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September 24, 2015
NRC-15-0091

10 CFR 50.90

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: License Amendment Request to Revise Technical Specification Section 3.5.1, "ECCS – Operating"

In accordance with the provisions of 10 CFR 50.90, DTE Electric Company (DTE) is submitting a request for an amendment to the Technical Specifications (TS) for Fermi 2.

The proposed amendment would delete the note associated with Surveillance Requirement (SR) 3.5.1.4 to reflect the Residual Heat Removal (RHR) system design and ensure the RHR system operation is consistent with the TS section 3.5.1 Limiting Condition for Operation (LCO) requirements.

Enclosure 1 provides a description and evaluation of the proposed change. Enclosure 2 provides the existing TS page marked up to show the proposed change. Enclosure 3 provides a clean version of the TS page with the change incorporated. Markups of the TS Bases pages are provided in Enclosure 4; for information only.

DTE requests approval of the proposed License Amendment by September 30, 2016, with the amendment being implemented within 60 days.

No new commitments are being made in this submittal.

In accordance with 10 CFR 50.91, a copy of this application, with enclosures, is being provided to the designated Michigan State Official.

Should you have any questions or require additional information, please contact Mr. Christopher R. Robinson of my staff at (734) 586-5076.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 24, 2015

Vito A. Kaminskas
Site Vice President

Enclosures:

1. Evaluation of the Proposed License Amendment
2. Marked-up Page of Existing Fermi 2 TS
3. Clean Page of Fermi 2 TS with Change Incorporated
4. Marked-up Pages of Existing Fermi 2 TS Bases (For Information Only)

cc: NRC Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Michigan Public Service Commission
Regulated Energy Division (kindschl@michigan.gov)

**Enclosure 1 to**
**NRC-15-0091**

**Fermi 2 NRC Docket No. 50-341**
**Operating License No. NPF-43**

# License Amendment Request to Revise Technical Specification Section 3.5.1, "ECCS – Operating"

## Evaluation of the Proposed License Amendment

**Evaluation of the Proposed License Amendment**

## 1.0 Summary Description

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit or early site permit," DTE Electric Company (DTE) is requesting to amend Facility Operating License No. NPF-43 for Fermi 2.

This amendment request proposes to delete the note in Surveillance Requirement (SR) 3.5.1.4 which is associated with Technical Specifications (TS) Section 3.5.1, "ECCS — Operating," to reflect the Residual Heat Removal (RHR) system design and ensure the RHR system operation is consistent with the TS Section 3.5.1 Limiting Condition for Operation (LCO) requirements.

## 2.0 Detailed Description

The proposed change will delete the following note in the Fermi 2 TS Surveillance Requirement (SR) 3.5.1.4:

> Low pressure coolant injection (LPCI) subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the Residual Heat Removal (RHR) cut-in permissive pressure in MODE 3, and for 4 hours after exceeding RHR cut-in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.

Enclosure 2 provides the marked-up TS page with the proposed change. Enclosure 3 provides the clean TS page with the proposed change incorporated. Enclosure 4 provides the marked-up TS Bases pages showing the proposed change. Enclosure 4 is provided for information only.

## 3.0 Technical Evaluation

### Background

An NRC inspection was conducted at Fermi 2 in 2012 in accordance with Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)." As noted in Integrated Inspection Report 05000341/2012003 (Reference 1), Fermi 2 had initiated a corrective action document to develop and implement measures to address the lack of an analysis to support the note in TS SR 3.5.1.4, which allows manual realignment of LPCI from shutdown cooling with reactor steam dome pressure less than the Residual Heat Removal (RHR) cut-in permissive pressure in Mode 3. This corrective action document includes an interim action tracking LCO requirement to declare a division of LPCI inoperable while using shutdown cooling in Mode 3. In December 2012, the NRC completed an integrated inspection (Reference 2) and closed TI 2515/177. NRC Integrated Inspection report 05000341/2012005 (Reference 2) documented a Green Finding with an associated licensee-identified violation of 10 CFR, Part 50, Appendix B,

Criterion Ill, "Design Control," for the lack of supporting analysis for LPCI subsystem operability in Mode 3, in accordance with the TS 3.5.1 "Note" that allows the manual realignment of LPCI.

As previously described, Fermi 2 does not have specific analysis to demonstrate the capability of the LPCI design function for a division of RHR that is operating in shutdown cooling while the plant is still in Mode 3. This lack of design information led to NRC findings for multiple Region III plants, including Fermi 2.

Currently, SR 3.5.1.4 contains a note stating that LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the Residual Heat Removal (RHR) cut-in permissive pressure in MODE 3, and for 4 hours after exceeding RHR cut-in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable. The note was added to SR 3.5.1.4 during the Fermi 2 Improved Technical Specifications (ITS) conversion as part of License Amendment 134, which was approved on September 30, 1999 (Reference 3).

TSTF-416, Rev. 0, "SR 3.5.1.2 Notation" modified the Improved Standard Technical Specifications (ISTS) provided in NUREG-1433, Volume 1, "Standard Technical Specifications, General Electric BWR/4 Plants," by moving the note that modifies LPCI surveillances to the LCO in LCO 3.5.1 and 3.5.2. These notes were intended to provide clarity that LPCI may be considered OPERABLE during alignment and operation in the decay heat removal mode. Fermi 2 TS have not been revised to incorporate TSTF-416, as the notes are still located in the SRs. As indicated in the NRC staff disposition of TSTF-416, Rev. 0 (ML022240526), relocating the notes was considered an administrative change.

**RHR System Design and Operation**

As described in section 1.2.2.5.4 of the Fermi 2 Updated Final Safety Analysis Report (UFSAR) (Reference 4), the safety function of the RHR system is to remove decay heat during and after plant shutdown and to remove heat from the primary containment following a loss-of-coolant accident (LOCA). The RHR system is also capable of cooling the suppression pool for long-term containment heat removal. The RHR system may be used during normal plant operation in the shutdown cooling mode to remove decay heat and cool the reactor coolant system to 125°F.

The RHR system consists of two loops. One loop, consisting of a heat exchanger, two main system pumps in parallel, and associated piping, is located in one area of the reactor building. The other heat exchanger, pumps, and piping, all of which form a second loop, are located in another area of the reactor building to minimize the possibility of a single physical event causing the loss of the entire system. The two loops of the RHR system are cross-connected by a single header, making it possible to supply either loop from the pumps in the other loop. The main RHR system pumps were sized for the flow required during LPCI operation, which is the subsystem that requires the maximum flowrate. The heat exchangers were sized on the basis of their required duty for the shutdown cooling function.

**LPCI and Shutdown Cooling System Design and Operation**

The emergency core cooling systems (ECCS) consist of the high-pressure coolant injection (HPCI) system, the low-pressure coolant injection (LPCI) system, the core spray system, and the automatic depressurization system (ADS). The LPCI mode of RHR operation supports the ECCS safety objective to limit the release of radioactive materials should a LOCA occur. In case of low water level in the reactor or high pressure in the primary containment, the LPCI mode of operation of the RHR system pumps water into the Reactor Pressure Vessel (RPV) in time to cool the core consistent with the design bases. In LPCI mode, upon receipt of an initiation signal, if normal power is available, all four RHR pumps start with no delay. LPCI is a low-head, high-flow function that delivers its rated flow to the RPV when the differential pressure between the RPV and drywell is less than 264 psid (rated flow is injected at 20 psid). It is designed to reflood the RPV to at least two-thirds of the core height and to maintain this level. During LPCI operation, the RHR system pumps take suction from the suppression pool and discharge to the RPV into the core region through one of the Reactor Recirculation System (RRS) loops.

The shutdown cooling mode of RHR, except for the portion through the LCPI bypass orifices, uses the same piping discharge path as the LPCI mode of RHR. However, the shutdown cooling suction path is from one of the recirculation loops off the RPV, while the LPCI suction path is from the Suppression Pool. The RHR system is serviced by an automatic fill system that maintains the containment spray lines filled up to the outermost containment isolation valves.

The two redundant, manually controlled shutdown cooling loops of the RHR System provide decay heat removal. Each loop consists of two subsystems; each subsystem having a separate motor driven pump, but sharing a common heat exchanger, associated piping and valves. Both loops also have a common suction from the same recirculation loop. Each pump discharges the reactor coolant, after circulation through the respective heat exchanger, to the reactor via the recirculation loops. The RHR heat exchangers transfer heat to the RHR Service Water System. Any one of the four RHR shutdown cooling subsystems can provide the required decay heat removal function. Decay heat removal by operation of the RHR system in the shutdown cooling mode is not required for the mitigation of any event or accident evaluated in the safety analyses. Decay heat removal is, however, an important safety function that must be accomplished or core damage could result.

The initial phase of nuclear system cooldown is accomplished by dumping steam from the RPV to the main condenser. When the nuclear system temperature has decreased to where the steam supply pressure is not sufficient to maintain the turbine shaft gland seals, the vacuum in the main condenser cannot be maintained and the RHR system is placed in the shutdown cooling mode of operation. The shutdown cooling system is able to complete cooldown to 125°F within 20 hours after the control rods have been inserted, and can maintain the nuclear system at 125°F for reactor refueling and servicing. In the shutdown cooling mode of operation, Reactor coolant is pumped from one of the RRS loops by one or both of the RHR main system pumps and is

discharged through the RHR heat exchangers, where cooling occurs by transferring heat to the service water. Reactor coolant is returned to the RPV through either RRS loop.

**LPCI and Shutdown Cooling TS Requirements**

Fermi 2 TS 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System — Hot Shutdown," LCO requires that two RHR shutdown cooling subsystems be operable, and, with no recirculation pump in operation, at least one RHR shutdown cooling subsystem shall be in operation. TS Section 3.4.8 is only applicable in Mode 3, with reactor steam dome pressure less than the RHR cut-in permissive pressure. Mode 3 means that the reactor mode switch is in the 'Shutdown' position and the average reactor coolant temperature is greater than 200 degrees F. In this mode, all the reactor vessel head closure bolts are fully tensioned and therefore, the reactor would typically be pressurized. Irradiated fuel in the shutdown reactor core generates heat during the decay of fission products and increases the temperature of the reactor coolant. This decay heat must be removed to reduce the temperature of the reactor coolant to less than or equal to 200 degrees F. This decay heat removal is in preparation for performing refueling or maintenance operations or for keeping the reactor in the Hot Shutdown condition.

Fermi 2 TS 3.5.1, "ECCS-Operating," requires each ECCS injection system to be OPERABLE in Modes 1, 2, and 3. With regard to the LPCI mode, this means that both LPCI subsystems are required for the LCO to be met. If one LPCI subsystem is inoperable, TS 3.5.1, Condition A requires the inoperable subsystem to be returned to OPERABLE status within seven days. There are two LPCI subsystems, each consisting of two motor driven pumps, piping, and valves to transfer water from the suppression pool to the RPV via the selected recirculation loop. The LPCI subsystems are designed to provide core cooling at low RPV pressure. Upon receipt of an initiation signal, all four LPCI pumps are automatically started. RHR system valves in the LPCI flow path are automatically positioned to ensure the proper flow path for water from the suppression pool to inject into the recirculation loops. When the RPV pressure drops sufficiently, the LPCI flow to the RPV, via the selected recirculation loop, begins.

SR 3.5.1.4 contains a note that allows a LPCI subsystem to be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the Residual Heat Removal (RHR) cut-in permissive pressure in MODE 3, and for 4 hours after exceeding RHR cut-in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable. This allows operation in the RHR shutdown cooling mode during MODE 3, if necessary, and sufficient time to restore the system line up to the LPCI mode of operation.

**Justification for Note Removal**

NRC Information Notice (IN) 2010-11 (Reference 5) and industry operating experience indicate that during operation in Mode 3, the potential exists for the water in the RHR pump suction piping aligned for shutdown cooling to flash/boil when the subsystem is realigned to the LPCI mode. This phenomenon is due to the physical arrangement (i.e., common interface) of the

shutdown cooling and LPCI suction lines for the RHR pumps. The realignment from shutdown mode to LPCI mode transfers the suction source for the RHR pump; thereby exposing the high temperature shutdown cooling water to the low pressure LPCI suction piping from the Suppression Pool. The resultant flashing/boiling of the high pressure, high temperature water when introduced to the low pressure piping could result in voiding in the suction piping, RHR pump cavitation, water hammer, and associated RHR system damage. This vulnerability is greatest during the early stages of Mode 3 operation when the shutdown cooling water temperature is highest.

The potential for flashing/boiling in the RHR suction piping and Suppression Pool suction valve thermal binding are the result of the RHR system design that supports several different operating modes using common equipment. This design feature, and the associated temperature phenomenon, prevents timely realignment of the RHR subsystem from shutdown cooling mode to LPCI mode. Therefore, the SR 3.5.1.4 note that allows an RHR subsystem to remain OPERABLE for LPCI mode when being aligned or operated in shutdown cooling mode is inappropriate and should be removed from the Fermi 2 TS. Fermi 2 will continue to declare the respective LPCI subsystem of ECCS inoperable for the subsystem operating in shutdown cooling mode and enter the appropriate Condition(s) of TS 3.5.1 in Mode 3. This operation is consistent with Fermi 2 practice in declaring the respective containment cooling modes of RHR inoperable for the RHR subsystem operating in shutdown cooling mode and entering the appropriate Condition(s) of TS Sections 3.6.2.3, "RHR Suppression Pool Cooling," and 3.6.2.4, "RHR Suppression Pool Spray," during Mode 3.

Plant operation described above (i.e., RHR subsystem in shutdown cooling mode and not available to support LPCI mode) is consistent with the original Fermi 2 RHR system design and approval. NUREG-0798, "Safety Evaluation Report related to the operation Enrico Fermi Atomic Power Plant, Units No. 2," (Reference 6) reviewed and approved the Fermi 2 RHR system design prior to the addition of the SR 3.5.1.4 note. As previously stated, the note was added to SR 3.5.1.4 during the Fermi 2 Improved Technical Specifications (ITS) conversion as part of License Amendment 134, which was approved on September 30, 1999 (Reference 3).

Standard Technical Specifications (STS - NUREG-1433) recognized this boiling water reactor design configuration and the mutual exclusivity of the LPCI and shutdown cooling functions. The STS bases explains the allowance provided by the TS 3.5.1 note (Fermi 2 SR 3.5.1.4 note) as "necessary since the RHR System may be required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor. At these low pressures and decay heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary." However, industry and site specific operating experience makes the application of the TS 3.5.1 note (Fermi 2 SR 3.5.1.4 note) inappropriate at Fermi 2.

Therefore, the removal of the SR 3.5.1.4 note, and operation with one RHR subsystem inoperable for LPCI mode while being aligned or operated in shutdown cooling in accordance with TS 3.4.8, is justified.

## 4.0 Regulatory Evaluation

### 4.1 Applicable Regulatory Requirements/Criteria

The following NRC requirements and guidance documents are applicable to the review of the proposed changes:

10 CFR 50, Appendix A, General Design Criterion (GDC) 34, "Residual heat removal," requires that a system to remove residual heat be provided with a safety function to transfer fission product decay heat and other residual heat from the reactor core at a rate such that specified acceptable fuel design limits and the design conditions of the reactor coolant pressure boundary are not exceeded.

10 CFR 50, Appendix A, GDC 35, "Emergency core cooling," requires that a system to provide abundant emergency core cooling be provided with a safety function to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.

10 CFR 10, Appendix A, GDC 37, "Testing of emergency core cooling system," requires that the emergency core cooling system design provide the capability for periodic pressure and functional testing. This testing shall assure (1) structural and leaktight integrity of components, (2) operability and performance of active components, (3) operability of the whole system under conditions as close to design as possible.

10 CFR 50.36, "Technical specifications," details the content and information that must be included in a station's Technical Specifications (TS). In accordance with 10 CFR 50.36, TS are required to include (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. As described in 10 CFR 50.36(c)(2), "Limiting conditions for operation," are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO is not met, the licensee shall shut down the reactor or follow any other actions permitted by TS.

10 CFR 50.46(a)(1)(i) requires that each boiling or pressurized light-water nuclear power reactor be provided with an ECCS designed with a calculated cooling performance in accordance with an acceptable evaluation model following a postulated LOCA.

The proposed change does not involve any physical changes to the structures, systems, or components at Fermi 2. The proposed change will reflect current plant configuration of the RHR system design and ensure safe operation by continuing to meet applicable regulations and requirements.

### 4.2 Precedent

The NRC has approved a similar license amendment request to remove this note for Peach Bottom Atomic Power Station in Reference 7.

In addition, Exelon Generation submitted a License Amendment Request (LAR) for LaSalle County Station, Units 1 and 2, to revise Technical Specifications Section 3.5.1, “ECCS-Operating.” The LAR proposes to delete the LCO note associated with TS Section 3.5.1, "ECCS — Operating," to reflect the RHR system design and ensure the RHR system operation consistent with the TS Section 3.5.1 LCO requirements. This LAR was submitted to the NRC on January 12, 2015 (ADAMS Accession Number ML15012A544).

### 4.3 No Significant Hazards Consideration

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit or early site permit," DTE Electric Company (DTE) is requesting to amend Facility Operating License No. NPF-43 for Fermi 2.

DTE proposes to delete the note in Surveillance Requirement (SR) 3.5.1.4 associated with Technical Specifications (TS) Section 3.5.1, "ECCS — Operating," to reflect the Residual Heat Removal (RHR) system design and ensure the RHR system operation is consistent with the TS Section 3.5.1 Limiting Condition for Operation (LCO) requirements.

DTE has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92(c), "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   No physical changes to the facility will occur as a result of this proposed amendment. The proposed change will not alter the physical design. The current TS SR note could make Fermi 2 susceptible to potential water hammer in the RHR system if a subsystem is operating in the shutdown cooling mode of RHR in Mode 3 and is required to swap from the shutdown cooling to LPCI mode of RHR. The proposed LAR will eliminate the risk for cavitation of the pump and voiding in the suction piping, thereby avoiding potential to damage the RHR system, including water hammer.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The proposed change does not alter the physical design, safety limits, or safety analysis assumptions associated with the operation of the plant. Accordingly, the change does not introduce any new accident initiators, nor does it reduce or adversely affect the capabilities of any plant structure, system, or component to perform their safety function. Deletion of the TS SR note is appropriate because current TS could put the plant at risk for potential cavitation of the pump and voiding in the suction piping, resulting in potential occurrence of water hammer and damage the RHR system.

   Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No.

   The proposed change conforms to NRC regulatory guidance regarding the content of plant Technical Specifications. The proposed change does not alter the physical design, safety limits, or safety analysis assumptions associated with the operation of the plant.

   Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above evaluation, DTE concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

**4.4 Conclusions**

In conclusion, based on the considerations discussed above, (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.

**5.0 Environmental Consideration**

DTE has evaluated the proposed amendment for environmental considerations. The review has resulted in the determination that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the

proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is required for the proposed amendment.

**6.0 References**

1) Fermi Power Plant Unit 2 Integrated Inspection Report 05000341/2012003, August 6, 2012
2) Fermi Power Plant Unit 2 - NRC Integrated Inspection Report 05000341/2012005, January 28, 2013
3) Fermi 2 – Issuance of Amendment Re: Conversion of Current Technical Specifications to Improved Standard Technical Specifications (TAC No. MA1465)
4) UFSAR, Revision 19, October 2014
5) NRC Information Notice 2010-11, Potential for Steam Voiding Causing Residual Heat Removal System Inoperable, June 16, 2010
6) NUREG-0798, Safety Evaluation Report related to the operation Enrico Fermi Atomic Power Plant, Units No. 2, July 1981
7) Letter from R. B. Ennis (NRC) to M. J. Pacilio (Exelon), "Peach Bottom Atomic Power Station, Units 2 and 3 — Issuance of Amendments Re: Delete Non-Conservative Note from Limiting Condition for Operation for Operation 3.5.1 (TAC Nos. MF3184 and MF3185)," dated July 28, 2014 (ADAMS Accession Number ML14163A589).

**Enclosure 2 to**
**NRC-15-0091**

**Fermi 2 NRC Docket No. 50-341**
**Operating License No. NPF-43**

**License Amendment Request to Revise Technical Specification Section 3.5.1, "ECCS – Operating"**

**Marked-up Page of Existing Fermi 2 TS**

SURVEILLANCE REQUIREMENTS (continued)

| | SURVEILLANCE | FREQUENCY |
|---|---|---|
| SR 3.5.1.4 | ~~NOTE~~<br>~~Low pressure coolant injection (LPCI) subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the Residual Heat Removal (RHR) cut-in permissive pressure in MODE 3, and for 4 hours after exceeding the RHR cut-in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.~~<br>Verify each ECCS injection/spray subsystem manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position. | 31 days |
| SR 3.5.1.5 | Verify primary containment pneumatic supply pressure is ≥ 75 psig. | 31 days |
| SR 3.5.1.6 | Verify the RHR System power operated cross tie valve is open. | 31 days |
| SR 3.5.1.7 | Verify each recirculation pump discharge valve cycles through one complete cycle of full travel or is de-energized in the closed position. | 18 months |

(continued)

**Enclosure 3 to**
**NRC-15-0091**

**Fermi 2 NRC Docket No. 50-341**
**Operating License No. NPF-43**

**License Amendment Request to Revise Technical Specification Section 3.5.1, "ECCS – Operating"**

**Clean Page of Fermi 2 TS with Change Incorporated**

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.5.1.4 | Verify each ECCS injection/spray subsystem manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position. | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.1.5 | Verify primary containment pneumatic supply pressure is ≥ 75 psig. | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.1.6 | Verify the RHR System power operated cross tie valve is open. | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.1.7 | Verify each recirculation pump discharge valve cycles through one complete cycle of full travel or is de-energized in the closed position. | In accordance with the Surveillance Frequency Control Program |

(continued)

**Enclosure 4 to**
**NRC-15-0091**

**Fermi 2 NRC Docket No. 50-341**
**Operating License No. NPF-43**

**License Amendment Request to Revise Technical Specification Section 3.5.1, "ECCS – Operating"**

**Marked-up Pages of Existing Fermi 2 TS Bases (For Information Only)**

BASES

APPLICABLE SAFETY ANALYSES (continued)

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. The core is maintained in a coolable geometry; and

e. Adequate long term cooling capability is maintained.

The limiting single failures are discussed in Reference 11. The Design Basis Accident recirculation suction line break with the failure of the Division II battery results in the highest nominal peak cladding temperature. One ADS valve failure is analyzed as a limiting single failure for events requiring ADS operation. The remaining OPERABLE ECCS subsystems provide the capability to adequately cool the core and prevent excessive fuel damage.

The ECCS satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Each ECCS injection/spray subsystem and five ADS valves are required to be OPERABLE. The ECCS injection/spray subsystems are defined as the two CS subsystems, the two LPCI subsystems, and one HPCI System. The low pressure ECCS injection/spray subsystems are defined as the two CS subsystems and the two LPCI subsystems.

With less than the required number of ECCS subsystems OPERABLE, the potential exists that during a limiting design basis LOCA concurrent with the worst case single failure, the limits specified in Reference 10 could be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by Reference 10.

A

LPCI subsystems ~~may be~~ is considered ~~OPERABLE~~ inoperable during alignment and operation for decay heat removal when below the actual RHR cut in permissive pressure in MODE 3, ~~if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable.~~ At these low pressures and decay heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary.

since transferring from the shutdown cooling mode to the LPCI mode, could result in voiding in the suction piping, pump cavitation, water hammer, and associated RHR System damage.

BASES

SURVEILLANCE REQUIREMENTS (continued)

verification that those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. For the HPCI System, this SR also includes the steam flow path for the turbine and the flow controller position.

The 31 day Frequency of this SR was derived from the Inservice Testing Program requirements for performing valve testing at least once every 92 days. The Frequency of 31 days is further justified because the valves are operated under procedural control and because improper valve position would only affect a single subsystem. This Frequency has been shown to be acceptable through operating experience.

~~This SR is modified by a Note that allows LPCI subsystems to be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the RHR cut in permissive pressure in MODE 3, and for 4 hours after exceeding the RHR cut-in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. This allows operation in the RHR shutdown cooling mode during MODE 3, if necessary and sufficient time to restore the system line up to the LPCI mode of operation.~~

SR 3.5.1.5

Verification every 31 days that ADS primary containment pneumatic supply pressure is ≥ 75 psig ensures adequate air or nitrogen pressure for reliable ADS operation. The accumulator on each ADS valve provides pneumatic pressure for valve actuation. The design pneumatic supply pressure requirements for the accumulator are such that, following a failure of the pneumatic supply to the accumulator, at least five valve actuations can occur with the drywell at the long term drywell pressure of the design basis small break LOCA analysis (Ref. 15). The ECCS safety analysis assumes only one actuation to achieve the depressurization required for operation of the low pressure ECCS. This minimum required pressure of ≥ 75 psig is provided by the primary pneumatic supply system. The 31 day Frequency takes into consideration administrative controls over operation of the pneumatic system and alarms for low pneumatic pressure.