



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 80 TO FACILITY OPERATING LICENSE NO. NPF-43

DETROIT EDISON COMPANY

FERMI-2

DOCKET NO. 50-341

1.0 INTRODUCTION

By letter dated December 5, 1991, as supplemented December 30, 1991, the Detroit Edison Company (DECo or the licensee) requested amendment to the Technical Specifications (TS) appended to Facility Operating License No. NPF-43 for Fermi-2. The proposed amendment would reconcile the TS required actions for the Emergency Equipment Cooling Water (EECW) and Emergency Equipment Service Water (EESW) systems and the TS required actions for certain systems which are cooled by the EECW and EESW systems. These systems are the Emergency Core Cooling Systems (ECCS), the A.C. electrical distribution system, and the battery chargers. In each system, the TS required action for the inoperability of the EECW/EESW supported equipment is more limiting than the required action for an EECW/EESW subsystem inoperability.

The need to reconcile these TS actions came from the issuance of Generic Letter (GL) 91-18, which distributed NRC Inspection Manual, Part 9900 section on the topic of operability. This section indicated that when the TS required action for a support system is less restrictive than the TS required action for a supported system then the most restrictive action should be followed until the inconsistencies are resolved. The section also indicates that an amendment to the TS may be necessary to resolve inconsistencies.

The issuance of GL 91-18 made it clear to DECo that the most restrictive actions should be taken immediately upon loss of EECW cooling. Therefore, DECo has requested a license amendment to resolve the situation. Prompt resolution of the proposed TS change to the EECW/EESW action requirements is needed to support continued plant operation, and to continue necessary surveillance testing and preventive maintenance on the EECW/EESW systems.

2.0 EVALUATION

The EECW is a standby system which provides cooling to equipment essential to reactor safe shutdown whenever the normal cooling to this equipment is unavailable. The EESW provides cooling to the EECW system and is in turn cooled by the Ultimate Heat Sink.

The EECW and EESW systems each consist of two subsystems. The subsystems are independent and divisionalized.

The essential safety-related equipment supported by EECW is as follows:

- o Residual Heat Removal/Low Pressure Coolant Injection (RHR/LPCI) Pumps
- o Core Spray (CS) Pumps
- o Non-interruptible Control Air Compressors
- o Thermal Recombiner System
- o Electrical Switchgear Room Cooling
- o Reactor Core Isolation Cooling (RCIC)
- o High Pressure Coolant Injection (HPCI)
- o Standby Gas Treatment System
- o Control Room Emergency Filtration System
- o Essential Battery Chargers Room Cooling

Heat removal from this equipment or the room where the equipment is located is normally via the non-safety related Reactor Building Closed Cooling Water (RBCCW) system. The two EECW subsystems are, in effect, two branches in the distribution of the RBCCW system. In the event of an EECW initiation signal, the RBCCW isolation valves are automatically repositioned to form the two independent EECW subsystems. The EESW system is the cooling medium for the EECW heat exchanger and has no other purpose. The EECW/EESW system design has been previously reviewed and accepted by the NRC staff in the Fermi-2 Safety Evaluation Report (NUREG-0798), Section 9.2.1.

The current TS requirements for the EECW (TS 3.7.1.2) and EESW (TS 3.7.1.3) provide for a 72 hour allowed outage time (AOT) for loss of one subsystem. After the 72 hour AOT expires, a plant shutdown is required.

This action creates several problems. First, the use of the 72 hour AOT for one division subsystem is not appropriate in situations where an opposite division component, which is reliant on the remaining operable EECW subsystem is also inoperable. In this case, the entire safety function may be lost and a more restrictive action requirement should be applied. The proposed TS change addresses this issue by requiring a verification of opposite train equipment within two hours following the loss of the EECW system, which, if not completed, requires a prompt plant shutdown.

The proposed TS change is consistent with the guidance expressed in GL 91-18, that the capability to perform a safety function must not be lost due to inoperabilities in more than one train. Requiring a plant shutdown if a safety function is lost is consistent with the TS actions for these functions.

A second problem is that the operability status of plant equipment should reflect the physical state of the equipment. The current TS provision could lead to the conclusion that it is acceptable to consider inoperable equipment operable during a 72 hour AOT. This is inconsistent with both the operability definition and the actual status of the equipment. Therefore, the proposed TS change requires that associated safety-related equipment made inoperable by the loss of EECW cooling be declared inoperable at the time cooling is lost. The proposed TS change then directs that the action requirements for the supported systems be taken. This assures that the necessary action

requirements (including any remedial actions) are taken. These systems include the ECCS, A.C. electrical distribution, and the battery chargers.

The Fermi-2 ECCS network consists of a standard BWR-4 design consisting of a Low Pressure Coolant Injection (LPCI) system, a Core Spray System (CSS), a High Pressure Coolant Injection (HPCI) system and an Automatic Depressurization System (ADS). The LPCI and CSS systems consist of two redundant subsystems. The HPCI and ADS systems provide redundant functions to each other. The TS actions for the ECCS allow one of the six systems or subsystems, detailed above, to be inoperable for time periods of between 7 and 14 days. The time periods reflect defense-in-depth of the ECCS network. Circumstances where more than one system/subsystem would be simultaneously inoperable were considered to be unlikely when the original TS were drafted for Fermi-2. Therefore, actions with shorter AOTs were not included in the TS at the time the plant was licensed.

The current ECCS TS actions (TS 3.5.1) do not cover the resulting ECCS inoperabilities for the situation when an EECW subsystem is inoperable. TS 3.5.1 does not contain an action statement that addresses the multiple resultant inoperabilities of the LPCI and CSS systems. Therefore, entry into TS 3.0.3 and an immediate plant shutdown would be required which could result in an unnecessary plant cycle.

The proposed TS changes overcome this problem by including a provision which addresses loss of an EECW subsystem within the TS action statement 3.5.1. The proposed TS allows one LPCI and one CSS subsystem in the same division to be inoperable for up to 72 hours. The existing evaluation in the Updated Final Safety Analysis Report (UFSAR) of a failure of a divisional battery provides a conservative evaluation of the impact on the ECCS of a loss of a division of LPCI and CSS. The ECCS performance evaluation shows that all ECCS acceptance criteria of 10 CFR 50.46 are met. The results are displayed in UFSAR Figure 6.3-17. These evaluations have been reviewed and accepted by the NRC staff in the Fermi-2 Safety Evaluation Report (NUREG 0798), Section 6.3.4.

The proposed changes to TS 3.5.1 direct the 72 hour AOT of the EECW TS to become limiting when loss of EECW cooling requires entry into TS Section 3.5.1. The proposed cross-train verification of equipment operability, discussed above, assures that sufficient equipment remains operable to meet the ECCS functional requirements.

The EECW system also supports the A.C. electrical distribution equipment and the battery chargers. The current TS AOTs for loss of one division of these systems are 8 hours and 2 hours, respectively. However, these AOTs do not reflect the capability of this equipment to perform its design basis function without EECW cooling. The guidance in GL 91-18 would now require all licensee's to evaluate the operability of supported systems upon the loss of the support systems.

The EECW supports the A.C. electrical distribution system by cooling the rooms in which the equipment is located. These rooms are maintained at less than 86°F in normal conditions by non-safety air conditioning systems and in

emergency conditions by the EECW system. This temperature is chosen to prevent accelerated aging of electronic components in the room. The room equipment will perform its UFSAR design basis function properly with temperatures up to 122°F.

By letter dated December 30, 1991, the licensee provided the results of evaluations of room temperature versus time. These evaluations show that following the design basis loss-of-coolant accident (LOCA), without EECW cooling in the A.C. electrical distribution rooms, temperatures increased from 86°F to 122°F in approximately 18 hours for both rooms. These evaluations conservatively contain a 12 percent margin. The non-safety air conditioning is assumed to fail at the time of the accident.

The battery chargers are similarly supported by the EECW system; however, the room temperature increases due to the loss of EECW are much less rapid than for the A.C. electrical distribution rooms. Since the battery chargers require an A.C. power supply, the battery chargers' capability without EECW is limited by the A.C. electrical distribution system.

The proposed TS change allows entry in the action statement to be delayed following the loss of EECW room cooling. Since the A.C. electrical distribution system and battery chargers retain their full capability for a period of time post-LOCA, following the loss of room cooling, a delayed entry into the A.C. distribution system TS action statement is warranted. The December 30, 1991, letter provided conservative calculations showing that a delay of up to 16 hours is justified. This delay entry into the action statement again allows for routine maintenance and testing of the EECW/EESW system to enhance its reliability without requiring the plant to start an unnecessary mode change.

The proposed TS change adds a clarification of what systems supported by the EECW system are required to be operable in operational conditions 4 and 5. In operational condition 4 and 5, there is no need to consider continued plant operation, because the reactor is shutdown. The intent is to take the action for any equipment which is rendered inoperable by the loss of the EECW cooling. Whether or not a piece of equipment should be considered inoperable depends upon the impact of the loss of EECW on the equipment's ability to perform its intended function. In operational conditions 4 or 5, the need for EECW cooling may depend upon the design basis scenarios which can credibly occur in these conditions. Thus, there could be no actual impact on the equipment's ability to perform its intended function with a loss of EECW cooling. The proposed action of TS 3.7.1.2.b reflects the intended action without mixing the Operational Conditions 4 and 5 requirements with the more complex Operational Conditions 1, 2 and 3 requirements. This action requirement directly applies the operability definition in a manner consistent with the GL 91-18 guidance.

The proposed TS change also changes the EESW TS to reflect the philosophy of GL 91-18 operability of support and supported systems. The proposed change will modify the EESW TS requiring the same actions when a subsystem of the EESW is inoperable as when a subsystem of the EFCW is inoperable.

In summary, the proposed changes to the TS act to eliminate any potential conflict between the explicit TS action for the EECW system and the application of the operability definition to the supported system TS. When the most restrictive actions are applied, as described in GL 91-18, EECW/EESW system outages are essentially prohibited with the existing TS since such an outage would cause entry into the TS 3.0.3 provisions requiring a plant shutdown. System outages are periodically necessary to allow for surveillance testing and minor preventive maintenance to be performed. Such activities act to enhance the reliability and availability and thus to benefit safety. The proposed TS change eliminates the requirement to shut the plant down if a system outage is required for the EECW/EESW while maintaining the operability of supported systems necessary to safely shutdown the plant in all operational modes. The proposed changes are consistent with the intent of GL 91-18 that it is not the intent of surveillance or other similar program requirements to cause unwarranted plant shutdowns.

Based on the above evaluation, the staff finds the proposed TS changes are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Michigan State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents which may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (57 FR 935). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such

activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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