U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/84-68(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: December 19, 20, 1984
January 3-5 and 10-12, 1985

Inspectors: R. Mendez — 1/28/85 Date

Z. Falevits — 1/28/85 Date

K. Tani — 1/28/85 Date

A. S. Gautam — 1/28/85 Date

Approved By: C. C. Williams, Chief
Plant Systems Section — 1/28/85 Date

Inspection Summary

Inspection on December 19, 20, 1984, January 3-5 and 10-12, 1985 (Report No. 50-341/84-68(DRS))

Areas Inspected: Special, announced safety inspection of licensee actions on previous inspection findings, followup on Part 21 reports, and review of implementation of the licensee's as-built verification program in the electrical and instrumentation areas. The inspection involved a total of 192 inspector-hours onsite by 4 NRC inspectors including 34 inspector-hours during off-shifts.

Results: In the areas inspected, one item of noncompliance was identified. (Failure to assure that revisions to drawings are properly reviewed for impact on the test program-paragraph 8.a.(12)).

DETAILS

1. Persons Contacted

Detroit Edison Company (DECo)

*W. H. Jens, Vice President, Nuclear Operations
*W. R. Holland, Vice President
*S. H. Noetzel, Assistant Manager
*L. P. Bregni, Engineer
*K. Earle, Licensing Supervisor
*D. Timmins, Licensing Engineer
*W. J. Fahrner, Manager
*G. M. Trahey, Director, NQA
*S. Martin, Licensing Engineer
*F. Agosti, Manager, Nuclear Operations
*P. Acharya, Director
*B. Wickman, Supervisor, Maintenance and Modification, QA
*J. F. Bross, Startup Assurance Engineer
*T. S. Nickelson, Startup Engineer Assistant
*W. P. Ripley, Startup Engineer
*M. A. Borgeson, Startup Test Engineer, Electrical
*P. R. Woodly, Lead Startup Engineer
*E. P. Griffing, Assistant Manager Nuclear Operations
*R. A. Vance, Assistant Project Manager
*J. P. Zoma, Resident Engineer
*J. S. Dudlets, Supervising Engineer, I&C

The inspectors also contacted and interviewed other licensee and contractor personnel including craft persons, technicians and engineering staff members.

*Denotes those who attended the exit meeting on January 12, 1985.

2. Licensee Action on Previous Inspection Findings

a. (Closed) Noncompliance (341/82-10-13): It was previously identified that field modifications were not being reviewed with regard to the effects of seismic qualifications. The modifications involved installing site fabricated cable supports on top of safety-related cabinets and replacing motor connection boxes on existing motors. Motor connection boxes had been previously replaced with larger ones in order to facilitate termination of the motor leads and the incoming power cable. These changes, however, had not been subjected to design control measures commensurate with those applied to the original design. In a previous inspection it was determined that design control measures had been implemented to review the adequacy of the cable support installations and motor connection box modifications. The inspector verified during this inspection that the as-built installation of the motor connection boxes of air compressor motors identified as P5002D001 and P5002D002, diesel

fuel transfer pump motors identified as R3001C004 and R3001C009 and the installation of the cable support rack on cabinet H11-P613 were in accordance with their applicable drawings. Additionally, records indicate that QC inspections were performed to verify proper installation. This matter is considered closed.

b. (Open) Noncompliance (341/84-17-01C): It was previously identified that the licensee did not calibrate safety-related reactor water level instruments to the required accuracy and that values and assumptions used in the calculation of water level instrument calibration were incorrect and misleading.

During this inspection period, the NRC inspector and the licensee representative reviewed the licensee's corrective action on the above open item and some of the questions discussed in Inspection Report 50-341/84-62 were resolved. Below are the concerns that were discussed in Inspection Report 50-341/84-62 and the licensee's subsequent response to the questions:

(1) Datum indicating that water level analytical limit and other water level setpoints were evaluated following the fuel change as delineated in Field Deviation Disposition Request (FDDR), KH1-749, Revision 0 were not available.

Licensee's response: The licensee provided the NRC inspectors with G.E. letter TDEC-4980 dated December 11, 1984, from G.E. Nuclear Power Systems Division in San Jose to Mr. C. R. Seibert, Project Engineer with Detroit Edison. The subject of the letter was entitled, "Water Level Setpoints." The letter states the following:

> "The reactor water level nominal trip setpoints, Tech Spec limits, and analytical design limits in the Nuclear Boiler Design Specification data sheet 22A2919AB are based upon top of active fuel (TAF) of 366.31" above vessel 0. This datum is shown on the Nuclear Boiler P&ID 729E616AB, Sheet 3."

The NRC inspectors reviewed the P&ID 729E616AB, Sheet 3, referenced in the letter, Fermi 2 FSAR Sheet 2 of 3 of Figure 7.3-9, Amendment 60, December 1984, and Design Spec Data Sheet 22A2919AB, Revision 10. None of these documents appear to reflect the actual values used by the licensee in the calculation of water level instrument calibration as delineated in FDDR KH1-1053, Revision 0, 1, and 2. However, the above documents do show the top of active fuel (TAF) to be at elevation 366.31". When the NRC inspector asked the licensee why these documents did not reflect actual values used in the calculations, the licensee replied that the Design Spec data sheet was currently going through a revision process; the FSAR is being revised to reflect the correct values, and this shall be reflected in FSAR Sheet 3 of 3 of Figure 7.3-9. G.E. has declined to revise P&ID 729616AB.

(2) The lower instrument tap value used in the calculation of the h_2 in the wide range top of scale calculation for instrument calibration as defined in the calculation basis given in FDDR KH1-1053, Rev. 0 and 1, is wrong and misleading.

Licensee's response: Specific formula and values shall be used (they shall be well defined in the latest revision of FDDR KH1-1053 for all instrument scales and ranges) to resolve this question.

Based on this commitment by the licensee, this issue is considered resolved with the licensee.

(3) The licensee's conclusion that the total loop accuracy of the process instruments was still within the water level setpoint margin was questionable. The licensee indicated earlier that the water level setpoint program that resulted from the fuel change, is an ongoing program.

Licensee's response: The setpoint methodology used by Detroit Edison has been submitted to NRR and is still under review by NRR. However, the licensee has already implemented the setpoint methodology pending NRR's approval.

Based on the above information, this issue is resolved with the licensee.

(4) As-built drawings reflecting the actual instrument tap nozzle elevations (Div. I and Div. II) differed from the actual values used in the calculations of water level instrumentation calibration.

Licensee's response: The licensee is still conducting a survey of the as-built instrument tap nozzle elevations, and shall make the as-built drawings and the latest revision of FDDR KH1-1053 available to NRC Region III for review.

Pending a review of the as-built drawings and the latest revision of FDDR KH1-1053, this item remains open.

c. (Closed) Unresolved item (341/84-45-02): It was previously noted that the specified value for full load amps (FLA) of 480V MCC 72F-2A, Position 1-D was determined to be uncoordinated with the protective device. The protecting fusing for the MCC was 40 amps while the FLA was specified to be 55 amps. (same for Div. I) The locked rotor amps for this feed was specified as 110A, however, LRA is not applicable for this feed.

Licensee's response: The licensee reviewed all FLA and LRA values assigned to MCC feeds. The inspector reviewed DC 2130, Revision A., dated December 14, 1984 which addressed this item. Drawing 5SD721-2512-22, Revision L., and 5SD721-2512-15A, Revision R., were

reissued to correct the noted discrepancies. This review by the licensee also required the revision of 91 motor operated valve LRAs values and 81 LRA values for continuous duty motors.

The licensees' corrective action addresses this issue. (See ABE 1407, Rev. 0.) This item is considered closed.

d. (Closed) Open item (341/84-50-02): This item relates to Design Instruction (DI) No. 50, Revision F., which addresses sizing of cables for control and power feeds. FSAR Table 8.3-3 did not conform to DI-50.

Licensee response: In response to this NRC finding, the licensee's letter EF2-72094 dated October 26, 1984, requested a revision to FSAR Section 8.3.1.4.2.1 for cable ampacities and outlines criteria used to size cables.

Licensee indicated in letter EF2-71823 dated December 10, 1984 that Fermi 2 cables for power feeds were sized using Tables 1 and 2 in DI-50, Revision F. FSAR change notice No. 84-523 dated November 1, 1984 was issued to revise the FSAR.

Based on corrective action taken by licensee, this item is considered closed.

e. (Closed) Open item (341/84-57-02): This item addresses Checkout & Initial Operations (C&IO) yellow lined master file drawing 6I721-2201-2, Revision I., missing from file.

This item has been escalated to an item of noncompliance (341/84-68-20). For additional details, see paragraph 8.a.(12).

3. Part 21 Report Followup

a. (Open) Part 21 Item (341/82-01-PP): "G.E. Type HFA Relay Contact Gap and Wipe Setting Adjustments." By letter dated July 28, 1982, G.E. reported an incorrect "wipe setting" of normally closed contacts on some HFA relays converted from normally open contacts. The original seismic qualification was performed with calibrated contacts, G.E. determined that relays with less than a minimum wipe setting may not fall within the component qualification limits. The potential hazard may prevent the HFA relay from actuating the engineered safety systems during a seismic event. On June 21, 1983, the licensee issued FMR No. 4064 to implement G.E. instructions FDI-WHIY. The G.E. instructions delineated wipe settings for adjusting normally closed contacts on HFA relays. The licensee has apparently taken corrective action to resolve the contact setting problem, but appeared not to have reported the deficiency under a 50.55(e). This matter remains open pending review of the reportability of this item under a 50.55(e) report.

b. (Open) Part 21 Item (341/83-01-PP): It was previously identified that Brown Boveri Electric Type HK Breakers manufactured between March 1974 and July 1978 are subject to a limit switch carrier deficiency. The licensee was informed by Brown Boveri Electric, Inc. of this deficiency in a letter dated February 22, 1983.

During this inspection period, the NRC inspector was informed verbally during a discussion with licensee representative that Fermi 2 has only two (2) of the HK breakers with the above mentioned deficiency, and that the breakers are the type 5HK350, 3000 Amps model and are only used in balance of plant switch gear, bus 64A, position A9, and bus 65D, position D9.

The NRC inspector requested the licensee to provide NRC Region III a list of the breakers described in the Part 21 report and the systems or switchgears where the breakers are used within the plant for review. Pending a review of the requested information by NRC Region III staff, this item remains open.

c. (Open) Part 21 Item (341/84-03-PP): By letter dated October 8, 1984, General Electric (G.E.) reported to the Office of Inspection and Enforcement a reportable condition. The defect was identified as the adjustment of the low voltage shutoff and turn on for G.E. Class 1E inverters. As a result of engineering error, G.E. checked for an operable range of 105 to 140 volts DC, instead of 100 to 140 volts DC. G.E. specifies typical DC voltages from 108 to 132 volts during startup of large DC loads. G.E.'s concern was that since a dip of the input bus voltage could equal the factory preset inverter low voltage cutoff (105V DC), the dip could result in an inverter trip and a failure to restart. The present restart voltage is 118 volts. G.E. requires a restart of 108 volts DC. The licensee states that the DC buses alarm at 124.5V DC and that the eight hour discharge voltage of the batteries is 105 volts. However, the licensee has not adjusted the inverter trip and restart voltages to comply with the G.E. specification.

d. (Closed) Part 21 Item (341/84-16-PP): ITE Gould circuit breaker P/N EF3-B015 used in the post-LOCA hydrogen recombiner had been found to fail during environmental qualification testing. By letter dated March 11, 1983, Rockwell International reported to the NRC Region IV office regarding a circuit breaker which failed to function properly at elevated temperatures. On October 26, 1983, the licensee responded to the vendor stating that Gould circuit breakers (EF3-B015) which were installed in the power panels had been qualified by relocation to a mild environment thus alleviating the possibility of equipment failure due to a harsh environment. The inspector observed that the hydrogen recombiner power panel was located in a mild environment, but noticed no EF3-B015 circuit breakers. However, discussions with the licensee indicated that as a result of an unrelated short circuit breaker rating concern, all EF3-BXXX type ITE Gould circuit breakers were replaced. Field modification

request number 1158A documents that change from EF3-BXXX to HE3 type breakers. The licensee did not appear to have EFB type breakers in any safety-related switchgear panels.

4. Functional Areas Inspected

During this review, the inspectors performed verifications of the licensee's as-built program to determine whether design drawings conform to as-built installations. The reviews were made using the licensee's Lead Design Document Index (LDDI). The LDDI was developed as a result of NRC inspection findings in the as-built program in the electrical and I&C areas. Essentially, the LDDI is intended to compensate for current deficiencies in the as-built drawings by providing assurance that correct engineering and design information is available on each drawing and provides guidance for locating missing information. The licensee has initiated a long-range program to review the accuracy of all engineering documents, but in the interim the LDDI provides guidelines for use of the engineering documents. The licensee has proposed to eliminate lead design drawings by June 30, 1985, at which time all drawings would reflect the correct information.

During the month of December 1984, the licensee and NRC personnel who performed the walked-down, selected safety related electrical and I&C systems to determine the effectiveness of the existing Fermi as-built program. As a result of the walkdowns conducted during December 19 and 20, 1984, and the more comprehensive walkdowns performed by the licensee, additional discrepancies were identified. The number of discrepancies and the possible impact on the safety of the plant indicated that a larger and more comprehensive as-built verification walkdown would be required. The licensee agreed to perform additional walkdowns.

On December 31, 1984, the licensee met with Region III personnel and presented some of the results from the engineering walkdowns of electrical systems. A lack of criteria for as-built drawings was noted by the licensee in addressing the deficiencies identified during the as-built program. The licensee concluded that based on the engineering walkdown performed, additional walkdowns would be performed to determine the adequacy of the as-built program prior to fuel load.

During the meeting, the licensee also presented a program which would establish checklists, acceptance criteria, methodology, disposition of identified deviations and provisions for scope expansion of the as-built program. The licensee proposed to have their QA personnel do a 100% walkdown of the division II core spray system and to have NRC inspectors accompany QA to check and compare all cable terminations against connection and schematic diagrams. The licensee would then document all deficiencies and evaluate their significance. Based on the results of the sample, the licensee would either initiate further walkdowns or determine that the significance and number of findings would not adversely affect the safety of the plant and, therefore, no further action would be required, in their opinion.

The results of NRC findings during inspections covering the dates of December 19, 20, 1984, January 3-5 and 10-12, 1985, by four inspectors are documented in the following four sections of this report.

Section I

Prepared by K. Tani

5. As-Built Program Review

a. 4160V and 480V Switchgear As-Built Inspection

During this inspection period, the NRC inspector performed a walkdown of the 4160V 65E switchgear, Position E8, and 480V switchgear Buses 72EA, 72EB, 72EC, and 72ED. During review of the as-built drawings, the inspector observed that voltage dropping resistors used in the control circuit of the ESF breakers in the 4160V and 480V switchgears had been replaced with resistors of different values. The inspector requested design change documents which would reflect calculations and evaluations of the circuit whose voltage dropping resistors were changed. The licensee responded that they did not have documentation on the calculations and evaluations performed on the modified ESF breaker control circuits of the 4160V and 480V switchgears. The licensee further stated that it was not the practice of Detroit Edison Engineering to provide calculations for these circuit modifications. The inspector then requested information on the breaker control circuit components' total resistance to be used to determine the circuit design adequacy. The inspector subsequently was presented with the control circuit component resistance and other values. Based on the NRC calculations using component resistance values submitted to the NRC inspector, the question of the control circuit adequacy has been resolved with the licensee.

b Containment Isolation System As-Built Inspection

The NRC inspector and the licensee's representatives performed a physical walkdown of the as-built field configuration of the main steam line high flow instrument sensing lines B21-L003A and B21-L004A, which provide isolation signals to the MSIV B21-F022A and B21-F028A. It was determined that the sensing line installation appeared to be adequate per the as-built isometric drawing; however, the inspector observed the following discrepancies:

(1) Main steam line D instrument tap condensing chambers fed by lines B21-L003D and B21-L004D, were observed to be separated by three (3) inches of free air from other sensing lines that were labeled as B31-L001A, Division I, and B31-L002B, Division II.

(2) Instrument sensing lines labeled B31-L001A, Division I, B31-L002A, Division I, B31-L001B, Division II, and B31-L002B, Division II, were separated from one another by six (6) inches of free air.

(3) Instrument sensing lines labeled B31-L001A, Division I, B31-L002A, Division I, B31-L001B, Division II, B31-L002B, Division II, and B21-L016, Division I, were all routed through one common penetration labeled Pen. X-28D.

The NRC inspector queried the licensee as to what separation requirements apply to redundant instrument sensing lines at Fermi 2. The licensee responded that they will be investigating the above discrepancies to determine if this is a separation violation or a mislabeling of the sensing lines. Pending a review of the licensee's investigation results, this item is considered unresolved (341/84-68-01).

c. The inspector reviewed P&ID 6M721-2089, Revision K, and other electrical drawings (discussed below) and observed the following discrepancies:

(1) Fermi 2 FSAR Figures 7.3-10 sheets 1, 2, and 3 do not appear to reflect the implementation of FMR S-1109 dated March 15, 1979.

(2) It appears that the correct reactor low water level interlocks are not used in the MSIV isolation logic (Ref. drawings 6I721-2095-14&15, Revision C).

(3) Color code discrepancies exist between the drawings listed in the brackets. (6I721-21-16 and 17, Revision C., and 6I721-2282-55, 60, 65 and 70, Revision F.) (Ref. DCP-B2100-I05 and I06, IDCN-442, IRMR-1087 and DCN-5990.) It appears that some of the referenced design change documents were not properly and completely implemented.

Pending further review and inspection of the area discussed in paragraph 5.c. above, these items are considered unresolved (341/84-68-02).

Section II

Prepared by A. Gautam

6. As-Built Program Review

This portion of the licensee's as-built program was reviewed in the field using the Design Document Road Maps Procedure 11.000.54, Revision 0, as the guide for the correct use of plant engineering documents.

The following switchgear was reviewed:

a. 4160V Bus 65E, Position E8 Indoor metal clad switchgear, type 5HK-350, 3 phase, 3 wire. Feed to diesel generator bus 13EC, Unit 2.

(1) As-built wiring drawing 6SD721-2501-40, Revision E., was reviewed for general arrangement of devices, identification of devices and external cables.

Device locations were found to be in accordance with the above as-built drawing. External cables 200022 A and B were reviewed in the rear compartment of position E8 and found identified and located per above as-built drawing.

During this review it was observed that the following devices and termination blocks, identified on the above as-built drawing, had either temporary or missing identification tags in the field: PK, PL, PM, PG, LA, LB, LC, LD, AA, AN, RA and RZ. The licensee reported there was no current program in place to identify such devices inside cabinets. Pending further review, this is an unresolved item (341/84-68-03A).

(2) External cable 221175, 2/C#12 was reviewed for termination to LA 13 (white) and LA 12 (black).

During review of above connections, tie wraps were cut to allow physical tracing of each wire to appropriate terminal. No discrepancies were found.

(3) Position 1A of 480V bus 72EC was reviewed for installed fuses. According to the road maps, fuse ratings, descriptions and fuse applications for Class 1E equipment were specified in Specification 3071-128, Electrical Engineering Standard. During this review, it was observed that Specification 3071-128, Revision B.,Section EJ, page 43, specifies A6Y7E-96 Shawmat 10 Amp fuses on 480V bus EC to protect the 480/120V potential transformers in the instrument compartment position 1A. However, fuses installed in the position 1A were found to be 7A (interpreted as 7 Amp fuses.) It appeared that the

walkdown of this compartment was complete and all modifications or changes completed. The licensee could not justify this apparent discrepancy in fuse ratings. Pending further review of fuse requirements, this is an open item (341/84-68-04).

(4) As-built one line drawing 6SD721-2500-4, Revision I., was reviewed for electrical arrangement, instrumentation, relaying, symbols, general notes, reference drawing lists, and power cable numbers for connected load, as installed in position E8 of 4160V bus 65E.

During this review, it was observed that the above as-built drawing specified 51^3 overcurrent relays of range 0.5 to 4A for protection on the 4160V feed to position EC4 of diesel generator bus 13EC. The symbol list of this as-built drawing identified device 51^3 to be a time overcurrent phase relay for the 4160V feeders, G.E. type 12IAC53 with trip characteristics of 4 to 16A, inverse time and with no instantaneous trip.

Contrary to the specification, the installed relays were observed to be G.E. type 12IAC66B4 time overcurrent phase relays with trip characteristics of 4 to 8A and with an instantaneous trip range of 20 to 80A.

The licensee reported the installed relays to be the correct type with the as-built condition reflected on the wiring diagram 6SD721-2501-40, Revision E. However, the NRC inspector observed this to be in discrepancy with the licensee's as-built program road map procedure 11.000.54, Revision 0, Attachment 3, page 13 of 47, which specified the single line diagrams to be the correct source for accurate information on relaying. Pending correction of above single line diagram, this is an open item (341/84-68-05(DRS)).

b. 480V Bus 72EC, Position 1A Indoor metal enclosed switchgear, 480V/277V, 3 phase, 4 wire.

(1) As-built connection diagram 6SD721N-2712-29, Revision I., was reviewed for basic overall arrangement of devices; point to point connections of internal wiring between devices and/or terminal strips; external cable number and terminations; internal and external connections agreeing with schematics.

Overall arrangement of devices in position 1A were found be to in accordance with above as-built drawing.

(2) Point to point connections were reviewed by physically tracing wires between the following terminal numbers shown on drawing 6SD721N-2712-29, Revision I.

PG 2 - PC4	LA23 - PH26	LA18 - PH22
PG 4 - PB4	LA22 - PH24	LA17 - PH23
PG 6 - PA4	LA21 - PH27	LA16 - PH21

PG 8 - LA7	LA20 - PH25	LA 1 - PC13
PG10 - LA9	LA19 - PH28	LA13 - PH5
		LA12 - PH5

Appropriate tie wraps were cut to allow for physical tracing of wire. No discrepancies were found.

(3) As-built single line diagram 6SD721-2510-5, Revision J., was reviewed for electrical arrangement, instrumentation, relaying, symbols, general notes, and reference drawing lists as applicable to Position 1A of 480V bus 72EC. Electrical arrangement of relaying, instrumentation and devices were found to be in accordance with as-built drawings. Instrumentation included 3 potential transformers 480V/120V and one potential transformer 120V/120V, found to be in accordance with the as-built drawing.

During review of relaying, it was observed that the as-built drawing 6SD721-2510-5, Revision J., called for three 27/59 undervoltage/overvoltage, 120V relays, to provide load shedding functions during high and low 120V AC inputs to the instrument panel. This in turn protects the RHR fan motors during transients. Contrary to these requirements, it was observed that the field installed relays only provided undervoltage protection (device 27).

The licensee reported changing this specification and presented ABE 0919, Revision A, that was confirmed by the inspector to require this change on schematic drawing 6I721N-2573-45, Revision G. However, the NRC inspector observed this to be in noncompliance with the licensee's as-built program road map procedure 11.000.54, Revision 0, Attachment 3, page 13 of 47, which specifies the single line diagrams to be the correct source for accurate information on relaying. Pending correction of as-built drawing, this is an open item (341/84-68-06).

(4) As-built schematic drawing 6I721N-2573-45, Revision I., was reviewed for the 480V, 72EC load shedding control scheme and relay and limit switch contact developments.

The tripping schemes of tie breaker (position 1C) to bus 72ED, and line 72EC connected load feeder breakers in positions 2A, 2B, 2C, and 2D, were reviewed to verify load shedding control schemes. Undervoltage relays 27-XY, 27-ZX, and 27-YZ, in position 1A were reviewed for tripping and reset developments on as-built drawing 6I721-2578-20, Revision E, and the 480V tie disconnect tripping scheme was reviewed on schematic 6I721N-2573-34, Revision J.

During this review it was observed that the relay development for the undervoltage relays 27-XY, 27ZX, and 27-YZ during low 120VAC input with 130VDC control power ON, was missing on

appropriate as-built schematic 6I721N-2573-45, Revision I. This development would show the contact status of contacts 1-2, 5-6, 9-10 and 11-12 during normal and undervoltage conditions and with control power OFF or ON. The licensee has since reported issuing a change document ABE1453 to incorporate this information.

During review of the tripping scheme of the Bus 72EC 480v tie disconnect breaker to Bus 72ED, shown on as-built schematic 6172IN-2573-34, Revision J, it was observed that device 86 (lock out relay) was shown closing contacts 16-14. No development of this relay was shown on this drawing. The licensee later confirmed the device to be 27/72EC (under voltage relay) whose development was shown on the appropriate schematic 6I72IN-2573-45, revision I. The licensee has since reported to be correcting this device designation.

It was also observed that there was no reference to the development of contacts $\underline{52L}_{a}$ and $\underline{52L}_{b}$ on schematic 6I72IN-2573-34, Revision J. The licensee reported these to be internal contacts of the tie disconnect breaker, identified on the manufacturer's drawing ITE CB-K line, 5SD721-2548-3, Revision A. The licensee reported that they planned to reference this drawing on all appropriate schematics.

Pending review of corrections for the above identified discrepancy to as-built drawings 6SD721-2510-5, Revision J, 6I721N-2573, Revision I and 6I721N-2573-34 described in paragraphs (2)(c) & (2)(d), this is an open item (341/84-68-07)

c. Review of Road Map Procedure 11.000.54 Revision 0, Attachment 3

Electrical road maps for 480V and 4160V switchgear were reviewed for adequacy and clarity of information. The following discrepancies were observed.

(1) Attachment 3, page 3 of 47, refers to wiring diagrams as having modifications which deviate from standard internal connections. There was no clarification as to what these deviations entail.

(2) Attachment 3, page 13 or 47, refers to wiring diagrams as not always showing exact locations of devices. It could not be determined how many drawings and how much variation of location was being indicated.

(3) Attachment 3, page 14 of 47, indicates that schematics show relay and limit switch contact developments, "as applicable". It could not be determined what devices and developments were not applicable.

(4) Attachment 3, page 13 of 47, references wiring diagrams not to be lead documents for identifying spare cable conductors". There was no reference to the correct lead documents for identifying spares.

(5) Attachment 3, page 13 of 47, regarding the use of wiring diagrams states, "May not reflect as-built wiring configuration of actual equipment, but is functionally correct in accordance with lead document, schematic". This disposition was not considered acceptable because it is contrary to as-built requirements as it could inadvertently cause errors during maintenance.

The items above 6.c (1-5) are considered unresolved (341/84-68-08).

Section III

Prepared by R. Mendez

7. As-Built Program Review

a. The inspectors accompanied QA personnel on a walkdown of the division II core spray system. The walkdowns consisted of verifying connection and schematic diagrams in selected motor control centers, motor operated valves, 4kv switchgears, and control operating panels. Inside the panels and switchgear, the inspector and QA performed a visual verification and hand traced (where possible) conductor termination points to terminal blocks, relays, fuses and other associated electrical components.

The inspector observed the following discrepancies:

(1) Connection points on drawings 6SA721-2501-52 show that on terminal block 1B, two conductors terminate on points 5 and 6. According to the drawing, a number eight conductor is terminated on point 6 and a number twelve is terminated on point 5. The inspector observed that the above connections were reversed in the field. The drawing designates these conductors as being connected to the main current transformer on the incoming power leads. The connection of the No. 2 conductor should be to the ground of the current transformer, but according to the as-built connection, the No. 12 conductor was connected on the positive side of the current transformer. Both division II core spray pumps (B&D) have this discrepancy. This matter is considered unresolved pending further review to determine whether the drawing is incorrect or whether the field installation is incorrect. (341/84-68-09).

(2) During inspection of the 4KV switchgear core spray pump cubicle, the inspector observed that numerous termina| blocks had not been labeled in accordance with the connection diagrams. Labels were observed to be missing from most of the terminal blocks in the 4KV Bus No. 65E position E10 cubicle.

The inspector observed missing identification tags inside the cubicle for the following components LA, LB, LD, LC, AF, AE and AZ. The licensee does not have a current program in place to identify missing identification tags inside a cubicle. This matter will be reviewed in a subsequent inspection and is considered unresolved (84-68-03B).

(3) The inspector observed that inside the core spray pump D cubicle, the positive and negative conductor terminations were reversed when connected to current transducers identified as XCCC-5. Drawing 6SD721-2501-52 shows the black conductor connected to the negative terminal and the white conductor connected to the

positive terminal of the current transducer. The field installation was observed to be the reverse of the above connection. Additionally, the schematic diagram also indicates that the positive and negative connections do not agree with the field installation. The licensee stated that the termination of the other end is to an AC ammeter and was of no consequence. However, schematic diagram 6SD721-2211-4 shows the connection to a DC ammeter. It appears that testing or start up personnel switched the wiring without initiating the proper design change paper to revise the schematic and wiring diagrams. This matter is considered unresolved. (341/84-68-10).

(4) During observation of the terminations inside panel H11-623, the inspector noted an extra connection on points 9 and 10 on a relay identified in the panel as AX-K120. Drawing No. 6I721-2045-60, Revision H, which shows the control development of this relay, indicated that this was incorrect. These points were later verified to be normally closed contacts that were not identified during testing by startup personnel. These normally closed contacts are in series with control room indication and could if undetected provide false indication to control room operators. This issue is considered unresolved pending further review of this matter (341/84-68-11).

(5) The following are examples where the equipment connections were installed such that the electrical components will function as designed but are not in accordance with the connection and/or schematic diagrams. The licensee has indicated that they will identify and document the deficiencies and revise the connection diagrams to reflect as-built installation. These matters will be followed-up in subsequent inspections.

(a) Limitswitch compartment of core spray minimum flow bypass valve "B" was checked against drawing numbers 6I721-2211-9, Revision G. According to the drawing, the connection from terminal point 36 is a green block conductor, the field installation was observed to be red. The schematic diagram also shows this connection to be incorrect. The inspector observed that this field connection is properly terminated at motor control center cubicle E2150F031B. The above discrepancies were noted as deficiencies and documented by the licensee.

(b) During review of the connections inside a motor control center cubicle it was observed that the field terminations were CR to R to F relays instead of CR to F to R relays as shown on drawing 5SA721-2521-9, Revision B. Additionally, conductors identified as No. 10 and No. 12 to contactors F and R respectively, were not in accordance with this same drawing; also in this cubicle, the drawing indicated a ground at the 120V/24V transformer low side connection, while the connection was to the 480V/120V transformer low side connection.

The issues (5)(a), and (5)(b) above are considered unresolved (341/84-68-12).

b. Independent Review

During review of a part 21 report relating to hydrogen recombiner EF type circuit breakers, the inspector requested the trip set point data of EF3 breakers. The licensee's test procedure CAIO.000.26, "Approved for Checkout and Initial Operations Test Procedure," delineates acceptance criteria of breakers according to frame type but not for EF3 type breakers. The licensee presently has EF3-A010 and EF3-L050 type breakers mounted on the hydrogen recombiner power panel but has not received the instantaneous trip point data for short-circuit protection from the manufacturer. Pending review of whether the breaker operates within the manufacturer's applicable trip times, this matter is considered open (341/84-68-13).

Section IV

Prepared by Z. Falevits

8. As-Built Program Inspection Review

a. The inspector reviewed the as-built inspection program performed by the licensee utilizing the licensee's LDDI. The auxiliary relay room high pressure coolant injection relay cabinet H11-P620 was visually inspected by the NRC inspector to ascertain the effectiveness of the licensee's as-built verification program. The visual inspection consisted of a comparison between the number of wires landed at the panel terminal points and the number of wires shown on the applicable design drawings. This effort included relay terminations, plugs, etc...

The following discrepancies were identified:

(1) Schematic Diagram 6I721-2225-1, Revision K dated September 28, 1984, indicated the following:

(a) Contact 3-4 of relay K3 is being utilized to interlock valve E4150-F021. However, this contact was found to be a spare in panel H11-P620.

(b) Contact 3-4 of relay K4 is being utilized to interlock valve E4150-F021. However, this contact was found to be a spare in panel H11-P620.

(c) Contacts 1-7, 3-7 and 2-8 of relay K82 were being utilized to interlock relay K35. However, relay K82 was found to be a spare in panel H11-P620.

(2) Schematic Diagram 6I721-2225-1, Revision C dated October 4, 1984, indicated that contacts 1-2 of relay K92 are being utilized. Inspection of the relay in panel H11-P620 indicated that contact T1-M1 was being utilized.

(3) Schematic Diagram 6I721-2225-5, Revision I dated October 4, 1984, indicated that Fuse F22 was wired to TBDD point 13 and fuse F21 was wired to TBDD point 14. However, field and applicable connection diagram 6I721-2045-54, Revision L, indicated that F22 was wired to TBDD-14 and F21 was wired to TBDD-13. Items 8.a.(1)(2) and (3) are considered unresolved pending licensee action (341/84-68-14).

(4) The inspector reviewed the design connection and schematic diagrams which were updated by the licensee to include findings of the as-built walkdown program. The 260V DC motor control center 2PB-1 was reviewed. A visual inspection in the plant as well as an engineering review and evaluation of the design

drawings was performed. In order to review the as-built configuration of the DC MCC compartments, the inspector was required to refer to various design drawings which when put together would depict the actual as-built installation. This system appears to lead to confusion, possibly errors and difficulty in interpretation. The inspector identified various discrepancies inconsistencies and errors which were relayed to the licensee's design and supervising engineers.

Subsequently, the licensee presented the inspector with a modified design which will combine the various design documents into one standardized drawing which will depict the actual as-built configuration of the 260V DC MCC compartments. This change is presently being modified and incorporated by the licensee. This item is considered open pending NRC review of licensee final resolution (341/84-68-15).

(5) The inspector reviewed the analysis performed by the licensee on deviations identified during the licensee's as-built walkdown program. The shield for cable 234427-2C shown on schematic diagram 6I721-2221-5, Revision I, and connection diagram 6I721-2045-54, Revision L; was found in the field and terminated at panel H11-P620 TBAA-80 as indicated in the above connection diagram. The connection diagram also indicated that a jumper existed between TBAA-80 and TBAA-84. However, this jumper did not exist in the field. Review of the schematic diagram mentioned above, indicated that the shield of cable 234427-2C should be terminated on terminal block TBAA-84 which is jumpered internally to TB BB-59 and grounded thru plug J6 pin 5. The result of the shield being terminated to terminal TBAA-80 as found in field is the application of 130VDC into the shield of cable 23447-2C, and electrically tying two unrelated loops and logic schemes. Review of DEP C3500 I02 indicated that it was not implemented adequately as designed.

The licensee's disposition of this deficiency stated "no safety concern." The inspector requested that the licensee re-review the impact of the 130V DC being applied to the cable shield and document it in more detail. The licensee was also asked to identify the root cause of the inadequate implementation of the DCP in the field. This item is considered open pending licensee action (341/84-68-16).

(6) C&IO test procedure TF.000.017.01, Revision 4, dated January 25, 1983, relating to the tests and inspections performed to shielded cable 234427-26 indicated by the documented signatures of the test engineer that the cable was checked for proper termination (ref. 3.3), that the cable shield is grounded where applicable (ref. 7.1), that the cable was checked for proper phasing and continuity "working drawings" are yellow-lined (ref. 7.3). Contrary to the above, the

shield of the above cable was found ungrounded and improperly terminated during licensee's walkdown. This item is considered unresolved pending licensee review and action (341/84-68-17).

Additional as-built discrepancies were identified by the licensee's walkdown program which indicated to the inspector that a larger and more comprehensive as-built verification walkdown may be required. This effort should include comprehensive QA involvement.

(7) The NRC inspector observed the licensee's as-built verification walkdown on the division II core spray system. Results of the walkdown were reviewed by the NRC inspector during onsite meetings with licensee's management and engineering staff. Various discrepancies were identified between the as-built design documents and the as installed equipment in the field, for example:

(a) The NRC inspector identified two wires terminating at plug J6 in MCB panel H11-P602B511 while connection diagram 6I721-2006-12, Revision H, indicated this plug to be spare. Further review indicated that circuitry of the RHR steam condensing mode was removed from the drawings per FMR 4979 but were not removed physically in the field. Note the NRC open item 341/84-17-02 (still open) identified identical problems with implementation of various FMR'S addressing the removal of the RHR steam condensing mode circuitry.

(b) The NRC inspector identified 13 wires terminated at plug 15, connection diagram 6I721-2006-2, Revision D, indicated 12 wires. Further review indicated that this discrepancy was due to a drafting error.

(c) The NRC inspector noticed a yellow Information Tag at TB G-14 of panel H11-P855. The tag stated "Deleted BLB wire from term G14 as per drawing." Tag was not signed or dated. The disconnect link at TB G-14 was found open and the conductor terminated to left side of termination point 14 eventhough design drawing 6I721-2051-32, Revision G, required this wire be removed. This was also identified by the licensee during the engineering walkdown. Another yellow information tag No. 20 was found in panel H11-P854 term point TBC-84, it stated "Open link ckt has not been tested" and dated June 16, 1983.

(d) The NRC inspector identified BOP (OC) cable conductors terminated at same term points as a division II (2C) cable conductors.

Items a to d above are considered to be an open item (341/84-68-18).

(8) The licensee had identified various other discrepancies during the QA core spray as-built walkdown. Some typical findings are:

(a) More conductors found installed in field than specified in design drawings. (Ref. ABV005, ABV007, ABV025, ABV011)

(b) Electrical circuits found operable, however, as-built configuration does not agree with design drawings configuration. (Ref. ABV003, ABV016, ABV017, ABV018, ABV021, ABV023)

(c) Some jumpers shown twice on same drawings. (Ref. ABV006)

(d) Connection to devices in field not shown on design drawing, also tagging missing in field. (Ref. ABV008, ABV027, ABV028)

(e) Orientation of device does not agree with orientation of installed component. (Ref. ABV009)

(f) Conductor or terminals connections are reversed. (Ref. ABV012, ABV013, ABV014, ABV015, ABV016)

(g) Identification tags and numbers missing. (Ref. ABV012, ABV013)

(h) Relay contacts physically wired in circuit but not shown on design drawings and should have been removed in field. (Ref ABV022)

Some of above QC walkdown findings were identified during a previous engineering as-built walkdown, performed by the licensee. The resolution of these issues will be reviewed during future NRC inspections.

(9) The inspector reviewed a portion of the engineering as-built walkdown findings and analysis. The findings indicated that similiar discrepancies were discovered during the engineering walkdown; for instance:

(a) The temperature control circuit for the HPCI emergency fan cooler depicted in schmatic diagram 6I721-2611-42 conformed to the connection diagram and cable routing card CR7. However, field installation at H21-P538 did not conform to any of the above mentioned documents. Both the field run cable from the panel to the RTD and the panel internal wiring to the controller were not in conformance with the wiring schematic or the CR7. It appeared that the drawings had been last issued in 1981. A C&IO test was performed to this circuit in 1983 and this test was signed and dated indicating that the circuit tested conformed with the design documents. The Test and

Startup Engineer indicated that he had used a sketch to perform the test. This circuit was also tested under the T41-00 preoperational test. This matter is still under investigation by the licensee.

(b) SRV cabinet B21-401 contained approximately 75 (80%) mislabeled Brady tags on the internal conductors wired from the termination blocks to the various relays inside the panel. It appears that the relay numbers were changed by the manufacturer during fabrication of the panel and were not QC inspected properly in the field. This same problem applies to panel P50-P402A.

(c) At panel H21-P536 external cable conductors are designated 1, 2, 3, etc. While on the applicable connection diagram, designations for the same conductors are B, W, R, etc.

The small sample reviewed indicated to the NRC inspector that a more comprehensive as-built review will be needed to assure that the design documents conform to the as-built configuration in the field.

Subsequently, the licensee committed to a 100% as built walkdown on electrical safety related components.

(10) During the as-built review, the inspector examined FMR 7096, Revision 0, A and B. This FMR addressed the requirements of GE FDDR KH1-1041, Revision 0 to provide bypass of limiting resistors ED1-R1 during manual mode of RCIC turbine and GE FDDR KH1-1086, Revision 0, addressed the same in the HPCI turbine control. The inspector noticed that on sheet 4 of FMR 7096, Revision 0 and A, the circuit had been modified by the licensee's engineer and sent to the field for incorporation without written documented approval from GE for this change. Revision B of the FMR again modified the GE circuitry in a different way than Revision A, but no written approval was available. It also contained GE FDDR KH1-1086, Revision 0, without superseding it; therefore, having two open FDDRS addressing the same item.

Furthermore, review of incorporation of above FMR into the appliable design schematic diagram 6I721-2042-15, Revision F, indicated that the circuit shown on this drawing does not conform to FMR specifications and was modified during the incorporation into the drawing. Note that the drawing revision block reads: "Per FMR-7096, Revision B..." eventhough drawing did not reflect FMR-7096, Revision B as specified.

The above appears to be another example where an engineer or a draftsman modified a design drawing arbitrarily without following the specific requirements of the design change document.

This matter is considered unresolved (341/84-68-19).

(11) The inspector reviewed the undervoltage relay setting sheets against the settings on the relays in the field and compared the settings with Tech Spec Table 3.3.3-2, Section 3/4 3-27. Two discrepancies were noted. Bus 65F UV relay XY27B was tapped at 90V while relay setting sheet 3 dated August 22, 1983, indicated a tap value of 100V and the tech spec indicated a tap value of 106.8V ± 2.14 volts. Bus 65E UV relay XY27B was tapped at 90V while relay setting sheet 3 dated August 22, 1983, indicated a tap value of 100V and the tech spec indicated a tap value of 106.8V ± 2.14 volts.

Subsequently, the licensee presented the inspector with new relay setting sheets correcting the values to agree with the tech spec requirements. This was also done in the field (Test Form 42.302.02 R.O.). Letter EF2-71664 dated December 17, 1984 also addresses this subject.

(12) Review of C&IO Yellow Lined Master Drawing Process

(a) During a previous inspection, the inspector noted that Revision I of C&IO yellow lined master schematic diagram drawing 61721-2201-2 dated August 14, 1984, was missing from the master file (open item 341/84-57-02). Review by licensee indicated that the drawing was transmitted to the C&IO test section but did not arrive at its destination. Further review by the NRC inspector indicated that new revisions in the yellow lined master file which are not reviewed as yet by the test engineer are being thrown away after the next revision to the drawing arrives. This has been done by the Document Control Department per Startup Instruction No. 4.7.4.02, Revision 2, Paragraph 5.4 which states that "Superseded prints that do not have yellow markings on them are thrown away." However, this contradicts paragraphs 5.6, 5.8, 5.9 of the same procedure and with Startup Instructions Procedure 7.7.2.01, Revision 6, Paragraph 5.1.9, 5.1.10 which states that "When a new revision is received, the Satellite Document Control Clerk logs the drawing number and sends a memo to the startup test engineer (STE) indicating that there is a later revision and the prints must be reviewed. The new and old revisions of the drawing are given to the discipline STE for review. The print is reviewed and the STE determines if the change effects completed testing. If testing is not affected, the STE will transfer the yellow marking to the new revision, along with the date and name from the original drawing. The STE will then stamp, or markup the new revision with the "Does Not Change Test Documentation" stamp then circle, sign and date the transferred markings. The superseded drawing is then filed in the

system files in the SRC and the new revision is returned to the electrical prints files. If the drawing change invalidates completed testing, the portion of the old drawing is stamped, or marked up "Testing Void" and the STE initiates paper work to complete the revision and a new 7.8 form is generated to perform the necessary retesting.... The old revision is filed in the system file in the SRC and the new revision is returned to the electrical print files."

(b) The inspector examined yellow lined master file drawing 6I721-2201-2, Revision D thru J. The following discrepancies were identified.

1. Revision D was the drawing used for the initial C&IO test. Contrary to procedures 7.7.2.01, Revision 6, the print was not stamped superseded nor was it stamped "Testing Void" as required when portions of the scheme have been changed or subsequent revisions require new testing.

2. Revision E was missing from the file.

3. Revision F was not stamped "Testing Void" as required.

4. Revision G was completely retested and yellow lined but was stamped "Does Not Change Completed Test Documentation". Contrary to procedure requirements, the revision on the stamp indicated previous Revision H rather than F. The stamp "Yellow Lined Master" was stamped on the drawing but was not dated or signed.

5. Revision H was completely retested and yellow lined, but was also stamped "Does Not Change Completed Test Documentation". Contrary to procedure requirements, no date or signature was found on the stamp. The drawing was stamped "Yellow Lined Master" but was not signed or dated. A portion of the circuitry was yellow lined even though it was not tested yet.

6. Revision I was missing from the file.

7. Revision J was the latest revision, dated October 2, 1984. The "Yellow Lined Master" stamp was on the drawing containing date and signature.

During discussions with various engineers, it appeared that each engineer would perform the test, reviews, transfer information, and stamp and sign the design documents in his own way. None of the test engineers appeared to consistenly follow procedure 7.7.2.01 or

4.7.4.02. Further, during discussion with Document Control personnel, one newly hired clerk indicated that she would keep each new revision in the yellow line master file while another clerk stated that she had been throwing away the new revisions (those not reviewed yet by the STE) when a new revision was received.

The inspector informed the licensee that failure to comply with Document Control as well as the Startup Test Procedures is an item of noncompliance in accordance with 10 CFR 50, Appendix B, Criterion VI. (341/84-68-20)

9. Conclusions Regarding As-built Design Documents

In summarizing the as-built walkdown findings reported in the four detail sections of this report, it appears that some or all of the root causes that led to such deficiencies can be attributed to the following:

- Engineering design change documents being improperly written (FMR'S, DCN'S, DCP'S, DCR'S).

- Lack of criteria requiring the drawings to reflect as-built configuration.

- Incomplete and insufficient implementation of design documents in the field.

- Inadequate design review against the design change paper by the engineering staff.

- Inadequate QA/QC inspections and verifications on field work performed to design change documents to confirm accurate implementation.

- Configuration of the design drawing was modified during the C&IO testing phase without the issuance of proper design change documents to document the changes. It appears that changes to electrical systems were made during C&IO testing, however, these changes were not documented.

- Representation of electrical components on electrical design drawings do not appear to conform to one standardized conventional format.

- Management was unaware as to the importance of as-built drawings and their requirements.

These areas in conjunction with the open and unresolved items will be reviewed further in subsequent inspections.

10. Open Items

Open items are matters which have been discussed with the licensee which will be reviewed further by the inspectors, and which involved some

action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraphs 6.a.(3), 6.a.(4), 6.b.(3), 6.b.(4), 7.b., 8.a.(4), 8.a.(5), 8.a.(7).

11. 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. Unresolved items disclosed during the inspection are discussed in Paragraphs 5.b, 5.c, 6.a.(1), 6.c.(1-5), 7.a.(1), 7.a.(3), 7.a.(4), 7.a.(5), 8.a., 8.a.(6), 8.a.(10).

12. Exit Interview

The inspectors met with licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on January 12, 1985. The inspectors summarized the scope of the inspection and the findings. The licensee acknowledged an understanding of the open and unresolved items.