

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/84-65(DRS)

Docket No. 50-341

License No. CPPR-87

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

Facility Name: Fermi 2

Inspection At: Fermi 2 Site, Newport, MI

Inspection Conducted: December 10, 1984, through January 11, 1985

Inspectors: *W. A. Ring*
S. G. Dupont

D. E. Hills
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1/30/85
Date

1-28-85
Date

Approved By: *W. A. Ring*
M. A. Ring, Acting Chief
Test Programs Section

1/30/85
Date

Inspection Summary

Inspection on December 10, 1984 through January 11, 1985, (Report No. 50-341/84-65(DRS))

Areas Inspected: Routine, unannounced inspection by regional inspectors for followup on licensee actions in regard to inspector previous findings, preoperational test results review, preoperational test result evaluation verification, startup phase test procedure review, and preoperational test witnessing. The inspection involved a total of 103 inspector-hours onsite by two NRC inspectors including 34 inspector-hours onsite during off-shifts. In addition, the inspection involved 122 inspector-hours in the Regional office.

Results: Of the five areas inspected, no items of noncompliance or deviations were identified in four areas. Within the remaining area, one item of noncompliance was identified (inadequate quality inspection-Paragraph 2.c).

DETAILS

1. Persons Contacted

- *F. A. Agosti, Manager, Nuclear Operations
- *R. S. Lenart, Superintendent, Nuclear Productions
- *G. R. Overbeck, Assistant Superintendent, Nuclear Productions
- *W. M. Ripley, Startup Engineer
- *T. S. Nickelson, Assistant to the Startup Engineer
- *J. F. Bross, Startup Assurance Engineer
- *J. E. Conen, Engineer, Licensing
- *G. M. Trahey, Director, Nuclear Quality Assurance
- *W. Miller, Supervisor, Nuclear Quality Assurance

The inspector also interviewed others of the licensee's Startup, Nuclear Production, and Quality Assurance staff.

*Denotes personnel attending the exit interview of January 11, 1985.

2. Action on Previous Inspection Findings

- a. (Closed) Noncompliance (341/84-36-01(DRS)): Failure to identify, disposition, or correct an inoperable Hydraulic Control Unit (HCU) ball check valve which caused the HCU accumulator to be unable to maintain pressure above the low pressure alarm setpoint during preoperational testing. This noncompliance is retracted because the revision of the General Electric Standard Technical Specification utilized by DECo was Revision 4, a proposed revision. The regional staff, nonetheless, utilized Revision 2, an approved revision to the Standard Technical Specification. The difference between the two revisions is significant in that Revision 2 requires the conductance of the pressure drop test to verify that the low pressure alarm setpoint is not exceeded within 20 minutes with no control rod drive pump flow for each individual accumulator. Revision 4 requires either a verification test, such as is required by Revision 2, or to only measure and record the time that each individual accumulator maintains the accumulatory pressure above the low pressure alarm setpoint with no control rod drive pump flow. DECo's current Technical Specifications require only the measurement and recording of the time to the low pressure alarm setpoint. As indicated by NRR, DECo Technical Specifications will be approved as submitted. Since Revision 4 has an option to the requirement, the applicable requirements are determined by the plant specific design and this issue has been submitted to the Generic Issue Branch by NRR for resolution.

- b. (Closed) Noncompliance (341/84-37-04(DRS)): Inadequate procedure shutdown margin check. The inspector verified that procedure 54.000.01, Shutdown Margin Check, had been revised to correct the deficient calculations used to determine total reactivity correction, actual K-critical and shutdown margin.
- c. (Closed) Open Item (341/84-11-02(DRS)): Review implementation of design change to primary containment isolation valve solenoids to the T4800 and T4600 containment systems. As documented in RIII Inspection Report 341/84-46(DRS) the inspector reviewed the proposed modifications, Design Change Request (DCR) I-2291, Revision B, and Field Modification Request (FMR) 6489, Revision D, and found them to be acceptable. However, during the installation of the modifications DECo Engineering discovered that both the DCR and FMR had been implemented incorrectly to all 16 solenoids.

The inspector reviewed the modification documents and determined that the copper tubing required by DCR I-2291 had been installed by Bechtel (field) incorrectly to the wrong port. The operating air had been installed to the exhaust port (connection 1) on the solenoid while the stainless steel required by FMR 6989 had been installed to the operating port (connection 2). This is the reverse of the instructions and drawings enclosed in both DCR I-2291 and FMR 6989.

In addition to the modifications being implemented incorrectly, three Maintenance and Modification (M&M) Quality Assurance inspectors failed to detect the error in the QA Level I FMR 6989.

In all cases the inspectors had signed both the Maintenance Inspection Checklist (MIC) and the Bechtel Form 14124-FMP-3.0, Revision 2, that they had verified the correct installation of the tubing to all 16 solenoids. Even though the FMR had indicated in the description, the step-by-step procedure, and two sets of drawings that the stainless steel tubing was to be connected between connection 1 and the exhaust, all three inspectors had failed to detect the obvious error on any of the 16 solenoids that they had inspected.

The inspector interviewed one of the M&M QA inspectors involved with verifying the implementation of FMR 6989 and was unable to determine the cause of the inadequate inspection. It was determined by the inspector nonetheless, that the FMR instructions were clear and detailed and that the work requests, PN-21 970703 and 970704 for implementation of the FMR, clearly stated what was to be inspected.

Because of the incorrect installation of the exhaust lines, these 16 solenoid-actuated valves would not have performed as required during an automatic primary containment isolation, preventing the system to respond as required by the safety analysis. This error would have been eventually detected by preoperational re-testing of Test Exception Disposition Report TEDR-10 of preoperational test PRET T4800.001. However, it is not acceptable to maintain the quality and safety of a plant by relying only on the quality of testing without an effective and meaningful quality assurance inspection program.

This is an item of noncompliance (341/84-65-01(DRS)) in that the licensee's quality assurance staff failed to perform an adequate inspection of a design modification implementation that would have adversely affected the quality and safety of the plant.

Because of the failure of a significant number of the licensee's M&M QA staff to perform an adequate inspection of a design modification, the licensee is requested to provide an explanation of how they will ensure the implementation of all QA Level 1 design modifications currently being performed.

No other items of noncompliance or deviations were identified.

3. Preoperational Test Results Review

The inspector reviewed the results of the following tests against the FSAR, SER, and Regulatory Guide 1.68 and determined that all test changes were processed in accordance with the applicable administrative procedures, test deficiencies were processed and corrected as required, results were evaluated and met the acceptance criteria, and the results were reviewed and approved as required:

*PRET. B2100.001	Nuclear Boiler System
*PRET. E1151.001	Residual Heat Removal Service Water System
*PRET. E4100.001	High Pressure Coolant Injection System
*PRET. E5100.001	Reactor Core Isolation Cooling System
*PRET. P4200.001	Reactor Building Closed Cooling Water System
*PRET. G3300.001	Reactor Water Cleanup System
*PRET. C1109.001	Rod Sequence Control System
*PRET. R3000.003	Emergency Diesel Generator Load Profile Test
*PRET. T4600.001	Standby Gas Treatment System
*PRET. T4100.001	Reactor Building Heating, Ventilation, and Air Conditioning System

*Denotes systems accepted for turnover by DECo Nuclear Production.

No items of noncompliance or deviations were identified.

4. Preoperational Test Result Evaluation Verification

The inspector verified that the following preoperational test results were documented, reviewed, and approved by the licensee in accordance with the requirements of Regulatory Guide 1.68 and the QA Manual and found them to be satisfactory:

PRET. P5002.001	Control Air System
PRET. P1100.001	Condensate Storage System
PRET. P4100.001	General Service Water System
PRET. U4100.001	Turbine Building Heating and Ventilation System
PRET. P4400.001	Emergency Equipment Cooling Water System
PRET. P3322.001	Liquid and Solid Waste Process Sampling System

No items of noncompliance or deviations were identified.

5. Startup Phase Test Procedure Review

The inspector reviewed the following startup phase test procedures against the FSAR, Regulatory Guide 1.68, the QA Manual, the Startup Manual and Instructions, and other regulatory commitments, and found them to be acceptable.

STUT. HUA.015	High Pressure Coolant Injection (HPCI) System-1000 PSIG Hot Injection
STUT. HUB.015	HPCI - 1000 PSIG Hot Injection (Extended Operation)
STUT. HUC.015	HPCI - 150 PSIG Hot Injection
STUT. HUD.015	HPCI - 150 PSIG Cold Injection
STUT. 03E.015	HPCI - Hot Vessel Injection
STUT. 03F.015	HPCI - Cold Vessel Injection
STUT. 03G.015	HPCI - 1000 PSIG Cold Injection (Base Line Data)
STUT. 03H.015	HPCI - Cold Vessel Injection (Second Run)

No items of noncompliance or deviations were identified.

6. Preoperational Test Witnessing

The inspector witnessed the following preoperational tests and reviewed associated records to ascertain that testing was conducted in accordance with approved procedures. Additionally, the performance of licensee personnel was evaluated during the test and found to be satisfactory.

a.	PRET. T2303.001	Primary Containment Vacuum Breakers System
b.	PRET. R3202.001	48/24 Voltage Direct Current System

The inspector witnessed the performance of Supplemental Test (STF) No. 6 which was conducted to disposition various problems encountered in the original test with establishing and maintaining certain testing conditions as documented by Test Exception Disposition Reports (TEDR) Nos. 12, 13, 14, 15, and 16. This retesting involved test section 6.1.6.2 consisting of a performance discharge test of the 2IA battery to verify that the battery capacity is at least 90% of the manufacturer's rating. Prior to the start of the discharge test, it was determined in test step 6.1.6.2.e.1 that cells Nos. 1 and 5 did not meet the prescribed condition of being within 0.04 volts of the average cell voltage for each bank and were in fact less than 2.13 volts even though the battery had been equalize charged. As documented in TEDR No. 20, the licensee decided to continue testing and to allow engineering to evaluate any impact on the test results. In addition, when the dummy load was applied in test step 6.1.6.2.g, the Battery Bank A1 load was 0.3 amps too low for about 30 seconds in meeting the prescribed tolerance of 9.375(-0,+1) amps. The slight adjustment required to bring the applied load within tolerance was delayed several seconds because the Digital Volt Meter (DVM) measuring the applied load had been initially set to the wrong scale. Therefore, a correct reading to use in adjusting the applied voltage was not obtained until the problem with the DVM had been discovered and the correct scale selected. Per TEDR No. 21, the licensee decided to allow engineering to also evaluate this occurrence for impact on the test results. At six hours and seven minutes into the test, cell No. 1 dropped to less than one volt (approaching reversal of its polarity) and thus was shorted to prevent cell reversal and possible subsequent damage. A new minimum terminal voltage was then determined for Battery Bank A1 based on the remaining cells. The failure of cell No. 1 was documented for later disposition in TEDR No. 22. As determined by the licensee and verified by the inspector's independent calculations, the remaining cells easily exceeded the acceptable percentage capacity for the 2IA Battery. The percentage capacity determined for Battery Bank A1 was 113.1% and for Battery Bank A2 was 118.1% as compared to the acceptable value of at least 90% of the manufacturer's rating.

In addition, the inspector also witnessed test section 6.1.6.3 consisting of a performance test of Battery Chargers A1 and A2 to ensure that they can recharge the battery in 24 hours following a performance discharge while also supplying the normal DC loads. It was determined that the Battery Charger A1 current limit adjustment had initially allowed the output current to raise to approximately 28.5 amps and the Battery Charger A2 output current to peak at 28.0 amps. Procedure step 6.1.6.3.c.1 specifies that the charger output current should be verified at 28.0 amps or less and thus Battery Charger A1 was reset to 27.5 amps about 15 to 30 minutes into the test and TEDR No. 23 was initiated to provide disposition. The charger output current decreased from these values over the 24 hour time period as is expected when the battery charges. The proposed disposition to TEDR No. 23 was to recalibrate the

Battery Charger A1 and A2 current limit setpoints to the recommended 110% of manufacturer's rating (27.5 amps for the 25 amp chargers). In evaluating the test data, the inspector also verified that, as expected, the battery voltage increased to approach the charger output voltage as the cells approached full charge. As determined by the licensee and verified by the inspector's independent calculations, the manufacturer's rating of 82.5 amp-hours was achieved in less than seven hours and the total charging at the end of the 24 hours time period was 86.88 amp-hours for Battery Bank A1 and 90.62 amp-hours for Battery Bank A2. The cell voltages were also verified to be within 0.04 volts of the average cell voltage for each bank after the chargers were disconnected.

Therefore, the performance discharge testing of the 21A Battery and the performance testing of Battery Chargers A1 and A2 indicated that this equipment meets the specified requirements. In addition, the inspector verified that the tests were conducted in accordance with IEEE 450-1972 as committed to in the DECo FSAR Appendix A. However, the low voltages of cells Nos. 1 and 5 after equalize charging prior to the battery performance discharge test, the low applied load on Battery Bank A1 for a very brief time period at the beginning of this test, the failure of cell No. 1 during this test, and the initially higher charger output current during the battery charger performance test require an engineering evaluation to determine the impact of the acceptability of test results or possible subsequent corrective actions for disposition as documented in TEDRs Nos. 20, 21, 22, and 23. Of particular concern is the approach of cell No. 1 to polarity reversal which is considered to be a good indicator for further investigation into the need for individual cell replacement.

No items of noncompliance or deviations were identified.

7. Exit Meeting

The inspectors met with site representatives (denoted in Paragraph 1) at the conclusion of the inspection on January 11, 1985. The inspectors summarized the scope and findings of the inspection.