



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

January 14, 2016

Mr. Vito Kaminskas  
Site Vice President - Nuclear Generation  
DTE Electric Company  
Fermi 2 - 280 OBA  
6400 North Dixie Highway  
Newport, MI 48166

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
FERMI 2 LICENSE RENEWAL APPLICATION – SET 38 (TAC NO. MF4222)

Dear Mr. Kaminskas:

By letter dated April 24, 2014, DTE Electric Company (DTE or the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating license NPF-43 for Fermi 2, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

This request for additional information was discussed with Ms. Lynne Goodman, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-3301 or e-mail [Daneira.Melendez-Colon@nrc.gov](mailto:Daneira.Melendez-Colon@nrc.gov).

Sincerely,

**/RA/**

Daneira Meléndez-Colón, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure:  
Requests for Additional Information

cc: ListServ

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**FERMI 2  
LICENSE RENEWAL APPLICATION  
REQUEST FOR ADDITIONAL INFORMATION SET 38**

**RAI 4.3.3-3a**

**Background:**

By letter dated September 24, 2015, the applicant provided its response to RAI 4.3.3-3. In this letter, the applicant stated that there are locations where the environmentally assisted fatigue (EAF) correction factors ( $F_{en}$ ) were recalculated using average transient temperatures or maximum operating temperatures. The RAI response also states that these  $F_{en}$  were recalculated in a manner consistent with NUREG/CR-6909, "Effect of LWR Coolant Environments on the Fatigue Life of Reactor Materials."

Appendix A of NUREG/CR-6909 states the following:

For the case of a constant strain rate and a linear temperature response, an average temperature (i.e., average of the maximum and minimum temperatures for the transients) may be used to calculate  $F_{en}$ . In general, the "average" temperature that should be used in the calculations should produce results that are consistent with the results that would be obtained using the modified rate approach described in Section 4.2.14 of this report. The maximum temperature can be used to perform the most conservative evaluation.

The method used to calculate the "average" temperature is dependent on whether the minimum transient temperature exceeds the temperature threshold value of the material. When the minimum temperature exceeds the threshold temperature, the maximum and minimum temperature values of the stress cycle or load set pair are used to calculate the average temperature. When the minimum temperature is below the threshold temperature, the maximum and threshold temperature are used to calculate the average temperature. Sections 4.2.4 and 5.2.7 of NUREG/CR-6909 provide examples of determining average temperatures.

As noted above, NUREG/CR-6909 also states that the average temperature may be used to calculate the  $F_{en}$  value for transients with a constant strain rate and a linear temperature response, which are defined as "simple" transients. Use of an average temperature may not be appropriate for more complex transients that have multiple or non-linear temperature variations. For complex transients, the modified rate approach should be used to validate  $F_{en}$  calculations.

Based on the RAI response, the staff requested clarification during a telephone conference call held on December 15, 2015, on how the average transient temperatures were calculated in the applicant's screening and  $F_{en}$  evaluations because it was not clear if the average transient temperatures were calculated appropriately considering the threshold temperature. In addition, it was not clear if use of the average temperatures were limited to simple transients. This clarification is needed to verify consistency with NUREG/CR-6909.

ENCLOSURE

**Issue:**

During the telephone conference call held on December 15, 2015, the applicant and the staff discussed three methods to determine the average temperature values, used to calculate the  $F_{en}$ . The staff finds that two of these methods, one based on minimum transient temperatures above the temperature threshold and the other based on minimum transient temperatures below the temperature threshold, are consistent with the approach described in NUREG/CR-6909. During the call the applicant stated that a third method used the minimum transient temperature instead of the threshold temperature to calculate the average temperature and, if the resulting temperature was less than the threshold temperature, then the threshold temperature was used to calculate the  $F_{en}$ . The staff finds this third approach to be not consistent with NUREG/CR-6909 methodology.

**Request:**

Assess the impact of revising the evaluations to use the correct determination of average temperature in a manner consistent with NUREG/CR-6909, and submit a description of the impact of this revision to the previous screening and  $F_{en}$  evaluation results for staff review. This includes:

- a) Identify all locations that used an average temperature to calculate the  $F_{en}$ . This includes locations which are not identified as sentinel locations. For each location, provide the following:
  - i. The material of construction.
  - ii. A description of how the average temperature was calculated.
  - iii. A description of all transients associated with the use of average temperatures and justification that the transients are simple transients.
- b) For all other locations not identified in (a), provide the material of construction and a description of what temperature was used to calculate the  $F_{en}$ .
- c) Describe whether the revised average temperature calculations impacts the selection of sentinel locations.
- d) Confirm that any revised  $F_{en}$  and EAF cumulative usage factor values ( $CUF_{en}$ ) values are determined in a manner consistent with the guidance of NUREG/CR-6909, as stated in LRA Section 4.3.3, A.2.2, and response to RAI 4.3.3-3.

Letter to V. Kaminskis from D. Melendez-Colon dated January 14, 2016

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