



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

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Docket No. 50-341

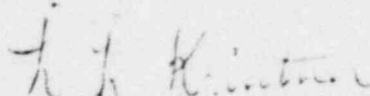
APPLICANT: Detroit Edison Company

FACILITY: Fermi 2

SUBJECT: SUMMARY OF MAY 5 - MAY 8, 1981 SITE VISIT BY INSTRUMENTATION  
AND CONTROL SYSTEMS BRANCH FOR OL REVIEW

The purpose of the site visit was to review drawings, view equipment, and discuss design aspects of safety-related instrumentation and control systems for Fermi 2.

A summary of the meetings is enclosed. This trip is a part of the staff's review of the Fermi 2 operating license application. Open issues will be resolved with the applicant and reported in our Safety Evaluation Report.

  
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Licensing Branch No. 1  
Division of Licensing

Enclosure:  
As stated

cc: See next page

A 8106110273

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ENCLOSURE

A. PLANT WALK THROUGH

The following areas were observed:

1. Control Room and Instrumentation Cabinet Area
  - a. General layout.
  - b. Nuclear and reactor protection instrument arrangement and layout.
  - c. Rod position indication.
  - d. Protection system initiation and bypass switch arrangements.
  - e. Cabling in control room (separation, type, provisions).
  - f. Engineered safety feature initiation and bypass switch arrangements and status panels.
  - g. Post Accident Monitoring Panel
  
2. Cable Runs and Cable Spreading Area
  - a. General layout.
  - b. Implementation of Separation Criteria.
  
3. Vital Instrumentation and Control Power Supply Installation
  - a. General layout.
  - b. Physical separation of redundant units.
  - c. Potential for damage due to fire, missiles, etc.
  - d. Batteries, Inverters, Chargers.
  
4. Reactor, Auxiliary, and Turbine Buildings
  - a. Protection system instrument arrangement and layout.
  - b. Potential for instrument damage due to fire, missiles, etc.
  - c. Separation of piping and wiring to redundant instruments.
  - d. Provisions for testing protection instruments.
  - e. Independence of safety buses.
  - f. MSIVs and S/R valves.
  
5. Shutdown Outside Control Room
  - a. Location of shutdown panel and potential for damage.
  - b. Identification of Controls.

6. ESF Systems

- a. General arrangements.
- b. Physical and Electrical Separation of Redundant Equipment.
- c. Bypasses and Interlocks.
- d. Testability.
- e. Cabling and Equipment Identification.

7. Reactor Trip System

- a. Rod drive power supplies.
- b. Scram discharge volume and associated instrumentation.
- c. Physical and Electrical Independence.
- d. Provisions for testing.
- e. Cable and Equipment Identification.
- f. Backup scram capability and separation of redundant divisions.
- g. RPS motor generator sets.

8. Instrument Piping

- a. Physical separation.
- b. Potential for damage from missiles, flooding, pipe whip, etc.
- c. Test features.

9. Other Areas

- a. Suppression Pool and Drywell Temperature Monitoring.
- b. Condensate Storage Tank level instrumentation and temperature alarm system.

B. DRAWING REVIEW

As part of our audit of the Fermi 2 drawings, we reviewed the schematic drawings and associated description and logic diagrams for the Reactor Protection System (RPS) concentrating on the backup manual scram system; the Automatic Depressurization System (ADS); the Reactor Core Isolation Cooling (RCIC) System concentrating on the automatic switchover from the Condensate Storage Tank (CST) to the Suppression Pool; and the Low Pressure Coolant Injection (LPCI) System. The review of the above areas highlighted the following concerns:

1. During the drawing review of the RPS, prior to the site visit we became aware that the Fermi 2 backup manual scram system consists of a second set of pushbuttons that concurrently trip the power feed to each division of the reactor trip system. Actuating the pushbutton deenergizes the normally energized trip coil of a 120 vac molded case circuit breaker. This is different from the present General Electric design which initiates a manual backup scram by opening logic contacts in the reactor trip system. The backup manual scram circuit breakers are wired electrically between the respective RPS system distribution cabinets and the associated half of the RPS logic cabinet. Control wiring from each manual scram breaker to its respective pushbutton is installed per a Class 1E design, and the divisional separation criteria are maintained. The separations criteria were verified during the plant tour which is discussed in Section C. The ITE Model EE2-S100 molded case breakers have been qualified to meet IEEE 344-1975 and IEEE 323-1974. Appropriate technical specifications surveillance of this system is included in the plant's technical specifications. The drawing review for this system indicated that it meets the requirements specified by IEEE 279, and it was concluded that this area is resolved.
2. During the drawing review of the RCIC system, we became aware that the design change for the RCIC pump suction transferred from the CST to the Suppression Pool has not been submitted. The applicant stated that this design would be similar to the HPCI transfer design. This part of the RCIC system will be reviewed when the automatic switchover design is received.
3. During the drawing review of the ADS, the applicant indicated that he will withdraw the present design submittal to satisfy TMI Item II.K.3.18, "ADS Logic Diversity", and will submit a new design that will follow the General Electric Option II approach. This design will be reviewed at a later date.

#### C. DISCUSSION OF ITEMS

##### 1. Isolation to Startrec

We discussed the isolation devices utilized for the isolation of the safety systems from the non-safety startrec system. The devices are Validyne #CM 249 isolators located in the Class 1E cabinets (e.g., the main control console). The applicant briefly described the device. Based on this information and the other submittals on this device, it was concluded that sufficient information is available and this area is resolved.

2. RPS Motor Generator Sets

We discussed the Class 1E equipment that has been provided to monitor the mg set output voltage and frequency. This equipment protects connected loads from damage that might occur from unacceptable values of voltage or frequency. The applicant provided information and drawings to reflect this design. It was concluded that sufficient information is available and this area is resolved.

3. Backup Manual Scram System

We discussed the backup manual scram system and reviewed the pertinent drawings associated with this system. During the plant tour it was noted that this system meets the separation requirements and that appropriate technical specification surveillance of this system is included in the plant's technical specifications. It was concluded that sufficient information is available and this area is resolved.

4. Thermal Power Monitor Surveillance

We discussed the thermal power monitor system as to the surveillance requirements placed upon it. The applicant provided a detailed I&C APRM response time test procedure and showed the actual test equipment utilized. Based on this information and the other submittals in this device, it was concluded that sufficient information is available to resolve this area.

5. TMI Item II.K.3.21, "Restart of CS and LPCI"

The applicant provided information that demonstrated that the HPCI system will autorestart after manual termination. Based on this information and other submittals on this issue, it was concluded that sufficient information is available and this issue is resolved.

6. ATWS Recirculation Pump Trip

The applicant provided preliminary design drawings for the ATWS Recirculation Pump Trip and indicated their intent for the design to be identical to the Monticello design. We will review this item when this information is transmitted to the staff.



7. MSIV Leakage Control System

The applicant discussed and provided drawings for review for this system. The applicant's approach to meeting Regulatory Guide 1.96, Revision 1 is unique in that they are using a pressure control system rather than a vacuum controlled system. The pressure control system utilizes 3 Main Steam Line Isolation Valves (MSIVs) in order to actuate a pressure boundary. A non-interruptible control air system maintains the pressure at 2 to 6 pounds above the Reactor Pressure Vessel pressure. This is a manual actuated system (keylock) that can be performed in 10 to 20 minutes following a LOCA. The drawings were reviewed and it was concluded that there is sufficient information available and this area is resolved.

8. Cable Separation/Separation Criteria

During the site visit the applicant described the electrical separation provided in the Fermi 2 plant. During this I&C separation review, it was noted that in some areas the Fermi 2 plant does not fully meet the guidance of IEEE-384-1974. However, we indicated to the applicant that we would coordinate the concern in this area with the Power Systems Branch (PSB) and the Fire Protection Review.

9. IE Bulletin 79-27, "Loss of Instrumentation and Power System Bus During Operation"

The applicant provided the staff with a preliminary copy of their response regarding IE Bulletin 79-27, "Loss of Instrumentation and Power System Bus During Operation" Applicant has concluded that no modifications are necessary due to the fact that:

1. Instrumentation associated with systems required to achieve a cold shutdown are powered from AC and/or DC sources.
2. If a main AC power source is lost, the "bus energized" light will go out on the capital in the control room.
3. If any of the DC power sources are lost, an alarm and annunciator indicator will be initiated in the control room. However, sufficient instrumentation associated with systems in the operating division will be available.

4. If power to a small group of instruments is lost, the operator will be readily aware that power has been lost due to a loss of indication or backlighting. However, the redundant system will be available.

D. SUMMARY

The applicant provided documentation that will enable the staff to resolve several issues that have been highlighted in past discussions with the applicant. Also, the applicant has indicated that he will provide documentation that will address the remaining open issues by appropriate dates that relate to the Safety Evaluation Report.

These open issues were discussed with applicant during an exit critique that was given by the staff. These open issues include:

- a) IE Bulletin 79-27 - Concern that simultaneously initiated failures of control systems and vital instrumentation may inhibit safe reactor shutdown.
- b) IE Bulletin 80-06 - Concern that safety equipment may not remain in emergency mode after reset.
- c) High Energy Line Breaks and Consequential Control System Failures.
- d) Multiple Control System Failures.
- e) TMI Item II.D.3 - Safety Relief Valve Position Indication.
- f) TMI Item II.F.2 - Inadequate Core Cooling.
- g) TMI Item II.K.3.18 - ADS Logic Diversity.
- h) TMI Item II.K.3.22 - RCIC Switchover.
- i) Regulatory Guide 1.97, Revision 2.
- j) ATWS Recirculation Pump Trip.
- k) Safety System Setpoints.



1) Separation - This item needs to be coordinated with the Power Systems Branch and the Fire Protection Review.

m) Seismic Qualifications for Safety Related Display Instrumentation Recorders.

ATTACHMENT

LIST OF EXIT CRITIQUE ATTENDEES

May 8, 1981

<u>NAME</u>	<u>ORGANIZATION</u>	<u>POSITION</u>
R. W. Barr	Edison	Supervising Engineer - I&C
L. F. Wooden	Edison	System Engineer
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Terry McKelvey	Edison	Electrical Engineer
Jeff Dudlets	Edison	I&C Engineer
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MEETING SUMMARY DISTRIBUTION

JUN 3 1981

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