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NRC-18-0001

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

Fermi 2 Power Plant
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Response to Request for Additional Information Regarding License Amendment Request to Revise Technical Specification Section 3.7.2

Reference: 1) DTE Electric Letter to NRC, "License Amendment Request to Revise Technical Specification Section 3.7.2 for Emergency Equipment Cooling Water / Emergency Equipment Service Water System and Ultimate Heat Sink," NRC-17-0025, dated July 17, 2017 (ML17198C829)

In Reference 1, DTE Electric Company (DTE) submitted a license amendment request (LAR) to revise Technical Specification (TS) 3.7.2 for Emergency Equipment Cooling Water (EECW) / Emergency Equipment Service Water (EESW) System and Ultimate Heat Sink (UHS). In an email from Ms. Sujata Goetz to Mr. Jason Haas dated December 12, 2017, the NRC sent DTE a request for additional information (RAI) regarding this LAR. The response to the RAI is enclosed.

No new commitments are being made in this submittal.

Should you have any questions or require additional information, please contact Mr. Scott A. Maglio, Manager – Nuclear Licensing, at (734) 586-5076.

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

Executed on January 8, 2018

Keith J. Polson
Senior Vice President and CNO

Enclosures: 1) Response to Request for Additional Information
2) Additional TS Bases Mark-up (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-18-0001

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

Response to Request for Additional Information

Response to Request for Additional Information

RAI-1

The original design basis for the Residual Heat Removal (RHR) Complex as summarized in the Fermi 2 Safety Evaluation Report, NUREG-0798, described two independent divisions for the RHR Complex, with each division having its own reservoir. The reservoirs are separated by a four foot thick concrete wall. The two divisions are functionally independent of each other with complete system and component redundancy. NUREG-0798 concluded that there is sufficient makeup water in the reservoirs for a 30 day on-site supply. In contrast, in the July 17, 2017, license amendment request (LAR), the licensee states that the reservoirs are a single source and that the combined volume is necessary for accident mitigation for 7 days. Please explain the discrepancy between the LAR and NUREG-0798.

RESPONSE

The RAI discusses potential discrepancies between the LAR and NUREG-0798 about whether the two reservoirs are independent or not and whether the Ultimate Heat Sink (UHS) inventory is sufficient for 30 days or 7 days. The question regarding independence of the two reservoirs is similar to RAI-2, and is therefore addressed in the response to RAI-2. The question regarding the duration of the UHS inventory is addressed as follows.

The original Final Safety Analysis Report (FSAR) reviewed and approved by the NRC in NUREG-0798 indicated that the UHS was sized to provide sufficient cooling for 30 days following an accident without make-up water addition. In response to an unresolved item regarding how design calculations accounted for degraded service water pump performance documented in NRC Inspection Report 50-341/94012, dated November 23, 1994, the design calculations associated with the UHS were reviewed and revised. The design calculation revisions closed the unresolved item as documented in NRC Inspection Report 50-341/95009, dated September 19, 1995. However, the results from the revised calculations could no longer demonstrate sufficient inventory for 30 days without make-up. Although Regulatory Position 1 of Regulatory Guide (RG) 1.27 (Revision 2 is used by Fermi 2) recommends a 30-day inventory, it also indicates that a cooling capacity of less than 30 days may be acceptable if it can be demonstrated that replenishment or use of an alternate supply can ensure the continuous capability of the UHS to perform its safety functions.

As a result, Fermi 2 revised the licensing basis described in the Updated Final Safety Analysis Report (UFSAR) to be based on a 7-day inventory with make-up rather than a 30-day inventory without make-up. The revised licensing basis was incorporated in UFSAR Revision 8 which was submitted to the NRC by DTE letter NRC-97-0010, dated May 2, 1997. The licensing basis change included providing a basis for demonstrating conformance with this alternative provision of Regulatory Position 1 of RG 1.27 (i.e. less than 30 days) by ensuring make-up to maintain adequate inventory beyond 7 days. This basis is currently described in detail in UFSAR Sections 9.2.5.3.3 and A.1.27. The information in the LAR regarding the 7-day inventory is therefore

consistent with the current licensing basis described in the UFSAR in Sections 9.2.5.1, 9.2.5.3, and A.1.27.

The changes to the UFSAR licensing basis from what was originally in the FSAR as described above were made under 10 CFR 50.59 prior to the issuance of RG 1.187 in November 2000. RG 1.187 provided guidance for the extensive revisions to the 10 CFR 50.59 rule that occurred in 1999. A review of the proposed change was performed in 1995 against the criteria in 10 CFR 50.59 at that time (i.e. before the extensive rule changes and the existence of RG 1.187) and it was concluded that the licensing basis change in inventory from 30 days without make-up to 7 days with make-up could be made without prior NRC review and approval. As required by 10 CFR 50.59(b)(2) at that time, a summary supporting the conclusion that prior NRC review and approval was not needed was included with the submittal of UFSAR Revision 8 discussed above. Note that no physical change was made to the UHS to reduce the inventory.

RAI-2

The LAR states that the reservoirs are a single source and that the combined volume is necessary for accident mitigation for 7 days. However, Updated Final Safety Analysis Report (UFSAR) Section 3.8.4.1.2 describes the RHR Complex consisting of two divisions completely independent of the other, with each division having a water reservoir and the capacity to shutdown the reactor during normal and/or accident conditions completely independent of the other. Please explain the discrepancy.

RESPONSE

UFSAR Section 3.8.4.1.2 is a general description of the RHR complex and includes the statement that:

> Each division has the capacity to safely and orderly shut down the reactor during normal and/or accident conditions completely independent of the other.

UFSAR Section 9.2.5.3 contains a similar description of the RHR complex (i.e. the UHS) that states that:

> The ultimate heat sink consists of a single highly reliable water source with fully redundant cooling towers, pumps, and conduits capable of providing sufficient cooling for 7 days to permit safe shutdown and cooldown of the nuclear unit in the event of a design-basis accident.

These statements are accurate and clear with respect to mechanical equipment (i.e. pumps and valves), piping, mechanical draft cooling towers, and emergency diesel generators (EDGs). With respect to the reservoirs, additional clarification of the statements is provided as follows.

As described in the LAR, the two RHR reservoirs are separated by a 4-foot thick concrete wall, but connected by two cross-tie lines. UFSAR Sections 9.2.5.2.1 and 9.2.5.3.4 explain that the reason that the reservoirs are connected in this manner is to permit access to the combined inventory of the two reservoirs to either RHR division in the event of a failure in one of the divisions. This is consistent with the statement in the TS 3.7.2 Bases that the UHS relies on the combined heat capacity of the two reservoirs. This is also consistent with the approach utilized by Fermi 2 in UFSAR Section A.1.27 to address conformance with Regulatory Position 3 of RG 1.27 whereby the UHS is considered a single source (see the response to RAI-4 regarding the meaning of "single source"). Therefore, although the reservoirs are separated from one another when the cross-tie lines are closed, the combined inventory of both reservoirs is needed in order to ensure sufficient heat sink inventory to mitigate all potential accident scenarios including failures. For this reason, the 1988 LAR submitted by DTE (Reference 7.4 in the current LAR) added requirements to the TS for the cross-tie lines and the combined inventory. If each reservoir had sufficient inventory to satisfy RG 1.27 on its own, then there would be no need for

cross-tie lines and valves to have been included in the TS since they would not meet criterion 3 of 10 CFR 50.36(c)(2)(ii) referenced in the TS 3.7.2 Bases (page B 3.7.2-2).

The NRC review and approval of the UHS design documented in NUREG-0798 contains the following description:

> Division I is functionally independent of Division II with complete system and component redundancy. The only common connection is redundant lines between the two reservoirs to permit access by either division to all the stored water.

NUREG-0798 also describes the total capacity of the reservoirs of about 6.9 million gallons and states that the NRC concluded there was sufficient water available in the reservoirs to meet the RG 1.27 recommendations. There is no statement in NUREG-0798 that indicates that each reservoir individually has sufficient inventory to meet the RG 1.27 recommendations; only the combined inventory of 6.9 million gallons is described. In its approval of License Amendment 51 in 1990 (Reference 7.5 in the current LAR), the NRC stated that the addition of the new TS requirements for the cross-tie lines and combined inventory was consistent with the UHS design which was reviewed and accepted in NUREG-0798.

Note that the 1990 revision of the TS occurred prior to the change to the licensing basis for the number of days of inventory which was described in the response to RAI-1. In other words, the reduction from a 30-day inventory without make-up to a 7-day inventory with make-up occurred several years after the TS had already been revised to provide requirements related to cross-tie lines and valves and combined reservoir inventory; it was not a concurrent change.

In conclusion, the statement in UFSAR Section 3.8.4.1.2 is accurate with respect to mechanical equipment, piping, mechanical draft cooling towers, and EDGs but is not intended to imply that each reservoir contains adequate inventory to meet RG 1.27 on its own as evidenced by the similar statement in UFSAR Section 9.2.5.3. However, DTE acknowledges that the statement, when applied to the reservoirs themselves and not taken in context of descriptions of the reservoirs elsewhere in the UFSAR, NUREG-0798, and License Amendment 51, can cause confusion. Implementation of the plant modification and TS changes associated with this LAR, if approved by the NRC, will include a review of the UFSAR to identify necessary changes. UFSAR Section 3.8.4.1.2 will be reviewed and revised as necessary at that time.

RAI-3

UFSAR Section 9.2.5.2.1 describes the RHR complex reservoir consisting of "two one-half capacity structures." What is meant by the term "capacity"? Capacity could be related to the quantity of water needed to perform its design function or two equally sized structures making the capacity of the RHR complex.

RESPONSE

The first sentence of UFSAR Section 9.2.5.2.1 states:

> The RHR complex reservoir consists of two one-half-capacity reinforced-concrete structures of Category I construction, each with a capacity of 3.41×10^6 gal of water at elevation 583 ft.

The term "capacity" is used twice in this sentence. The first use of the term "capacity" is intended to describe that the two reservoirs are equally sized and that each reservoir provides one-half (i.e. 50%) of the total inventory of water in the RHR complex (i.e. the UHS). This is consistent with the classification of the UHS as a single source (see the response to RAI-4 regarding the meaning of "single source") since the combined inventory of both reservoirs is needed for the 7-day period discussed in the UFSAR. The second use of the term "capacity" is intended to describe the physical volume of water that each reservoir is capable of holding.

RAI-4

UFSAR Section 9.2.5.3 refers to the ultimate heat sink as a single water source. RHR Complex could be considered a single source. What is meant by "a single source"?

RESPONSE

Regulatory Position 3 of RG 1.27 (Revision 2 is used by Fermi 2) states that the UHS should consist of two sources of water, unless it can be demonstrated that there is an extremely low probability of losing the capability of a single source. The meaning of the phrase "single source" in the Fermi 2 UFSAR corresponds to the meaning in Regulatory Position 3 of RG 1.27. In other words, the two reservoirs in the RHR complex are not considered as two separate sources of water for conformance with Regulatory Position 3 of RG 1.27. Instead, the combined volume of the two reservoirs in the RHR complex is considered as a single source for conformance with the "single source" alternative described in Regulatory Position 3 of RG 1.27.

The UFSAR Section 9.2.5.3 description of the Fermi 2 UHS as a single source has not changed from that originally provided in Section 9.2.5.3 of the FSAR which was reviewed and approved by the NRC in NUREG-0798.

RAI-5

TS Bases 3.7.2 in the LCO Section is not clear. The third paragraph under the LCO section states "each reservoir must have sufficient capacity to accept the design heat load from supported equipment." Yet each reservoir's supported equipment has sufficient capacity to shutdown the reactor during normal and/or accident conditions. Explain the LCO section of TS Base 3.7.2.

RESPONSE

The third paragraph of the LCO section of TS Bases 3.7.2 describes the operability requirements for each reservoir individually. These requirements consist of the reservoir water volume, the reservoir water temperature, and the operability of that reservoir's cooling tower and both cooling tower fans. If these requirements are not met, then that reservoir is considered inoperable (i.e. not capable of removing the design basis heat loads from its supported equipment). However, the fourth paragraph of the LCO section of TS Bases 3.7.2 describes additional operability requirements for the combination of the two reservoirs. These requirements consist of the combined water volume and the combined average water temperature. Taken together, the requirements described in the third and fourth paragraphs ensure that the UHS can be utilized to safely shut down the reactor during normal and/or accident conditions using either Division I or Division II supported equipment.

The safety evaluation associated with License Amendment 51 (Reference 7.5 in the LAR), which added new TS requirements for the cross-tie lines and combined inventory, indicated that the NRC found the amendment acceptable on the basis that it retained all existing individual reservoir requirements while adding conservative new requirements for the combined reservoirs. The structure of the current LCO section of TS Bases 3.7.2 is consistent with the safety evaluation as it retains individual reservoir requirements (i.e. third paragraph) and has combined reservoir requirements (i.e. fourth paragraph).

The statement in the third paragraph that "a RHR reservoir must have sufficient capacity to accept the design heat load from the supported equipment" is not intended to imply that each reservoir contains adequate inventory to meet RG 1.27 on its own. Instead, conformance with RG 1.27 is based on the combined inventory of both reservoirs, consistent with the term "single source" as discussed in the response to RAI-4.

To reduce the potential for future confusion, the TS Bases markup of page B 3.7.2-3 previously provided in Enclosure 4 of the LAR is revised to also include clarification of the third paragraph of the LCO section as indicated in Enclosure 2. Note that Enclosure 2 is provided for information only.

RAI-6

Fermi 2 UFSAR Appendix 1.27 describes 6,598,000 gallons of water to meet regulatory guide 1.27 position 1. Does this refer to a combined single source or redundant reservoirs?

RESPONSE

UFSAR Section A.1.27 states that the UHS contains 6.598×10^6 gallons of water at 1 foot below grade level. Since the site grade is 583 feet as indicated in UFSAR Section 1.2.2.3.5, this volume of 6.598×10^6 gallons corresponds to level at an elevation of 582 feet and is the combined volume of water in the UHS (i.e. the sum of the two reservoirs) at that elevation.

Reservoir levels are typically maintained at an elevation between 582 feet and 583 feet. However, the level corresponding to the TS minimum for operability (i.e. elevation 580 feet as indicated on page 3.7.2-5 of the TS Bases) is used in the design calculations that demonstrate adequate inventory for a 7-day period. Any volume of water associated with a level above the TS minimum level, such as the 6.598×10^6 gallon value given in UFSAR Section A.1.27, provides margin to the inventory required for a 7-day period. This conservatism is also described in UFSAR Sections 9.2.5.3.3 and A.1.27.

In conclusion, the inventory used to address conformance with RG 1.27 is based on the combined inventory of both reservoirs, consistent with the term “single source” as discussed in the response to RAI-4.

Enclosure 2 to
NRC-18-0001

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

Additional TS Bases Mark-up (For Information Only)

BASES

LCO

The EECW/EESW system consists of two completely independent subsystems. In the event of a DBA, one subsystem of EECW/EESW is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems of EECW/EESW must be OPERABLE. At least one subsystem will operate, if the worst single active failure occurs coincident with the loss of offsite power.

An EECW/EESW subsystem is considered OPERABLE when it has an OPERABLE EECW pump, an OPERABLE EESW pump, an OPERABLE EECW/EESW heat exchanger, an OPERABLE EECW makeup tank, an OPERABLE EECW makeup pump, and OPERABLE flow paths to provide cooling water flow to the supported equipment and reject the heat to the division's RHR reservoir.

replace with: the

The OPERABILITY of the UHS is based on the OPERABILITY of each RHR reservoir. To be OPERABLE, ~~a~~ RHR reservoir ~~must have sufficient capacity to accept the design heat load from the supported equipment. To accomplish this each reservoir~~ water volume must be greater than 2,990,000 gallons (an indication of 25 feet) and the water temperature must be ≤ 80°F. In addition, the associated cooling tower and both fans must be OPERABLE.

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Since the UHS relies on the combined heat capacity of the two RHR reservoirs to accomplish its design objectives, UHS OPERABILITY must also be based on the two reservoirs having a combined water volume of 5,980,000 gallons and a combined average water temperature of ≤ 80°F. Furthermore, the two reservoirs must be cross-connected~~, or capable of being cross-connected~~.

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The isolation of the EECW cooling to components or systems may render those components or systems inoperable, but does not necessarily affect the OPERABILITY of the EECW/EESW System.

APPLICABILITY

In MODES 1, 2, and 3, the EECW/EESW System and UHS are required to be OPERABLE to support OPERABILITY of the equipment serviced by the EECW/EESW System. Therefore, the EECW/EESW System and UHS are required to be OPERABLE in these MODES.

Although the LCO for the EECW/EESW System and UHS is not applicable in MODES 4 and 5, the capability of the EECW/EESW System and UHS to perform their necessary related support functions may be required for OPERABILITY of supported systems.