty and 15% for continuous duty). This is verified via design calculation 968 and 969.

(3) The inspector reviewed Design Instruction No. 50 Revision "F" titled "Design Criteria for Sizing of Wire and Cables." Table III on page 9 indicates maximum circuit length in feet for different wire sizes, and full load amps of 480V 3 phase motors. A comparison of this table with approximately 35 randomly selected motor operated valve (MOV) power feeds indicated no apparent discrepancies. Table 1 on page 5 lists cable ampacity ratings for the various cable sizes in cable trays, duct runs, and conduits in general areas and in the drywell. A short time duty ampacity chart indicated ampacity limits for MOV's in cable trays for general/drywell cable runs.

Review of valve evaluation data sheets indicated some differences in Locked Rotor Amps (LRA) for identical motor operated valves. A discussion with the licensee's design engineer indicated that for those motor operated valves for the vendor which did not supply a LRA value, the licensee's engineers assumed a value of 6 (six) times the full load amps (FLA). No documented evidence could be found to support this assumption. Since the LRA value is the basic value used in the sizing of starters, the inspector requested the licensee to obtain the missing LRA values for the safety-related valves and pumps, and review their starter sizes to verify that proper sizes exist in the plant.

This item will remain unresolved pending NRC review of licensee action regarding LRA values (341/84-45-01(DRS)).

(4) The inspector reviewed the latest detail calculation DC968 dated November 1, 1983 which is applicable to motor starter sizing. Item C.3.a states that "Starter sizing of full voltage single speed starter for MOV's requiring repeated interuptions of stalled motor current or repeated closing of high transient current..., are sized based on NEMA Standard Publication No. 1CS2-1972 table 2-327-3" and that "starters are not used with motors whose full load current rating exceed the continuous current rating, or whose locked rotor current ratings exceed locked rotor current rating shown in the following table:

460V AC 30 Starter Size (NEMA)	Current Rating	Locked Rotor Current Amps @460V 30 Single Speed
1	27	52
2	45	127
3	90	350
4	135	500

The inspector reviewed NEMA publication ICS2 part ICS 2-327 dated September 1978. Table 2-327-3 which specifies the ratings of 30, single-speed full-voltage magnetic controllers, indicated that maximum locked rotor current for a size 3 controller (starter) is 250A rather than the 350A specified DC968 table above. The inspector pointed out the discrepancy to the licensee and expressed the concern that since the above table has been used to size or review motor starters since November 1, 1983, some starters might have been undersized. The licensee's design engineer indicated that this was a typographical error and that a computer program has been used to verify all sized starters, and assured the inspector that the 250A value is contained in the program. A subsequent review of design and computer program data verified that the proper value was being used. The licensees response adequately addressed the technical concern.

(5) Review of MCC drawing 5SD721-2512-22, Revision "J" titled, "Frontal Elevation 480V MCC 72F-2A Division I" indicated that position 1D contains a power feed to MPU #2 (Division II) R31015002 (Same for Division 1). The full load amps rating is specified as 55A while the protective fuse is rated at 40A. The licensee indicated this was in error and that it would be reviewed and corrected. This item remains unresolved pending NRC review (351/84-45-02).

(6) It was previously identified by an agent of the licensee that valve E1150-F009 was designated by the licensee as having a 12.8 horse power motor when it should have been designated as a 19.2 horsepower motor. Consequently, the power cable, fuses, starter and overload had been sized under the assumption that the motor was 12.8 horsepower. The licensee took adequate corrective measures. During this inspection the NRC inspector determined through examination that no other similar cases existed. This finding appears to be an isolated case.

(7) The inspector reviewed attachment 7 of Design Calculation 968 (list of motor operated valves with starter problems). Revision 0 of this attachment issued January 1982 indicated that based on the calculation method for sizing the starters of the MOV's it was found that 58 of the existing starters do not meet NEMA standard design criteria. Forty three (43) of these motor starters were classified as feeding stop valves, which are defined by the licensee as motor operated valves whose motors function similar to a continuous duty motor; that is, requiring only 5 or less openings or closings

per minute and not in excess of 10, in a 10 minute period. Therefore, these starters (43) were sized as per the continuous duty motor design criteria (DC969), which is less conservative. Thirty six (36) of the motor operated valves were found acceptable and 7 starters had to be replaced. Twenty two (22) starters feeding throttle valves needed to be replaced. As of October 10, 1984, 16 starters have been replaced and 6 are in the process of being replaced.

(8) The inspector observed that RHR throttle valves E1150-F017A & B, E1150-F024A & B and E1150-F048A & B contained higher LRA's than allowed by NEMA standard table 2-327-3 (DC968). The licensee indicated that by analysis these valves should not open or close more than 5 times in one minute or 10 times in 10 minutes. Pending further review by the licensee to determine if their analysis is acceptable this item will remain open (341/84-45-03).

(9) The inspector reviewed installed starters for correct size as specified in design documents, the following MCC's were reviewed:

(a) 480V MCC 72C-3A Division I F/E drawing 5SD721-2512-18 Revision "0"

(b) 480V MCC 72F-4A Division II, F/E drawing 5SD721-2512-19B, Revision "S"

(c) 480V MCC 72C-F Division I/II F/E drawing 5SD721-2512-17, Revision "N"

No discrepancies were identified.

(10) The inspector reviewed MCC drawing 5SD721-2512-17, Revision "E" and MCC drawing 5SD721-2512-28, Revision "F". Position 2D of MCC 72C-3B and MCC 72F-5B contains feeds to recombiner heaters T4804Z001 & 2 (90 KW each) which translates to approximately 120 horsepower. FSAR section 8.3.1.1.3 states that the motor horsepower rating determines the voltage and the source of the motor feed as follows:

a. 1/2 to 49 h.p. at 480V, feed from 480V MCC
b. 50 to 249 h.p. at 480V from 480V bus switchgear.

No discrepancies were identified in this practice.

(11) The inspector reviewed test results used to ascertain whether valve E5150-F007 performed within design specifications, (voltage, current). Test Form TF.000.031.01 Revision 3 test #6686E startup form 7.8 indicated that a voltage and current test was performed during the opening and closing cycles of RCIC valve E5150-F007 titled RCIC Steam Supply Inboard Isolation Valve. The pertinent data is as follows:

Valve Specifications: 460 V AC, 0.7 h.p., 2.3 FLA
Starter Size 1,

3/C #12 power cables 214720A-2P
214720B-2P

Criteria Used: 2.3A + 20%
Schematic Diagram 6I721-2231-3, Revision "D"

Measured Values:

Opening Cycle	Closing Cycle
ØX - 2.4A	ØX - 2.4A
ØY - 2.5A	ØY - 2.5A
ØZ - 2.4A	ØZ - 2.5A

A second test performed June 20, 1984 indicated:

Opening Cycle	Closing Cycle
ØX - 2.6A	ØX - 2.6A
ØY - 2.7A	ØY - 2.7A
ØZ - 2.6A	ØZ - 2.6A

Power cables were meggered at 1000V, reading was 2000 megohms (acceptable criteria is 100 megohms minimum). Voltage measurements were taken at the MCC terminals and found to be 494V.

No discrepancies were identified.

c. Conclusion

The Allegation as stated in subparagraph a. above could not be substantiated. Some errors were identified in the related documentation and hardware inspected. However, it does not appear that power cables feeding MOV's or starters are undersized, or improperly identified and controlled.

6. Independent As-Built Review

a. During a previous inspection the inspector identified an apparent discrepancy in the conformance of some installed thermal overloads with the design documents (Ref. Item 341/84-35-01).

During this inspection, review of the design calculations and applicable design documents and discussions with the licensee's test engineers indicated the following sequence of events:

(1) In March 24, 1982, FMR-3409 requested the replacement of the existing thermal overload heater in position 3A of 480V MCC 72C-3A with thermal overloads size G30T49B.

(2) In April 19, 1982 DCR-SDE 734 replaced the thermal overloads in Position 3A of MCC 72C-3A with G30T51. (G30T49B was removed.)

(3) Startup test form 7.8 #6161E dated November 1982 indicated that thermal overloads G30T49B were tested in Position 3A and found acceptable (Note: Last one installed was G30T51).

(4) DCR SUE-734 appeared to have been incorporated into design drawing No. 5SE721-2512-18, Revision Ø on March 1983 changing G30T49B to G30T51.

During this inspection on August 8, 1984, the NRC inspector identified the following discrepancy:

The installed thermal overloads in Position 3A was G30T49B. However, Design drawing No. 5SD721-2512-18 indicated overloads #G30T51.

The NRC inspector observed that the thermal overload element G30T51 was installed on April 24, 1980, and that in November 1983 overload element G30T49B was tested. The NRC inspector expressed concern that no records existed to indicate when the overload element was replaced and who replaced it.

b. Subsequent to the NRC inspector's identification of the discrepancies outlined in 6.a. above regarding loop A; the licensee initiated a concurrent examination and discovered a similar problem in the identical loop B. The details are as follows:

(1) FMR-SDE-734 dated April 19, 1982 requested replacement of thermal overloads G30T49B to G30T51 in MCC 72F-4AR position 5AR to agree with motor nameplate data.

(2) Associated design drawing 5SD721-2512-19B also indicated that G30T51 was the proper thermal overload element in position 5AR.

(3) Startup test form TF.000.026.02 dated February 12, 1982 indicated that thermal overload element G30T51 was tested and found acceptable as installed in position 5AR.

(4) Design calculation D.C. 968 Revision "A" indicated that thermal overload element G30T49B should be installed.

Summary

As found in August 1984 although above items b(1), b(2), and b(3) indicated G30T51 to be the proper overload, item b(4) appears to meet the design requirements. That is, b(1), b(2) and b(3) were in error when compared to design calculation DC 968.

As the results of the licensee's review outlined in b(b) above, the licensee initiated FMR S-7544 dated September 21, 1984, requiring the change of existing G30T51 thermal overload element to G30T49B in MCC 72F-4AR Position 5AR as required per design calculation 968.

c. During this inspection the following discrepancies relating to installed thermal overload vs. drawing and design calculation requirements were identified:

(1) MCC	Position	Thermal Overload	Adverse NRC Observation
72F-4A	2AR	G30T50 G30T53	Installed thermal overloads do not appear in the vendors catalog.
Drawing			
5SD2512-19B Revision S		G30T50A	Drawing does not indicate correct overloads, as specified by Design Calculation 968.
Design Calculation			
DC 968, Revision A		G30T50A G30T53A	Existing overloads need to be replaced with new ones as specified by DC 968.

(2) MCC	Position	Thermal Overload	Adverse NRC Observation
72E-5A	2D	G30T38	DC 968 differs from installed and drawing specified overload
Drawing			
5SD2512-15A Revision Q		G30T38	
Design Calculation			
DC 968		G30T39	

(3) MCC	Position	Thermal Overload	Adverse NRC Observation
72B-2A	4B	G30T15	Installed thermal overload differs from DC 968 and drawing specified overload
Drawing			
5SD2512-20 Revision L		G30T16	
Design Calculations			
DC 968		G30T16	

(4) MCC	Position	Thermal Overload	Adverse NRC Observation
72B-3A	5DR	G30T48A	Design calculation differs

from installed and drawing
specified thermal overload

Drawing

5SD2512-16B G30T48A
Revision Q

Design Calculation

DC 968 G30T49A

Based on the finding outlined in Paragraph 6. above, the inspector informed the licensee that lack of QA documents for replaced safety-related components and numerous discrepancies identified relative to installed components, design drawings and design calculations is an example of an item of noncompliance contrary to the requirements of 10 CFR 50, Appendix B, Criterion III (341/84-45-04). Note that item 341/84-35-01(DRS) is hereby being escalated to an item of noncompliance.

7. 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 5.b.(8).

8. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. An unresolved item disclosed during the inspeciton is discussed in Paragraph 5.b.(3) and 5.b.(5).

9. Exit Interview

The inspector met with licensee representatives (denoted under persons contacted) at the conclusion of the inspection on October 5, 1984. The inspector summarized the scope and findings of the inspection. The licensee acknowledged the information.