50-341

August 21, 1987

MEMORANDUM FOR: Charles E. Norelius, Director
Division of Reactor Projects
Region III

FROM: Gary M. Holahan, Assistant Director
for Regions III and V
Division of Reactor Projects - III, IV, V
& Special Projects
Office of Nuclear Reactor Regulation

SUBJECT: FERMI-2 OPERATION AT REDUCED FEEDWATER TEMPERATURE AND WITH MOISTURE SEPARATOR REHEATER (MSR) OUT OF SERVICE

The enclosed letter to DECo, dated August 14, 1987, contains the NRR technical staff's position pertaining to the issues raised by Walt Rogers regarding operation of the Fermi-2 plant: (1) at reduced feedwater temperature, and (2) with the MSR out of service. For both issues, the NRR staff finds that the licensee operated the plant in these conditions without performing the necessary safety evaluation required pursuant to 10 CFR 50.59 and/or contrary to the requirements implicit in the Plant Technical Specifications. On the basis of this finding, appropriate enforcement action should be considered.

Should you need further assistance in this matter, please inform the Project Manager, John J. Stefano. Mr. Stefano may be reached at (FTS) 492-8007.

Sincerely,

Original signed by

Gary M. Holahan, Assistant Director
for Regions III and V
Division of Reactor Projects - III, IV, V
& Special Projects
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/enclosure:
A.B. Davis, RIII
E. Greenman, RIII
W. Rogers, SRI Fermi-2
F. Miraglia
D. Crutchfield
R. Starostecki
L. Shao
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R. Bevan

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

August 14, 1987

Docket No. 50-341

Mr. B. Ralph Sylvia
Group Vice President - Nuclear
Detroit Edison Company
6400 North Dixie Highway
Newport, Michigan 48166

Dear Mr. Sylvia:

SUBJECT: FERMI-2 OPERATION WITH REDUCED FEEDWATER TEMPERATURE AND TECHNICAL SPECIFICATION VIOLATION WITH MOISTURE SEPARATOR REHEATER OUT-OF-SERVICE (TAC 65400)

This letter provides the NRC staff's conclusions from its review of the issues raised by the NRC Senior Resident Inspector at Fermi-2 relative to: (1) operation of the plant at reduced feedwater temperature during startup without having performed the requisite safety evaluations pursuant to 10 CFR 50.59, and (2) Detroit Edison's (DECo's) compliance with the Minimum Critical Power Ratio (MCPR) limits of Section 3.2.3 of the plant Technical Specifications. The information provided by DECo letter (NRC-87-0073) dated May 19, 1987, was the basis for the staff's review relative to plant operation at reduced feedwater temperature; the safety evaluation performed by DECo in April 1987 pursuant to 10 CFR 50.59 (File No. 87-0114) was the basis for the staff's review relative to the issue raised in regard to compliance with Section 3.2.3 of the Plant Technical Specifications.

A. Reduced Feedwater Temperature

Nominally, feedwater temperatures increase smoothly from approximately 290°F at 25% of Rated Thermal Power to 420°F at Rated Thermal Power. However, the startup sequence employed at Fermi-2 results in a condition where feedwater temperature is about 100°F lower than these nominal conditions at power levels less than 75% of Rated Thermal Power; and there occurs a step increase in feedwater temperature at 75% of Rated Thermal Power approximating nominal conditions. Since the reduced feedwater temperatures increase the subcooling of the reactor coolant, the core power is also increased. Consequently, the MCPR may be affected.

In response to this issue, DECo submitted an analysis performed by the General Electric Company (GE) which addresses the effect of feedwater temperature on the MCPR for Fermi-2. The GE analysis postulates a feedwater controller failure event which results in excess feedwater flow as the limiting event for core subcooling. Four cases were analyzed encompassing nominal and reduced feedwater temperatures at 25% and 50% of Rated Thermal Power. The results of this analysis indicate that the δCPR for the reduced feedwater temperature increases from 0.20 to 0.25 for the 50% Rated Thermal Power cases; and from 0.32 to 0.41 for the 25% Rated

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Thermal Power cases. Since the expected operating CPR at low power is much larger than the safety limit MCPR, GE and DECo conclude that these small increases in CPR would have no impact on the safety limit MCPR.

The staff finds that GE's analytical results agree with the typical trend in CPR for BWR plants operating at core flow and power other than at Rated Thermal Power. However, the staff recommends that since the margin to the safety limit MCPR reduces rapidly with increase in power, DECo perform a further analysis of the δCPR for reduced feedwater temperature at 75% of Rated Thermal Power to ensure that a safety margin continues to exist under all plant operating conditions. The results of this further analysis should be available before the plant is operated above 50% of Rated Thermal Power. The need for this further analysis was discussed with your technical staff and they have agreed to perform said analysis.

B. MCPR Technical Specification Limits

The MCPR limits specified in Section 3.2.3 and illustrated in Figure 3.2.3-1 of the Fermi-2 Technical Specifications are based on the input parameters stated in FSAR Table 15.0.1. One of the key parameters is the assumption that the turbine generator moisture separator reheater (MSR) is in service. As a result of this assumption, the operating limit critical power ratio (OLCPR) was calculated to be 1.25 for the event of turbine generator trip with steam bypass, and 1.31 without steam bypass. If the MSR is out of service, the OLCPR is 1.30 with steam bypass, and 1.35 without steam bypass. Since the OLCPR increases with the removal of the MSR from service, the Fermi-2 Senior Resident Inspector raised the concern that operation with the MSR out of service is contrary to the analytical assumption in the FSAR upon which the OLCPR was determined for the Fermi-2 Technical Specifications, and as such, operation with the MSR out of service constitutes a violation of the plant Technical Specifications.

In response to the Senior Resident Inspector's concern on this issue, DECo provided the following explanation in justification of its operation of the plant with the MSR out of service:

(1) The calculated OLCPR was based on end-of-cycle life of the core. For the beginning-of-cycle core life, such as is the case for Fermi-2, there are significant CPR margins and the current Technical Specification limits are thereby not exceeded; therefore no Technical Specification change is needed to address operation with the MSR out of service; and

(2) If Fermi-2 is operating at greater than 25% of Rated Thermal Power, and it becomes necessary to remove the MSR from service, corrective action consistent with the applicable LCO in the Plant Technical Specifications will be implemented.

The staff agrees with the licensee's explanation above relative to there being significant CPR margin at beginning-of-cycle life of the core. However, although it appears that a safety limit was not exceeded, given the core life of the time of this occurrence, it is evident that the plant was operated with the MSR out of service contrary to the analytical assumptions in the FSAR, and as such the plant was operated in an unanalyzed condition. The safety evaluation performed by DECo pursuant to 10 CFR 50.59 (in April 1987) should have been performed before the plant was operated with the MSR out of service. Therefore, the concern raised by the NRC Senior Resident Inspector has merit with respect to DECo's compliance with 10 CFR 50.59. Additionally, since the Technical Specification pertaining to this matter was developed based on the analysis contained in the FSAR, a violation of the licensing basis may also be involved. We recognize that the Plant Technical Specifications do not explicitly prohibit operation with the MSR out of service. Nonetheless, it is apparent in the FSAR that DECo did not intend to operate the plant with the MSR out of service.

To preclude any future misunderstandings, and assuming that DECo intends to operate the plant with the MSR out of service, the staff has recommended that DECo submit a proposal to change Section 3.2.3 and Figure 3.2.3-1 of the plant Technical Specifications to either include the operational OLCPR limits as stated above, or change the current operating MCPR limits, or operate in accordance with the current Technical Specification LCO which would limit operation up to 25% of Rated Thermal Power. The staff requires that any such Technical Specification change be approved by the NRC before the plant is allowed to operate with the MSR out of service.

It is accordingly requested that (1) DECo perform the additional analysis of δCPR for reduced feedwater temperature at 75% of Rated Thermal Power as discussed with and agreed to by your staff to verify that sufficient safety margins continue to exist under all plant operating conditions; and (2) if DECo intends to operate the plant with the MSR out of service, to submit a proposed Technical Specification change with appropriate technical justification, so that action may be taken to amend the operating license accordingly.

The NRC staff is prepared to meet with DECo to answer any questions regarding this matter.

Sincerely,

Original signed by

John J. Stefano, Project Manager
Project Directorate III-1
Division of Reactor Projects - III,
IV, V and Special Projects

cc: See next page

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