

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

REPORT NO. 50-341/95013

FACILITY

Fermi Nuclear Plant, Unit 2  
License No. DPF-43

LICENSEE

Detroit Edison Company  
6400 North Dixie Highway  
Newport, MI 48166

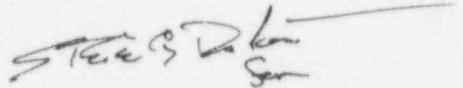
DATES

October 18 through November 21, 1995

INSPECTORS

S.G. DuPont, Reactor Engineer

APPROVED BY



\_\_\_\_\_  
M. Jordan, Chief  
Reactor Projects Branch 7

12/5/95  
Date

AREAS INSPECTED

A special inspection of procedural adherence during refuel floor activities and adherence to radiological protection controls. The findings of this report were based on collected transcripts summarized in the Office of Investigations (OI) Report of Investigations, Case No. 3-93-023.

## RESULTS

Adherence to procedures for work and design control of refuel floor equipment were weak between June 1991 and August 30, 1992. An apparent violation involved a deliberate action by the Refuel Floor Coordinator in crossing a radiation safety barrier without donning the required clothing. Additionally, several operational and process procedures were violated as modifications and maintenance were performed without authorization. The lack of formal training of the Refuel Floor Coordinator contributed to the violations. Management's lack of a questioning attitude resulted in missed opportunities to have discovered the violations in a timely manner. The licensee failed to recognize the willful violation of the radiological controls. The licensee's corrective actions included counselling the individual Refuel Floor Coordinator on requirements to adhere to procedures but did not recognize that the individual had performed unauthorized work and had circumvented several process controls. Additionally, the licensee's investigation did not determine the nature or effects of unauthorized modifications to a refuel tool (Unresolved Inspection Item in Section 3.1).

### Summary of Open Items

Apparent Violation: One identified in Section 1.2.

Violations: Two identified in Sections 1.3 and 1.4.

Unresolved Inspection Items: One identified in Section 2.1.

## INSPECTION DETAILS

### 1.0 OPERATIONS

NRC Inspection Procedure 71707 was used in the performance of a special inspection of refuel floor operations. Additionally, transcripts gathered by the Office of Investigations (OI) were reviewed. One apparent violation involving a deliberated disregard of radiological protection barriers and procedures occurred. Additionally, two violations were identified regarding failure to follow technical specifications and procedures.

### 1.1 Summary of Events

Between January 1991 and August 30, 1992, several unauthorized modifications and violations of procedures and processes occurred. A Refuel Floor Coordinator (RFC), a supervisor, repeatedly violated process procedures. The following sequence was determined through interviews conducted by the Office of Investigations (OI):

- During June 1991 the RFC removed anchor bolts that were installed on the refueling floor for the New Fuel Uprighting Stand mounts and the New Fuel Storage Crate Stop.
- Prior to May 1992, specific date unknown, the RFC modified the Control Rod Latch Tool. The tool was modified without authorization, documentation, or engineering evaluation. The tool is listed in Table 9.1-5 of the UFSAR and described in operating procedure NPP-23.710, and as such, required a preliminary evaluation.
- On May 20, 1992, the RFC modified the general purpose "J-Hook" by adding a release lanyard to the safety latch. The RFC did this modification "in the interest of improving productivity" during double blade guide relocation in the spent fuel pool. This resulted in a dropped double blade guide on top of the spent fuel storage racks on May 21, 1992. Deviation Event Report (DER) 92-0251 was issued addressing this event. Procedure 23.710, Fuel Handling System, was revised to include the design and operation of the J-hook and safety latch.
- On August 30, 1992, the RFC performed maintenance on the New Fuel Handling Crane without authorization or documentation. The RFC determined power cables to the swing beam detent solenoid. The detent is a feature that prevents operation of the crane in any position of the beam other than at 90 degrees.
- During 1992, specific date unknown and unable to be obtained, the RFC willfully violated a Radiological Work Permit (RWP) by not donning the required protective clothing prior to accessing a contaminated area. The RFC admitted to doing this "out of pure

laziness." The RFC was fully knowledgeable of RWP requirements, routinely worked under authorization of RWPs, and received annual training.

- During each of these violations, another Refuel Floor Coordinator witnessed the violation and did not initiate a Deviation Event Report. This individual reported his concerns to Detroit Edison Company (DECo) corporate personnel on May 6, 1993.

## 1.2 The Refuel Floor Coordinator Deliberately Violated Radiological Protection Procedures and Requirements

The inspector reviewed the Office of Investigations (OI) transcripts No. 3-93-023, including the transcript of the Refuel Floor Coordinator (RFC). The inspector concluded that on one occasion during 1992, the specific date or period was unknown and unattainable, the RFC knowingly violated radiological procedures and requirements. This is an apparent violation.

The RFC described in the OI transcript an occasion when the RFC lifted ("ducked under") a radiological protection boundary rope, entered a contaminated area without the required radiological protection clothing, and closed a tool and equipment cage door. The RFC knowingly did not obtain the clothing required by the Radiological Work Permit (RWP). When questioned on why the RFC took the above actions, the RFC responded, "out of pure laziness."

A review of the RFC's training records revealed that annual radiological protection training was successfully completed for several years prior to 1992. The inspector reviewed training plans and determined that the annual training provided sufficient information to ensure understanding of radiological protection requirements. Specifically, the training emphasized that RWPs are to be strictly adhered to, including always wearing the required protective clothing.

Fermi 2 Interfacing Procedure, FIP-RC1-01, Revision 4 (dated May 4, 1992), "Accessing and Working in Radiologically Controlled Areas," Step 10.1.4.12 requires that "personnel shall be prohibited from ducking under' boundary ropes." In addition, the same Interfacing Procedure, Step 10.1.4.11 requires that "personnel accessing Contaminated Areas, High Contamination Areas, and Airborne Radioactivity Areas shall be dressed in accordance with the current Specific RWP." Also, the same Interfacing Procedure, Step 10.1.3.1 requires, in part, that "radiological protective clothing required by an RWP (Radiological Work Permit) shall always be worn when entering any contaminated area..." The inspector conclude that the RFC had full understanding of the requirements through successfully completed annual training and that the actions of the RFC appeared to violate the interfacing procedure (50-341/95013-01 (DRP)).

1.3 Unauthorized Changes to Refuel Floor Structures by the Refuel Floor Coordinator (RFC) Did Not Meet Procedure Requirements for Configuration Control

The inspector concluded from review of relevant documents, that during June 1991 the RFC removed anchor bolts that were installed on the refueling floor for the New Fuel Uprighting Stand mounts and the New Fuel Storage Crate Stop. The RFC believed that these bolts were a personnel safety hazard and removed them without obtaining written authorization.

The anchor bolts were previously relocated per Engineering Design Package (EDP) No. 11190 with the appropriate evaluations and revision to the UFSAR. The installation was approved by the On-site Safety Review Organization on October 2, 1990. This EDP contained a safety evaluation per 10 CFR 50.59 and a seismic qualification. The appropriate plant drawings and Updated Final Safety Analysis Report (UFSAR) were changed to reflect the as-built location of the mounted anchor bolts. The purpose of EDP-11190 was to relocate the New Fuel Uprighting Stand such that the New Fuel Transfer Crane could be used to move new fuel bundles between the uprighting and inspection stands. Previously, the Refuel Floor Overhead Crane was used to upright the new fuel bundles because the uprighting stand was located beyond the reach of the transfer crane.

The transcripts of the OI interview of the RFC indicated that the RFC had not reviewed plant drawings or the UFSAR prior to removing the anchor bolts. The RFC did not adhere to design control procedures and did not initiate the required preliminary evaluation that would have determined that a design change, 10 CFR 50.59 safety evaluation, seismic evaluation, and a change to the UFSAR required prior to removal of the anchor bolts. Fermi 2 Interfacing Procedure, FIP-CM1-12, Revision 4 (dated April 18, 1991), "Engineering Design Packages," Section 5.1 requires, in part, that "all QA Level 1 and 1M EDPs (Engineering Design Packages), generated to modify systems, structures, or components contained within... (5.1.1 Reactor Building), shall be designated as Type 1 EDPs, and shall be generated in accordance with all applicable requirements of the procedure." Failure to adhere to FIP-CM1-12 in June 1991 while removing mounting bolts for the uprighting stand and new fuel crate stop is a violation (50-341/95013-02(DRP)).

1.4 Unauthorized Maintenance on the New Fuel Transfer Crane Done by the Refuel Floor Coordinator

The inspector concluded from review of relevant documents, that on August 30, 1992, the RFC performed maintenance on the New Fuel Handling Crane without authorization or documentation. The RFC determined power cables to the swing beam detent solenoid. The detent is a feature that prevents operation of the crane in any position of the beam other than at 90 degrees.

The New Fuel Transfer Crane is used to move new fuel bundles from the inspection stand, over the spent fuel pool, to the preparation machine

located in the spent fuel pool. The crane is mounted on a rail attached to the refuel floor wall. A safety device, the swing beam detent solenoid (detent solenoid), ensures that the crane's beam is locked in a 90 degree location (in reference to the crane's traveling rail). This is to prevent a condition where a heavy load, such as a new fuel bundle, does not result in a load imbalance that could dislodge the crane from the rail and a possible dropping of the crane and its load into the spent fuel pool. The combined weight of the crane and a new fuel bundle could cause damage to the spent fuel pool liner or to the spent fuel storage racks and contents.

During a transfer of a new fuel bundle from the inspection stand to the preparation machine, the detent pin came out and prevented further movement of the crane. The RFC recognized this as a condition where the detent solenoid had energized. The RFC had also recognized that a similar failure had previously occurred. The RFC believed that the new fuel bundle being transferred was in an unsafe condition, being suspended above the fuel pool. Two options existed by Fermi's work control process. Either a work request or "emergency" work request could have been written. The RFC did not pursue either option and physically cut the power cables to the detent solenoid. The inspector was unable to determine why the RFC did not pursue either work control option. The inspector did determine that none of Fermi's procedures, processes, or policies allowed the RFC to disable the swing beam detent solenoid. The RFC also did not record the determination of the detent solenoid's power cables on a determ/reterm checklist, in the refuel floor logs, or on a work request. This action of performing unauthorized maintenance on the new fuel transfer crane is in violation of Fermi administrative procedure NPP-MA1-01 (Revision 7), "Work Control," Sections 5.1 and 5.1.1 (50-341/95013-03 (DRP)).

After the RFC performed the unauthorized maintenance at least four additional new fuel bundles were transferred from the inspection stand, which transversed the spent fuel pool, to the fuel preparation machine. The inspector was unable to determine the exact number of bundles that were transferred while the crane was degraded. The inspector was able to determine that appropriate corrective actions to repair and return the crane to conformance of its original requirements were not taken until the fuel bundle transfers were completed.

## 2.0 Root Causes

The inspector concluded from review of relevant documents, that several barriers to prevent errors were either negated or neglected. These barriers included training, procedure usage, management involvement, and identification of errors. Violations resulting from the inadequacies of procedure usage as a barrier are discussed in Section 1.0 above.

## 2.1 The Refuel Floor Coordinator's Training was not Sufficient to Ensure Compliance to Fermi's Procedures, Processes, and Policies

The inspector concluded that the RFC's training was insufficient for the tasks and responsibilities of a Refuel Floor Coordinator, a supervisory position. This was based on a review of the RFC's training records. Prior to 1994, the RFC had not received training, either formally or informally, on any of the Fermi processes. However, the individual routinely was required to supervise and perform functions governed by the work control, design control, and error identification processes. The OI transcripts indicated that the individual was not fully aware of requirements of either work control, design control, or error identification.

The inspector concluded that the RFC believed that modification of tools was not restricted by any control process, procedure, or policy. The RFC admitted to modifying two specific tools used in handling refuel floor components and reactor vessel internals. One pertained to the "J-Hook," a tool that assists in holding, guiding, and grabbing other structures or components. On May 20, 1992, the RFC modified the general purpose "J-Hook" by adding a release lanyard to the safety latch. The RFC did this modification "in the interest of improving productivity" during double blade guide relocation in the spent fuel pool. This resulted in a dropped double blade guide on top of the spent fuel storage racks on May 21, 1992. Deviation Event Report, DER 92-0251, was issued addressing this event. The licensee's investigation revealed that the change to the "J-Hook" was an unauthorized modification that defeated a safety device.

The RFC also modified the above vessel Control Rod Blade Unlatching Tool. The nature and potential impact of this modification is unknown. The inspector discussed the possibility of this modification with senior station management and discovered that they were unaware of the modification and not knowledgeable of its impact. This is an Unresolved Inspection Item (50-341/95013-04 (DRP)) until the licensee can determine the nature of the modification and safety impact.

## 2.2 Management Lacked a Questioning Attitude about Refuel Floor Activities

The inspector determined from review of relevant documents that licensee management was aware that the RFC had performed the modifications and maintenance discussed in Section 1.0. However, in each case, management did not assess the actions and determine that those actions were unauthorized and violated several processes. The cognizant manager, per transcripts, was shown by the RFC, the removed mounting bolts to the uprighting stand. This was shortly after the RFC had removed them. The manager did not enquire about the process that accomplished the authorization for their removal. The manager was aware of the usual lengthy review and approval process for a design change and did not question the speedy removal of the bolts. This was an opportunity to identify the weakness in the RFC's knowledge and could have avoided the remainder of the violations.

The manager was also aware that the new fuel transfer crane was malfunctioning on the morning of August 30, 1992, and that the RFC was investigating the trouble. The manager observed that the crane was operational later that afternoon. The RFC informed the director that the crane was temporarily operational and that the RFC had lifted the leads to the swing beam detent solenoid. The manager later requested that a work request to be generated to investigate and repair the original problem with the crane. However, the manager did not question that the lifting of the leads were unauthorized and violated the work control process. A DER was not written on this event.

An opportunity to discover the extent of unauthorized work being performed by the RFC was missed after the dropped double blade guide incident. The root causes for the dropped blade guide were not pursued to determine the weakness in the RFC's training and a determination for other similar unauthorized work had not been accomplished. The concern on the nature of the modification to the blade guide unlatching tool was not identified until November 21, 1995 by the NRC.

Although management had several opportunities to discover the extent of unauthorized work and the weakness in the RFC's knowledge of work processing, the individual was not counselled until July 1993 or provided training until 1994.

### 3.0 Licensee's Corrective Actions Were Partially Appropriate

On May 6, 1993, various concerns about adherence to procedures and processes were identified to DECo corporate personnel by a concerned employee. Fermi station personnel were then notified and initiated a DER on May 7, 1993. DER 93-0267 was generated to initiate an independent investigation into the concerns. An independent investigation was started on May 14, 1993. The DER's conclusion did not identify all of the technical issues or the deliberate violation of radiological requirements.

The executive summary of the independent investigation was attached to DER 93-0267. The summary confirmed that "irregularities" existed with modifications to the new fuel transfer crane and removal of mounting bolts on the refuel floor for the uprighting stand. However, the summary concluded that "neither irregularity ... involved other than potentially minor violations of NRC requirements." This conclusion incorrectly simplified the issues and did not recognize that the Refuel Floor Coordinator (RFC) had performed unauthorized modifications and maintenance. The investigation had also failed to consider a previous unauthorized modification (DER 92-0251) or investigate modifications done on the Control Rod Blade Unlatching Tool. The investigation also did not identify violations of radiological protection requirements.

DER 93-0426 was initiated on July 23, 1993, to track the concerns identified in DER 92-0267. This DER summarized the issues as concerns of work control and work practices on the refueling floor. As a basis for closure, the DER concluded that since the events had occurred, a



reorganization of refuel floor crews was established. The licensee also established several lessons learned to be provided to the Director, Nuclear Fuels and Reactor Engineering. These lessons included emphasis to bring concerns to supervision and for supervision to take appropriate actions. Another stated that procedures are to be followed and do not make alterations to the plant without ensuring that such activities are evaluated. These lessons learned were communicated to personnel involved with refuel floor activities. Another corrective action included counselling the RFC on following procedures.

DER 93-0426 was closed on August 4, 1994, by the Director Plant Safety and September 10, 1994, by the Plant manager.

Separate of the DER efforts, corporate counsel conducted an independent investigation of the issues. However, not all of the technical issues were communicated to station management. Most of the technical issues, the deliberate violation, and the unresolved issue were not identified to site management by either the DER efforts or the independent investigations until the NRC identified the specifics on November 21, 1995. Because of this, the inspector found the licensee's corrective actions prior to November 21, 1995, to be less than adequate.

After the apparent violation and violations were identified by the NRC, the licensee initiated several new corrective actions. Not all of these efforts are complete and as such, their effectiveness can not be assessed. These included:

- Evaluating tool control. The licensee identified weakness in their program that allowed modifications to refuel handling tools without appropriate design controls.
- Evaluating the need to have corporate investigations evaluated by technical personnel for technical and safety issues.

#### 4.0 Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during the inspection is discussed in Section 2.1.

#### 5.0 PERSONS CONTACTED AND MANAGEMENT MEETINGS

The inspector contacted various licensee operations, maintenance, engineering, and plant support personnel throughout the inspection period. Senior personnel are listed below.

At the conclusion of the inspection on November 21, 1995, the inspector met with licensee representatives (denoted by \*) and summarized the scope and findings of the inspection activities. The licensee did not identify any of the documents or processes reviewed by the inspector as proprietary.

- \* J. Conen, Supervisor, Licensing
- P. Fessler, Plant Manager
- \* D. Gipson, Senior Vice President, Generation
- \* L. Goodman, Director, Nuclear Licensing
- \* A. Hickman, Ombudsman
- \* J. Korte, Director, Nuclear Security
- \* P. Marquardt, Esq., Legal Counsel for Detroit Edison
- \* R. McKeon, Assistant Vice President/Manager, Operations
- \* D. Nordquist, Director, Quality Assurance
- \* D. Ockerman, Superintendent, Operations
- \* J. Plona, Superintendent, Technical Services
- \* W. Romberg, Assistant Vice President and Manager, Technical

## SYNOPSIS

On August 25, 1993, an investigation was initiated by the U.S. Nuclear Regulatory Commission (NRC), Region III (RIII), Office of Investigation (OI), concerning an allegation that Detroit Edison Company (DECo), through the Director of Nuclear Fuel and Reactor Engineering (Director) at the Fermi Nuclear Power Plant (Fermi), discriminated against a Refueling Floor Supervisor (RFS) by terminating his employment after the RFS allegedly notified the Director, on a continuous basis, of numerous safety violations committed by the Refueling Floor Coordinator (RFC). During the investigation, an additional allegation of a potential violation was identified; that the RFC deliberately violated Fermi's Radiation Protection Barrier by crossing a radiation control area without proper dress.

Based upon the evidence developed, the OI:RIII investigation did not substantiate the allegation that DECo discriminated against the RFS by terminating his employment after the RFS allegedly notified, on a continuous basis, the Director of numerous safety violations committed by the RFC. The investigation by OI:RIII did substantiate the allegation that the RFC did deliberately violate Fermi's Radiation Protection Barrier.