

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/94005 (DRP)

Docket No. 50-341

License Nos. NPF-43

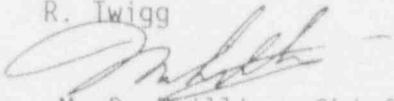
Licensee: Detroit Edison Company  
2000 Second Avenue  
Detroit, MI 48226

Facility Name: Fermi 2

Inspection At: Fermi Site, Newport, Michigan

Inspection Conducted: February 8, 1994, through March 31, 1994

Inspectors: K. Riemer  
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Approved By:  M. P. Phillips, Chief  
Reactor Projects Section 2B

4/12/94  
Date

Inspection Summary

Inspection from February 8, 1994, through March 31, 1994  
Report No. 50-341/94005(DRP)

Areas Inspected: Routine, unannounced safety inspection by the resident inspectors of actions on previous inspection findings; operational safety verification; current material condition; housekeeping and plant cleanliness; radiological controls; security; regional requests; LER followup; maintenance and surveillance activities; engineering and technical support; fuel handling; and report review.

Results: Of the 12 areas inspected, one violation was identified that pertained to operation of plant valves by an unauthorized individual (paragraph 6.a). Two unresolved items were identified that pertained to the seismic consideration of flow instrumentation associated with the Emergency Diesel Generator Service Water system (paragraph 6.a) and MOV testing (paragraph 7.a). Two Inspection Followup Items were identified that pertained to check valves located in sump drain lines between the Radwaste and Reactor Buildings (paragraph 3.a) and to the governing procedure for work planning (paragraph 6.a).

The following is a summary of the licensee's performance during this inspection period:

### Plant Operations

The licensee's performance in this area was mixed. The activities associated with the CST discharge evolutions were conducted in a professional and satisfactory manner. However, housekeeping, especially in the turbine building, was poor. Also, activities associated with the resumption of CST cleanup following diver cleanup evolutions were inadequate and resulted in a spill in the CST dike area.

### Maintenance and Surveillance

The licensee's performance in this area was adequate. The work planning associated with the replacement of an EDG service water flow gauge resulted in a work package being inappropriately released to the field of work. An instance was noted (documented initially in a prior NRC inspection report) where a case of procedural violations resulted in a plant transient and challenge to control room operators.

### Engineering and Technical Support

The licensee's performance in this area was adequate. Errors associated with entering the wrong valve stem diameter into the VOTES testing software program resulted in an apparent over thrust condition of Valve P4400-F615 and subsequent surveillance failure of the valve. Also, the seismic qualification of flow instrumentation associated with the EDG service water system was not completed or documented when the equipment was upgraded to a Seismic Level 1 Category.

## DETAILS

### 1. Persons Contacted

#### Detroit Edison Company

S. Bartman, Supervisor, Chemistry  
J. Bragg, Group Leader, QA Audits  
\*K. Burke, NASS/Work Control  
\*C. Cassise, General Supervisor, Maintenance  
\*J. Clark, NSS, Operations  
\*J. Crews, Consultant, Licensing  
\*R. DeLong, Superintendent, Radiation Protection  
\*R. Eberhardt, Assistant to Plant Manager  
\*P. Fessler, Manager, Technical  
\*L. Fron, Supervisor, Turbine  
\*T. Gibbs, NIRA, I&C  
D. Gipson, Senior Vice President, Nuclear Generation  
\*L. Goodman, Director, Nuclear Quality Assurance  
\*E. Hare, Senior Compliance Engineer  
H. Higgins, Supervisor, Operations Support  
\*K. Howard, Supervisor, Mechanical & Civil Engineering  
\*J. Hughes, General Supervisor, Maintenance  
J. Korte, Director, Nuclear Security  
\*J. Malaric, Supervisor, Modifications  
R. Matthews, Supervisor, Shift Testing  
\*R. McKeon, Assistant Vice President and Manager, Operations  
\*W. Miller, Superintendent, Technical  
\*D. Nordquist, Director, NQA  
\*D. Nastally, GMJ, Maintenance  
\*R. Newkirk, General Director, Regulatory Affairs  
\*E. Nickolite, GS ICMA, Maintenance  
\*J. Nolloth, Superintendent, Maintenance  
\*J. Nyquist, Supervisor, Safety Engineering  
\*D. Ockerman, Director, Nuclear Training  
\*H. Ortiz, GMJ, Maintenance  
J. Pendergast, Compliance Engineer  
\*G. Pierce, Supervisor, Work Control  
\*J. Plona, Superintendent, Operations  
D. Powell, Nuclear Shift Supervisor, Operations  
\*W. Romberg, Assistant Vice President and Manager, Technical  
T. Schehr, Supervisor, Work Planning  
G. Smith, Director, Nuclear Fuel  
\*R. Stafford, Manager Nuclear Assurance  
\*R. Szkotnicki, Supervisor, Inspection & Surveillance  
J. Tibai, Compliance, Licensing  
\*V. Vuyovich, Superintendent, Maintenance  
J. Walker, Director, Plant Engineering

\*Denotes those attending the exit interview conducted on March 31, 1994.

The inspectors also had discussions with other licensee employees, including members of the technical and engineering staffs, reactor and

auxiliary operators, shift supervisors, and electrical, mechanical and instrument maintenance personnel, and security personnel.

2. Action on Previous Inspection Findings (92701)

- a. (Closed) Unresolved Item (341/92021-04(DRP)): Observations of the Division I CCHVAC outage led to a concern with the lack of effective work planning although the outage that had been scheduled for several weeks. Based on these observations and an NIAS actuation caused by inadequate work planning, the effectiveness of work planning was considered an Unresolved Item by the NRC. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.
- b. (Closed) Unresolved Item (341/92021-07(DRP)): Concerns were identified with LER 92008 "65 Bus De-Energized During Surveillance." Corrective actions included continued training in the areas of shutdown cooling and "repeat-back" communications. This matter is considered closed.
- c. (Closed) Unresolved Item (341/93004-03(DRP)): While witnessing work on the Electrical Protection Assembly (EPA) Breaker for reactor protection Motor Generator Set "B", the inspectors identified problems with the lifting of leads and discrepancies in the Interim Alteration Checklist. Neither the inspectors nor the licensee had identified similar lifted lead problems. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.
- d. (Closed) Unresolved Item (341/93004-04(DRP)): Work Request (WR) 00Z923690 issued to install a new EPA breaker was marked N/A (not applicable) for an Abnormal Lineup Sheet (ALS) and applicability for a limiting condition of operation (LCO). The method used to authorize work was not clearly defined in the station's administrative procedures. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.
- e. (Closed) Unresolved Item (341/93010-01(DRP)): On June 2, 1993, operators isolated both trains of the Standby Liquid Control (SLC) system per Abnormal Lineup Sheet (ALS) 93-0719 and entered LCO 93-194 to allow for removal of the SLC pump "B" relief valve for corrective maintenance and installation of blank flanges. The inspectors determined that the proper system lineup and isolation, as required by the work request and temporary modification instructions, was not established for this particular job and the SLC "A" system was returned to service without "locking open" the pump discharge valve. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.

- f. (Closed) Unresolved Item (341/93010-05(DRP)): Concerns with not documenting completed steps in work requests (WRs) appeared to be indicative of insufficient attention to detail or understanding of requirements. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.
- g. (Closed) Violation (341/93010-06(DRP)): Failure to identify acceptance criteria for Technical Specification (TS) Surveillance Requirement 4.5.1.d.2. This TS surveillance was to verify that safety relief valves for the Standby Liquid Control System did not actuate during recirculation to the test tank. The surveillance procedure was revised to include adequate acceptance criteria for TS 4.5.1.d.2. This matter is considered closed.
- h. (Closed) Unresolved Item (341/93010-07(DRP)): The inspectors were concerned that inadequate preparation and planning for work that required isolation of the "B" Train of Standby Liquid Control (SLC) may have led to unnecessarily removing the safety system from service and entering an LCO. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.
- i. (Closed) Inspection Followup Item (341/93018-02(DRP)): The use of mixed compression fittings in the field may have been indicative of lax maintenance practices (inattention to detail with respect to procedural requirements) in ensuring that proper components were being used while installing compression fittings. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.
- j. (Closed) Unresolved Item (341/93018-04(DRP)): Licensee's corrective actions for past problems associated with jumper removal. The inspectors reviewed LERs associated with events resulting from jumper removals and had no further concerns. This item is considered closed.
- k. (Closed) Unresolved Item (341/93018-05(DRP)): Repetitive problems with Modular Power Units (MPU) and Valve G3300F120. There had been several failures of voltage regulators for MPUs. Also, Valve G3300F120, the Reactor Water Clean-Up (RWCU) to Feedwater Spring Assist Close Check Valve, failed Surveillance 24.707.001 on October 6, 1993. The licensee's investigation determined that the wrong spring had been installed in the actuator during a replacement in April 1993. Further review of the maintenance history for Valve G3300F120 by the inspectors determined that since 1990 there have been actuator problems noted in several work requests. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.

- l. (Closed) Unresolved Item (341/93018-07 (DRP)): Potential common mode failure for motor operated valves (MOV). In January 1993, the Maintenance Effectiveness Group initiated Potential Design Change (PDC) 13770 to request engineering assistance to determine root cause of MOV failures. Engineering personnel initiated an investigation into the root cause of the MOV failures in September, 1993. Even though the licensee had commenced a thorough investigation, the inspectors did not consider the investigation into the potential problems with MOV auxiliary contacts as timely. Based on corrective actions implemented by the licensee in response to an escalated enforcement issue, this item is considered closed.
- m. (Closed) Unresolved Item (341/93025-01 (DRP)): On December 3, 1993, a maintenance worker opened a drain valve on Instrument Rack H21-P423A during a maintenance activity and the excess flow check valve in the associated instrument line closed, resulting in the isolation of the "C" Steam Flow Instrument Line. This resulted in a plant transient which is described in inspection report 50-341/93-010. This item is closed based on the issuance of a violation described in paragraph 6.a of this report.
- n. (Open) Inspection Followup Item (341/93028-01(DRP)): On January 27, 1994, a loss of Division I offsite power resulted in a loss of the Division I reactor protection system (RPS) MG set and caused a loss of shutdown cooling. The division I Emergency Diesel Generators (EDGs) also received an automatic start signal on bus undervoltage. The loss of Division I offsite power was initiated by a fault in one of the three incoming 120 kV lines to the Division I switchyard while the area was experiencing an ice storm with freezing rain. This item is further discussed in paragraph 7.e of this report. This item will remain open pending further NRC review of licensee actions.
- o. (Closed) Inspection Followup Item (341/93028-02(DRP)): On January 29, 1994, a fire occurred in the turbine building passenger elevator shaft. Operators declared an Unusual Event based upon a fire in the plant not being brought under control within ten minutes. This followup item is further discussed in paragraph 7.d of this report. This matter is considered closed.
- p. (Open) Inspection Followup Item (341/93028-03(DRP)): Subsequent to the December 25 turbine failure event, oil was observed dripping from several locations in the turbine building HVAC (TBHVAC) exhaust ductwork. Chemical analysis of the oil showed that the oil was related to the turbine generator. The licensee cleaned the ductwork and removed approximately 500 gallons of oil. Subsequent to the cleaning evolution, the licensee performed a fire protection walkdown to verify that the level of cleanliness was acceptable from a fire protection standpoint. At the end of the inspection period, the TBHVAC system remained shut down for other maintenance activities.

Pending licensee restart and successful operation of the system, this item remains open.

3. Plant Operations

Fermi 2 remained in cold shutdown for the inspection period due to the extensive outage activities required as a result of the December 25, 1993 turbine generator failure.

a. Operational Safety Verification (71707)

The inspectors verified that the facility was being operated in conformance with the license and regulatory requirements, and that the licensee's management control system was effective in ensuring safe operation of the plant.

On a sampling basis, the inspectors verified proper control room staffing and coordination of plant activities; verified operator adherence with procedures and technical specifications; monitored control room indications for abnormalities; verified that electrical power was available; and observed the frequency of plant and control room visits by station management. The inspectors reviewed applicable logs and conducted discussions with control room operators throughout the inspection period. The inspectors observed a number of control room shift turnovers. The turnovers were conducted in a professional manner and included log reviews, panel walkdowns, discussions of maintenance and surveillance activities in progress or planned, and associated LCO time restraints, as applicable.

On February 24-25, and again on March 15-16, the licensee discharged the contents of the Condensate Storage Tank (CST) to the environment. The excess water resulted from the December 25, 1993 turbine generator failure event. The pre-evolution briefs for the discharge were appropriate and thorough; responsibilities, points of contact for problem resolution, and specific contingencies and required actions for abnormalities that might be encountered during the event were all discussed prior to commencing the discharge. The inspectors provided continuous, 24 hour coverage for the first discharge and periodic coverage throughout the second. The inspectors had no concerns with the conduct or performance of the discharge evolution. The water treatment process, sampling program, and sample analysis results are further discussed in NRC Inspection Report 50-341/94-003.

Throughout the inspection period, the inspector noted several instances of inappropriate housekeeping and material control. On February 22, 1994, the inspector observed bags of insulation, hoses, and scaffolding material staged against, or laying on, piping on the turbine deck. There were no safety concerns with most of the noted items since the affected piping was large diameter piping and did not appear to be adversely impacted by the

materials. However, one instance was noted where several bags of insulation material were laying on top of instrument tubing. The inspector discussed his observations with the turbine deck supervisor and the Nuclear Shift Supervisor (NSS) and appropriate corrective actions were taken. On March 16, the inspector observed a large wheeled cabinet staged in the Reactor Building for refuel outage activities. The cabinet was secured and roped off to a handrail protecting the Division I Jet Pump flow and pressure instrumentation rack. The instrumentation rack itself was labeled with a "Caution" sign stating that the rack contained sensitive instrumentation and that NSS approval was required for any activity. In addition, the cabinet contained a side door that was unlatched and partially open; had the door swung fully open, it would have impacted on Rosemount transmitters associated with the Main Steam Isolation Valve (MSIV) Leakage Control System Instrumentation Panel. The inspector discussed his observations with the NSS and the cabinet was relocated and secured in a different location. During a Turbine Building tour on March 18, the inspector noted handtools and other equipment stored in a cable tray. During the same tour, scaffolding was also noted to be in contact with instrument tubing associated with the East Moisture Separator Reheater (MSR). The tubing was bent but the inspector was unable to determine if the bend was due to the contact with the scaffolding or was a pre-existing condition. On March 25, the inspector noted that scaffolding erected at the South end of the East MSR was in contact with an open, hinged access cover plate on the MSR. The cover plate, which would normally hang straight down in the vertical position when open, was pushed back as a result of the contact with the scaffolding. The cover plate then impacted on instrument tubing associated with the MSR and caused it to skew slightly in its support bracket. The inspector again discussed his observations with the NSS and the discrepancies were subsequently corrected. Prior to the end of the inspection period, the licensee appointed an individual from the Corporate Safety Department to oversee housekeeping activities on the turbine deck.

During the NRC's Augmented Inspection Team (AIT) review of the December 25, 1993, turbine generator failure event (reference NRC inspection report 50-341/93-029), several questions were raised concerning backflow of water from the Radwaste Building to the Reactor Building. Specifically, the AIT questioned what measures were available to prevent water from backflowing from the Radwaste Building to the Reactor Building through the Reactor Building and drywell sump discharge lines. The AIT learned that check valves were installed in the individual sump pump discharge lines; however, the check valves are not in the ISI program and have no record of maintenance or testing associated with them. The licensee initiated a DER to investigate the need to include the valves in a regular maintenance or testing program. Pending licensee closure of the DER, and NRC review of the results, this is an Inspector Followup Item (341/94005-01(DRP)).



b. Current Material Condition (71707)

The inspectors performed general plant as well as selected system and component walkdowns to assess the general and specific material condition of the plant, to verify that work requests had been initiated for identified equipment problems, and to evaluate housekeeping. Walkdowns included an assessment of the buildings, components, and systems for proper identification and tagging, accessibility, fire and security door integrity, scaffolding, radiological controls, and any unusual conditions. Unusual conditions included but were not limited to water, oil, or other liquids on the floor or equipment; indications of leakage through ceiling, walls or floors; loose insulation; corrosion; excessive noise; unusual temperatures; and abnormal ventilation and lighting. No significant discrepancies were identified other than those discussed in Section 3.a above.

c. Housekeeping and Plant Cleanliness

The inspectors monitored the status of housekeeping and plant cleanliness for fire protection and protection of safety-related equipment from intrusion of foreign matter. Housekeeping was adequate throughout the inspection period. The inspectors identified several housekeeping deficiencies during the conduct of plant tours (reference Section 3.a above for details).

d. Radiological Controls (71707)

The inspectors verified that personnel were following health physics procedures for dosimetry, protective clothing, frisking, posting, etc., and randomly examined radiation protection instrumentation for use, operability, and calibration.

On March 29, 1993, divers entered the CST to perform a vacuum operation in support of CST cleanup activities. To facilitate diver entry into the tank, the discharge hose from the temporary cleanup trailer back to the CST was removed from the CST opening. The end of the hose was bagged and tagged per appropriate Radiation Protection procedures. On March 30, contractors in charge of the temporary cleanup trailer attempted to pump a disposal tank back to the CST while another contractor organization repaired the CST cleanup pump. This evolution utilized the normal return line from the trailer to the CST. However, the return hose from the trailer to the CST had not been placed back into the CST opening and was still laying on top of CST with the end bagged. Approximately 30 gallons of water spilled on to the top of the CST and into the dike area before the pumping evolution was secured. Frisks and sampling of the water were negative. The licensee's corrective actions in response to the incident included the following: stopping all work with the exception of area cleanup; critiquing the event; documenting the event via the DER process; and issuing a change to the CST

operating procedure to require a Fermi operator to have overall cognizance for any CST evolution. This item will be further reviewed during a routine NRC RP inspection.

e. Security (71707)

Each week during routine activities or tours, the inspectors monitored the licensee's security program to ensure that observed actions were being implemented according to the approved security plan. The inspectors noted that persons within the protected area displayed proper photo-identification badges, and those individuals requiring escorts were properly escorted. Additionally, the inspectors also observed that personnel and packages entering the protected area were searched by appropriate equipment or by hand.

No violations or deviations were identified.

4. Regional Request (92701)

The Region III office requested information pertaining to the licensee's response to Information Notice 89-77, Supplement 1, "Debris In Containment Emergency Sumps And Incorrect Screen Configurations." The inspectors' assessment of the licensee's response is documented in paragraph 7.c of this report.

5. Safety Assessment/Quality Verification (40500 and 92700)

a. Licensee Event Report (LER) Follow-up (92700)

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, that immediate corrective action was accomplished, and that corrective action to prevent recurrence had been or would be accomplished in accordance with Technical Specifications (TS):

(Closed) LER (341/92002): An inadvertent ESF actuation resulting in a manual scram. The inadvertent actuating signal was caused by a short circuit condition in a digital multimeter (DMM) during a surveillance. The short circuit occurred when the DMM function select rotary switch was placed at a midposition. The licensee has removed this type of DMM from service and implemented procurement controls to require testing of all test equipment with rotary switches capable of producing midposition short circuits.

In addition to the foregoing, the inspector reviewed the licensee's Deviation Event Reports (DERs) generated during the inspection period. This was done in an effort to monitor the conditions related to plant or personnel performance, potential trends, etc. DERs were also reviewed to ensure that they were generated appropriately and dispositioned in a manner consistent with the applicable procedures.

No violations or deviations were identified.

6. Maintenance/Surveillance (62703 & 61726)

a. Maintenance Activities (62703)

Routinely, station maintenance activities were observed and/or reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with technical specifications.

The following items were also considered during this review: limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; and activities were accomplished by qualified personnel.

Portions of the following maintenance activities were observed or reviewed:

- 000Z932534 Receive, Transport, and Inspect New Fuel
- E015930217 Uncouple RHR Pump 'A' Motor From Pump
- 000Z941992 Repair Close Coil for Booster Pump Suction From Torus Isolation Valve
- E539930223 Perform MOV Thrust Test/RCIC Turbine Exhaust Line Isolation Valve
- 000Z940451 Repair Generator Rotor
- 000Z940427 Inspect & Repair HP Turbine Rotor
- 000Z940425 Inspect & Repair LP-1 Rotor
- 000Z940426 Inspect & Repair LP-2 Rotor
- 000Z940423 Inspect & Repair LP-3 Rotor
- 000Z942172 Troubleshoot/Test/Repair Cause of XFMR 72C Bad Lamination Megger Readings
- 000Z941249 Clean TBHVAC Ductwork of Oil
- 000Z932716 Replace EDG-11 Service Water Flow Switch

On February 24, 1994, the inspector noted that work being performed on Barton Transmitter R30N569A, Emergency Diesel Generator 11 Service Water Pump "A" Water Flow Low, was not in accordance with the original work package. The original work package was to replace the Barton transmitter with a new transmitter because of calibration problems. Although the Work Planning Group had not released the work package because the new transmitter had not yet been qualified as Quality Assurance level Q1 by the Material Engineering Group (MEG), I&C personnel coordinated with the MEG group to conduct the necessary test to certify the new transmitter. A different work planner, not associated with the preparation of the original work package, helped prepare the package for release to the field. In the process of certifying the new transmitter, I&C personnel had to

remove a relay from the transmitter and switch the face plate for the transmitter to conform to the as found condition of the old transmitter. When I&C personnel attempted to mount the new transmitter, they discovered the new transmitter did not have the required mounting bracket for the plant configuration, which was supposed to be seismically qualified. As a result, the work package was revised by the I&C supervisor to refurbish and reinstall the old transmitter. The inspectors were concerned that a work package that was originally in a parts "Hold" status was inadequately prepared and issued for work in the plant. The General Supervisor of Work Control informed the inspectors that a revision would be issued to the procedure governing the work control process. Pending licensee issuance of the procedure change, this is an Inspection Followup Item (341/94005-02(DRP)).

After discussions with the inspectors, the licensee could provide no documentation to validate the seismic qualification of the mounting device for the old transmitter, which consisted of a pipe within a pipe, a .25" gap between the pipes, and three bolts 120 degrees apart to hold the pipes together. The licensee will conduct an engineering analysis to validate the mount as seismically qualified. This is considered an Unresolved Item pending completion of the analysis (341/94005-03(DRP)).

In December, 1993, work request (WR) 000Z932708 was issued to replace leaking Instrument Valve B2100F171. The WR required replacing the leaking valve with a new valve. The maintenance workers had difficulty in locating Valve B2100F171 and in fact identified an incorrect valve. Even though the WR did not require a purge path for the welding required to install the new valve, the maintenance workers located a valve to utilize for a purge path. The maintenance workers identified the wrong valve; the valve identified for use as a purge path was in fact a drain valve for the instrument line associated with Steam Line "C" flow indication. In addition, per licensee procedure NPP-OP1-12 ("Tagging and Protective Barrier System"), only Operations personnel are authorized to operate plant systems and equipment. When this valve was opened during the maintenance activity by the maintenance worker, the excess flow check valve in the associated instrument line closed, resulting in the isolation of the "C" Steam Flow Instrument Line. This resulted in a plant level transient which is described in NRC Inspection Report 50-341/93025(DRP). The maintenance individual's failure to follow licensee procedures with respect to operation of plant equipment is considered a Violation of 10 CFR 50, Appendix B, Criterion V (341/93005-04(DRP)).

One violation was identified.

b. Surveillance Activities (61726)

During the inspection period, the inspectors observed technical specification required surveillance testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that results conformed with technical specifications and procedure requirements and were reviewed, and that any deficiencies identified during the testing were properly resolved.

The inspectors also witnessed or reviewed portions of the following surveillances:

- 82.000.03 New Fuel Inspection
- 23.104 Condensate Storage and Transfer System
- 24.307.017 EDG-14 Start and Load Test - Fast Start
- 78.000.16 Plant Process Sampling System

No violations or deviations were identified.

7. Engineering & Technical Support (37700)

The inspectors reviewed and assessed engineering related activities and events at Fermi. As part of the assessment, the inspectors reviewed engineering related documents, attended meetings and interviewed engineering personnel. The engineering staff interviewed appeared to be competent and eager to improve the engineering process at Fermi. Also, some engineering improvement projects were being implemented. The inspectors reviewed the following areas:

a. Failure of Valve P4400F615 to Fully Close During Surveillance Testing

During the review of Control Room Logs, the inspectors noted that on February 14, 1994 Gate Valve P4400F615, "Division II RBCCW/EECW Drywell Inboard Return Isolation Valve," failed to fully close during the performance of Primary Containment Technical Specification Surveillance Testing 24.207.04, "RBCCW/EECW Misc. Valve Operability Test."

The inspectors examined the past failure history of valve P4400F615 to assess the effectiveness of engineering involvement in determination of root causes, specification and review process of valve testing parameters, and subsequent analysis of test results.

The inspectors noted that on September 22, 1992 Valve P4400F615 was VOTES tested as part of the Generic Letter 89-10 program. During performance of the test, the as-found thrust values were noted to be higher than the maximum allowable values. As a result of the

apparent overthrust condition, engineering decided to lower the setting of the closing torque switch (TSC) from the original setting of 3.5 to 1 and DER 92-0486 was written to evaluate the overthrust issue. However, the valve failed to close during subsequent testing. The torque switch was then raised to 2 and the valve was again VOTES tested on October 2, 1992 at which time it stroked properly. Although the licensee attempted to perform a dynamic test, no valve differential pressure data was recorded by the licensee. Consequently, the static test performed did not provide the intended dynamic test results needed to confirm design assumptions and obtain required parameters such as rate of loading (ROL), maximum expected differential pressure (MEDP), and valve factor.

Subsequently, on December 18, 1992, during the design engineering evaluation of DER 92-0486 to determine the cause and effect of the high thrust values on the valve, the design engineer determined that the apparent higher thrust values obtained during testing resulted from a maintenance engineer's data entry error into the VOTES software program. During the VOTES sensor calibration, the maintenance engineer entered a valve stem diameter of 1.175 instead of the actual 1.888. The error resulted in obtaining valve thrust readings higher than actual. The inspectors were concerned that the design review process, which should have identified this error in the initial stages of test preparation, failed to identify the error.

Further review of DER 92-0486 and WR000Z924354 indicated that due to a lack of proper surveillance dynamic testing, valid data such as MEDP, ROL, cut off flow point, and valve factor were not available. Both documents required a valid dynamic test to obtain the design parameters needed to confirm valve functionality. The inspectors determined that although the licensee had several opportunities in 1993 to perform a dynamic test on Valve P4400F615 during several forced outages, this was not accomplished. An engineering operability evaluation performed between December, 1992 and June 1993 concluded that with TSC setting of 2, a narrow thrust value margin existed and the valve was considered operable.

During a static surveillance test performed in February 1993, the valve stroked properly (at this time a dynamic test should have been performed).

On February 14, 1994 the valve failed to fully close during surveillance testing. On February 25, 1994 a diagnostic test under dynamic conditions was performed. The valve failed twice to close under full differential pressure conditions. The torque switch value was raised from 2 to 3 and the valve stroked successfully. The engineering post dynamic test analysis revealed that an actual valve factor significantly higher than that assumed in the previous engineering evaluations was obtained (0.89 vs the assumed 0.30). Also, the valve closing available thrust values had decreased considerably since the valve test on October 4, 1992. The licensee attributed the loss of thrust margin to stem factor degradation due to possible rust on the stem.

During the dynamic test of P4400F615 on February 23, 1994, the licensee found loose wires on the valve terminals, broken strands and corrosion. Also, Valve P4400F606B tripped on overload and could not be opened. The torque switch had pin failure and had to be replaced.

The inspectors noted that four out of approximately 85 Gate Valves had been dynamically tested at Fermi (E11-F028A&B, E11-F007B and P4400F615). All four were noted to have a significantly higher valve factor than the factor assumed in the licensee's calculations of valve stem factor. Consequently, a higher than assumed thrust value was needed to properly operate the valve. The licensee issued DER 94-0022 to generically evaluate this concern. This issue was also raised in NRC Inspection Report 50-341/93003. The inspectors were concerned with the coordination and management oversight of the MOV testing program, specifically dynamic testing as recommended by Generic Letter 89-10. Of the 21 MOVs dynamically tested to date, nine needed to be retested due to a lack of obtaining adequate dp test data and inadequate dynamic testing system configuration provided by system engineering. Also, review of MOV failure history at Fermi showed that a relatively large number of valves have failed to stroke during surveillances and on demand.

The licensee informed the inspectors that a MOV test coordinator has been recently designated to coordinate MOV testing. Also, the licensee is in the process of updating the MOV VOTES testing schedule and intends to dynamically test all GL 89-10 related valves that can be tested prior to startup.

This item is considered unresolved pending licensee engineering evaluation and NRC review (341-94005-05(DRP)).

b. Review of Engineering Related Audits and Surveillances

The inspectors reviewed engineering related audits and surveillances conducted by the licensee in the last two years. The review was performed to assess their effectiveness in identifying engineering related problems and licensee's corrective action to resolve audit findings.

The following audits and surveillances were reviewed:

<u>Audit No.</u>	<u>Title</u>
• 93-0109	Safety Review and Evaluation Program (April, 1993)
• 93-0136	Evaluation and Corrective Action Program (October, 1993)
• 93-0301	Performance Based Maintenance and Modification (February, 1993)
• 92-0070	Corrective Action Program (April, 1992)
• 92-0096	System Engineer's Function and Responsibilities (June, 1992)
• 92-0110	Design Control Program (August, 1992)

<u>Surv. No.</u>	<u>Title</u>
• 93-0347	Performance Based Technical Surveillance (November, 1993)
• 93-0349	Independent Verification (December, 1993)
• 93-0361	Performance Based Technical Surveillance (January, 1994)
• 94-0253	Technical Surveillance RF04 EDP Review (March, 1994)

The audits and surveillances reviewed appeared to be effective in identifying Findings (DERs) and Observations in the areas assessed.

The inspectors noted, however, that none of the three important observations identified in Audit 92-0096



required response from engineering. The audit assessed the duties and responsibilities of system engineers to determine if direction to the system engineer met the requirements of Fermi Procedure NPO-FMP-06, "Technical Engineering Organization". The audit identified significant deficiencies concerning duties and responsibilities of system engineers, specifically, that there was no clear understanding among the engineers as well as other organizations as to the function, duties and responsibilities of a system engineer. Also, the audit identified that an outside organization had recently revised their Guidelines and Good Practices for the conduct of technical support and use of system engineers and recommended that the changes be incorporated into Fermi engineering Organization Procedure NPO-FMP-06.

The inspectors noted that subsequent to the completion of Audit 92-0096, the supervisor of system engineering, who originally requested that the audit be performed, cancelled Technical Engineering Organization Procedure NPO-FMP-06, Revision 3 on July 30, 1993, rather than address the significant concerns identified in the system engineering audit. As of the end of this inspection, system engineering responsibilities were not defined. The licensee stated that the new VISION program will address this issue.

The inspectors were concerned that because the audit findings did not require a response from Engineering, corrective action could potentially remain uncorrected. A similar concern was raised in NRC Inspection Report 50-341/93002.

The inspectors also noted on March 10, 1994 that engineering responses to Observations 93-0347-6 and 7 were overdue (due date was January 31, 1994).

c. Licensee's Response to Information Notice (IN) 89-77, Supplement 1 (90700)

This Information Notice alerts licensee's to potential problems relating to debris in containment emergency sumps and incorrect sump screen configurations which could result in blocking of emergency core cooling systems.

The inspectors reviewed the licensee's actions to address IN 89-77 related concerns that were documented in DER-0025, DER 93-0255 and Plant Engineering Meeting Minutes TMPE-94-0119. Although the licensee concluded

in their initial review of IN-89-77 in 1990 (DER 90-0025) that IN-89-77 was not applicable to Fermi, the licensee had been using Surveillance Procedure NPP-34.144.001 to inspect the suppression pool every eighteen months for debris, coating and loose objects.

DER 93-0255 was written by plant engineering to evaluate concerns documented in NRC Bulletin 93-02, IN-93-34, and INPO PS 2808 relative to debris plugging containment suction strainers. The Engineering department's initial review concluded that the possibility of thermal insulation and fibrous material clogging of the ECCS suction strainers was not a concern at Fermi. However, additional review was needed to evaluate the issue of unqualified coatings inside the containment that have the potential to clog the strainers. The inspectors were informed the action plan denoted in Plant Engineering Letter TMPE-94-0119 would be accomplished prior to plant restart. Licensee action to address this issue will be further reviewed prior to plant restart.

d. Review of Elevator Fire

On January 29, 1994, a fire occurred in the Fermi 2 Turbine Building passenger elevator. To determine the cause of the fire, the licensee removed several cables from the elevator and performed an evaluation and failure analysis. The licensee determined that during the turbine failure on December 25, 1993, the cables' cotton jackets were soaked by water and oil which caused the physical and electrical properties of the insulation to deteriorate resulting in the fire. The inspectors were informed that the cotton type jacket cables (SBR) were used only in Turbine Building elevators and would be replaced with better insulated cables. No further concerns were identified.

e. Loss of Three Incoming Offsite Feeds and Division I Power

On January 27, 1994 with the plant in Cold Shutdown, power was lost to Division I Bus. All the expected actuations/isolations were received; however, Shutdown Cooling was not available for 58 minutes and reactor temperature increased by 15 degrees, but was maintained below the Technical Specification limit. The cause of the loss of power was attributed to electrical fault experienced in the Swan Creek substation during an ice storm and a failure of an incoming 120 kV GM Breaker to open and a relay timer to function and isolate the faulted condition.

The licensee determined that the GM breaker failed to close due to the trip linkage in the "Y" phase being mechanically inhibited as a result of water intrusion creating ice. The failure of the relay timer to energize and isolate the bus from all incoming feeds was caused by contaminants on the timer contacts.

Subsequent to the event, the inspectors observed the Detroit Edison System Maintenance Crew perform corrective and preventive maintenance on the GM breaker. The inspectors noted that no procedures, checklists or vendor manuals were used by the System Maintenance Crew, at the work location, to perform and document breaker maintenance activities. Also, the breaker PM period was recently changed from 6 to 10 years while the Vendor recommended much shorter intervals for Routine and General inspections of 1 to 3 years. Detroit Edison System Maintenance Procedure D-1-1, dated October 16, 1956, "Inspection of Westinghouse 120-KV Oil Circuit Breakers," specified routine inspections every year and a complete inspection every four years. Furthermore, the handbook required inspections for leaky gaskets and evidence of moisture. It appeared that greater plant engineering involvement in the selection of the appropriate switchyard breaker PM intervals, failure history and root cause determination was warranted.

No violations or deviations were identified.

8. Fuel Handling

On several occasions the inspectors witnessed the receipt, inspection, and storage of new fuel on the refuel floor of the Reactor Building. The inspectors verified the appropriate documentation of new fuel and that station procedures were followed in unloading, lifting, moving, lowering, and inspecting new fuel assemblies. Appropriate cleanliness controls were implemented. Efficient communications between fuel handlers, crane operators, radiation technicians, and the fuel handling foremen facilitated fuel handling operations.

No violations or deviations were identified.

9. Report Review

During the inspection period, the inspector reviewed the licensee's Monthly Operating Status Reports for January and February, 1994. The inspector confirmed that the information provided met the requirements of Technical Specification 6.9.1.6 and Regulatory Guide 1.16.

The inspector also reviewed the licensee's Monthly Performance Report for January and February, 1994.

No violations or deviations were identified.

10. Inspection Followup Items

Inspection Followup items are matters which have been discussed with the licensee, which will be reviewed by the inspector and which involve some action on the part of the NRC or licensee or both. Inspection Followup Items disclosed during the inspection are discussed in paragraphs 3.a and 6.a.

12. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. Unresolved items disclosed during the inspection are discussed in paragraphs 6.a and 7.a.

13. Meetings and Other Activities

a. Management Meetings (30702)

On March 1, 1994, Mr. Jack Roe, Director, Division of Reactor Projects III/IV/V, toured the Fermi plant and met with licensee management to discuss plant performance and plant material condition.

On March 28, 1994, Mr. Richard Crlenjack, Acting Deputy Director, Division of Reactor Safety in Region III, toured the Fermi plant and met with licensee management to discuss plant performance and plant material condition.

b. Exit Interview (30703)

The inspectors met with the licensee representatives denoted in paragraph 1 during the inspection period and at the conclusion of the inspection on March 31, 1994. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.