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DTE Energy

10 CFR 54

March 10, 2016
NRC-16-0021

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

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) DTE Electric Company Letter to NRC, "Fermi 2 License Renewal Application," NRC-14-0028, dated April 24, 2014 (ML14121A554)

3) NRC Letter, "Requests for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 17 (TAC No. MF4222)," dated January 14, 2015 (ML14356A212)

4) DTE Electric Company Letter to NRC, "Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 17," NRC-15-0011, dated February 12, 2015 (ML15045A007)

Subject: Supplemental Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 17 RAI 4.3.3-1

In Reference 2, DTE Electric Company (DTE) submitted the License Renewal Application (LRA) for Fermi 2. In Reference 3, NRC staff requested additional information regarding the Fermi 2 LRA. DTE previously responded to the request for additional information (RAI) in Reference 4. DTE is providing a supplemental response to RAI 4.3.3-1 based on clarification calls with the NRC on February 10, 2016 and February 25, 2016. The supplemental response is provided in the enclosure to this letter.

No new commitments are being made in this submittal.

Should you have any questions or require additional information, please contact Lynne Goodman at 734-586-1205.

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

Executed on March 10, 2016

Keith Polson
Site Vice President
Nuclear Generation

Enclosure: DTE Supplemental Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 17 RAI 4.3.3-1

cc: NRC Project Manager
NRC License Renewal 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-16-0021**

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

# DTE Supplemental Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 17 RAI 4.3.3-1

***Set 17 RAI 4.3.3-1***

*Background*

*LRA Section 4.3.3, "Effects of Reactor Water Environment on Fatigue Life," states that a screening evaluation has been conducted on the six locations identified in NUREG/CR-6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components," to assess the impact of environmentally assisted fatigue (EAF) for the period of extended operation. The results of the screening evaluation are provided in LRA Table 4.3-8, "EAF Screening of Fermi 2 Locations," with multiple locations having projected CUF values exceeding the limit of 1.0 when accounting for environmental effects. The LRA also states that the fatigue usage calculations will be updated using refined fatigue analysis to determine valid CUFs of less than 1.0 for the locations in Table 4.3-8. The LRA further states that "DTE will review design basis ASME Class 1 component fatigue evaluations to ensure the Fermi 2 locations evaluated for the effects of the reactor coolant environment on fatigue include the most limiting components within the reactor coolant pressure boundary."*

*Issue*

*The staff lacks sufficient information to evaluate the effects of the reactor coolant environment on component fatigue life during the period of extended operation. It is unclear what methodologies are being used to identify the plant-specific limiting locations. It is also unclear what corrective actions and/or refined fatigue analysis will be used to ensure that the CUF values projected to exceed 1.0, when accounting for environmental effects, will remain within the ASME Code limit.*

*Request*

1. *Provide the methodology being used to identify plant-specific component locations in the reactor coolant pressure boundary that are more limiting than the components identified in NUREG/CR-6260.*
2. *Explain the technical basis for how this methodology identifies the plant-specific, bounding component locations.*
3. *Provide the corrective actions being used and/or the methodology to refine the fatigue analysis to ensure that the CUF values projected to exceed 1.0, when accounting for environmental effects, will remain within the ASME Code limit. Justify the use of the Fatigue Monitoring Program to ensure that the CUF ASME Code limit of 1.0 is not exceeded.*

**Response:**

DTE previously responded to RAI 4.3.3-1 by letter dated February 12, 2015 (NRC-15-0011). Based on clarification calls with the NRC held on February 10, 2016 and February 25, 2016, the previous response is being supplemented to include additional revisions to the Fatigue

Monitoring Program in the LRA. The Fatigue Monitoring Program description is revised to include the information regarding stress-based fatigue monitoring that was previously included in the RAI 4.3.3-1 response, but was not previously added to the LRA. The LRA revisions are indicated below.

**LRA Revisions:**

LRA Sections A.1.17 and B.1.17 are revised as shown on the following pages. Additions are shown in underline and deletions are shown in strike-through. Note that previous changes to these sections made in previous letters are not shown in underline or strike-through such that only the new supplemental changes are shown as revisions.

### A.1.17 Fatigue Monitoring Program

The Fatigue Monitoring Program ensures that fatigue usage remains within allowable limits for components identified to have a TLAA by (a) tracking the number of critical thermal and pressure transients for selected components, (b) verifying that the severity of monitored transients are bounded by the design transient definitions for which they are classified, (c) assessing the impact of the reactor coolant environment on a set of sample critical components including those from NUREG/CR-6260 and those components identified to be more limiting than the components specified in NUREG/CR-6260, and (d) addressing applicable fatigue exemptions. Tracking the number of critical thermal and pressure transients for the selected components ensures a code design usage factor of less than or equal to 1, including environmental effects where applicable. The environmental effects on fatigue for the identified critical components will be evaluated.

The program monitors the number of occurrences for the plant transients that cause significant fatigue usage. The program also provides for updates of fatigue usage calculations on an as-needed basis if an allowable cycle limit is approached or in a case where a transient definition has been changed, unanticipated new thermal events are discovered, or the geometry of components has been modified.

As an alternative to monitoring occurrences of transients, NUREG-1801, Section X.M1, Fatigue Monitoring, also allows more detailed monitoring of local pressure and thermal conditions to be performed to allow the actual fatigue usage for the specified critical locations to be calculated. Therefore the program will include Stress-Based Fatigue (SBF) monitoring. SBF monitoring computes stress history for a given component from transient pressure and temperature data collected from plant instruments, and the corresponding stress history at the critical location in the component. The stress history is analyzed to identify stress cycles and then a cumulative usage factor is computed. The recommendations of NRC Regulatory Issue Summary (RIS) 2008-30 will be applied for any use of SBF. Use of SBF monitoring will appropriately account for environmental effects on fatigue usage.

## B.1.17 FATIGUE MONITORING

**Program Description**

The Fatigue Monitoring Program ensures that fatigue usage remains within allowable limits for components identified to have a TLAA by (a) tracking the number of critical thermal and pressure transients for selected components, (b) verifying that the severity of monitored transients are bounded by the design transient definitions for which they are classified, (c) assessing the impact of the reactor coolant environment on a set of sample critical components including those from NUREG/CR-6260 and those components identified to be more limiting than the components specified in NUREG/CR-6260, and (d) addressing applicable fatigue exemptions. Tracking the number of critical thermal and pressure transients for the selected components ensures a code design usage factor of less than or equal to 1, including environmental effects where applicable. The environmental effects on fatigue for the identified critical components will be evaluated.

The program monitors the number of occurrences for the plant transients that cause significant fatigue usage. The program also provides for updates of fatigue usage calculations on an as-needed basis if an allowable cycle limit is approached or in a case where a transient definition has been changed, unanticipated new thermal events are discovered, or the geometry of components has been modified.

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