



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

June 11, 2015

LICENSEE: DTE Electric Company

FACILITY: Fermi 2

SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALLS HELD ON DECEMBER 16, 2014, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION AND DTE ELECTRIC COMPANY, CONCERNING REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE FERMI 2 LICENSE RENEWAL APPLICATION (TAC NO. MF4222)

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of DTE Electric Company (DTE or the applicant) held three telephone conference calls on December 16, 2014, to discuss and clarify the staff's draft requests for additional information (DRAIs) 3.1.2.3.2-2, 3.1.2.3.2-3, 4.7.4-1, 4.1-2, 3.3.2.9-1, 3.5.2.2.1.3.1-1, 3.5.2.2.1.3.1-2, 3.5.2.2.1.3.2-1, and 3.5.2.2.1.3.3-3 concerning the Fermi 2 license renewal application. The telephone conference calls were useful in clarifying the intent of the staff's DRAIs.

Enclosure 1 provides a listing of the participants and Enclosure 2 contains a listing of the DRAIs discussed with the applicant, including a brief description on the status of the items.

The applicant had an opportunity to comment on this summary.

*/RA/*

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

Docket No. 50-341

Enclosures:

1. List of Participants
2. Summary of Telephone Conference Call

cc: Listserv

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SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALLS HELD ON DECEMBER 16, 2014, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION AND DTE ELECTRIC COMPANY, CONCERNING REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE FERMI 2 LICENSE RENEWAL APPLICATION (TAC NO. MF4222)

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TELEPHONE CONFERENCE CALL  
FERMI 2  
LICENSE RENEWAL APPLICATION

LIST OF PARTICIPANTS  
DECEMBER 16, 2014

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SUMMARY OF TELEPHONE CONFERENCE CALL  
FERMI 2  
LICENSE RENEWAL APPLICATION  
DECEMBER 16, 2014

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of DTE Electric Company (DTE or the applicant) held three telephone conference calls on December 16, 2014, to discuss and clarify the following draft requests for additional information (DRAIs) concerning the Fermi 2 license renewal application (LRA).

**DRAI 3.1.2.3.2-2**

Background:

LRA Section 4.7.3 discusses the applicant's plant-specific time-limited aging analysis (TLAA) for evaluating loss of preload due to irradiation-assisted stress relaxation or creep in the jet pump auxiliary spring wedge assembly. LRA Section 4.7.4 discusses the applicant's plant-specific TLAA that evaluated relaxation of the jet pump slip joint repair clamps. The applicant dispositioned both of these TLAAs in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 54.21(c)(1)(ii).

Issue:

LRA Table 3.1.2-2 does not include any applicable aging management review (AMR) items for managing loss of preload due to irradiation-assisted stress relaxation or creep in the jet pump spring wedge assemblies and jet pump slip joint repair clamps that are associated with the applicable TLAAs.

Request:

Provide the basis why LRA Table 3.1.2-2 does not include any applicable AMR items to manage loss of preload due to irradiation-assisted stress relaxation or creep in the jet pump auxiliary spring wedge assembly and jet pump slip joint repair clamps that are associated with the applicable plant-specific TLAAs in LRA Sections 4.7.3 and 4.7.4.

Discussion:

The staff provided clarification related to its concern in draft RAI 3.1.2.3.2-2.

The applicant understands the staff's concerns and will provide a response to the RAI.

This request will be sent as a formal RAI.

### **DRAI 3.1.2.3.2-3**

#### Background:

LRA Table 3.1.2-2 states that the jet pump assembly: slip joint clamp adjustable bolt and ratchet lock spring will be managed by the BWR Vessel Internals Program for cracking and reduction of fracture toughness. The LRA states that the BWR Vessel Internals Program, when enhanced, will be consistent with the program element criteria in Generic Aging Lessons Learned (GALL) Report Aging Management Program (AMP) XI.M9, "BWR Vessel Internals." GALL Report AMP XI.M9 recommends that the jet pump assembly be managed in accordance with the recommended criteria in Boiling Water Reactor Vessel and Internals Project (BWRVIP) Technical Report No. BWRVIP-41.

#### Issue:

The staff is unclear if the jet pump assembly: slip joint clamp adjustable bolt and ratchet lock spring is within the inspection strategy of BWRVIP-41. The staff could not confirm which location in BWRVIP-41, Table 3.3-1, "Matrix of Inspection Options," recommends specific inspection of these components.

#### Request:

- (1) Clarify whether the jet pump assembly: slip joint clamp adjustable bolt and ratchet lock spring components are within the scope of BWRVIP-41 and whether the criteria in Table 3.3-1 of BWRVIP-41 recommends specific inspection of these components. If so, identify the inspection methods and frequencies that will be applied to these components.
- (2) If the components are not within the scope of any inspection methods recommended in the BWRVIP-41 report, clarify and provide the basis on how cracking and reduction of fracture toughness will be managed in the components such that the intended function(s) of the components will be maintained during the period of extended operation.

#### Discussion:

The staff provided clarification related to its concern in draft RAI 3.1.2.3.2-3.

The applicant understands the staff's concerns and will provide a response to the RAI.

This request will be sent as a formal RAI.

#### **DRAI 4.7.4-1**

##### Background:

LRA Sections 4.4.7 and A.2.5.4 describe the slip joint repair clamps as being connected to the diffuser and the mixer (throat) in the jet pump assembly. The LRA states that the clamps were installed with a preload that may decrease due to neutron fluence and thermal exposure. The LRA also states that the analysis that evaluated the decrease of the installation preload for the slip joint repair clamp is a TLAA that has been projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii). The LRA further states that after 52 effective full-power years (EFPY) of plant operation the expected fluence at the location of the repair clamps is  $3.07E+18$  n/cm<sup>2</sup> (E > 1 MeV), which is below a level necessary ( $1.0E+19$  n/cm<sup>2</sup>) to cause stress relaxation in stainless steel.

##### Issue:

The staff lacks sufficient information to evaluate the jet pump slip joint repair clamp TLAA (LRA Section 4.4.7) for the period of extended operation and determine if the updated final safety analysis report (UFSAR) supplement (LRA Section A.2.5.4) adequately summarizes the TLAA in accordance with 10 CFR 54.21(d). The LRA does not include the following information that the staff needs for its determination: (a) the intended function of the jet pump slip joint repair clamps, (b) how the loss of preload affects the capability of the clamps to perform their intended function, (c) a physical description of the slip joint repair clamp, and (d) the specific methodology and details of the methodology that was used to assess loss of preload in the jet pump slip joint repair clamps during the period of extended operation.

##### Request:

- (1) State the intended function of the jet pump slip joint repair clamps and how the loss of preload affects the capability of the clamps to perform their intended function.
- (2) Provide a physical description or drawing of the slip joint repair clamps. The level of detail in the description should provide for an understanding of the style of clamp construction (e.g., bolted, pressed, pined, keyway) and how the clamps are retained in the jet pump assembly.
- (3) Provide summaries of the stress and fluence analysis, as applicable, used to evaluate the jet pump slip joint repair clamps for the period of extended operation. The summaries should include the:
  - methodology and pertinent details of the methodology used in the analysis
  - calculations (mathematical modeling, including pertinent safety assumptions or coefficients used in the modeling) used to evaluate the decrease in preload
  - key variables used to evaluate the decrease in preload, such as the design basis preload and minimum value of the preload required for the clamps to perform their intended function

- basis used to establish the fluence threshold of  $1.0E+19$  n/cm<sup>2</sup> to cause stress relaxation in stainless steel
- basis used to determine that the loss of preload that has occurred prior to entering the period of extended operation is acceptable during the period of extended operation

Additionally, if the analysis used to evaluate the jet pump slip joint repair clamps utilized any industrial topical reports or methodologies reviewed and approved by the staff, provide the references for these documents and the dates of the staff's safety evaluation approving the reports.

Discussion:

The staff provided clarification related to the level of detail needed in the response to address its concern in Request (3) of draft RAI 4.7.4-1.

The applicant stated that the response to RAI 4.7.4-1 might be proprietary. The applicant understands the staff's concerns and will provide a response to the RAI.

This request will be sent as a formal RAI.

**DRAI 4.1-2**

Background:

Section 2.4 of the staff's December 7, 2000, safety evaluation (SE) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML003775989) on Electric Power Research Institute (EPRI) Technical Report BWRVIP-25, "BWR Core Plate Inspection and Flaw Evaluation Guidelines," states that the analysis for loss of preload due to stress relaxation for the core plate rim hold-down bolts is a generic TLAA that was demonstrated to be acceptable in accordance with 10 CFR 54.21(c)(1)(ii) (i.e., the generic analysis was projected to the end of a postulated period of extended operation). As a result, the staff's safety evaluation includes Applicant Action Item (AAI) No. 4 on the BWRVIP-25 methodology and recommends that boiling water reactor (BWR) applicants for license renewal identify and evaluate whether the analysis of stress relaxation in core plate rim hold-down bolts is a TLAA.

The applicant provided its response to AAI No. 4 in LRA Appendix C, which states that the structural integrity of the core plate is not ensured by the inclusion of wedges that hold it in place. Instead, the LRA states that the core plate design relies on pre-tensioned rim hold-down bolts to maintain position during normal and transient operations and postulated design-basis and seismic events. To address AAI No. 4, the LRA also states that the applicant will enhance the BWR Vessel Internals Program to perform one of the following two options:

- (1) install wedges in the core plate design prior to entering the period of extended operation
- (2) complete a plant-specific analysis to determine acceptance criteria for continued inspection of the core plate rim hold-down bolts in accordance with BWRVIP-25 and submit the inspection plan, along with the acceptance criteria and justification for the inspection plan, to the staff two years prior to entering the period of extended operation

The applicant included these enhancements in LRA Section A.1.10 and LRA Table A.4, Commitment No. 7.

Issue:

Commitment No. 7 needs to be clarified, particularly if the second option is selected as the basis for managing aging of the core plate rim hold-down bolts.

- (a) Option 2 in LRA Table A.4, Commitment No. 7, does not address whether the analysis will evaluate loss of preload due to stress relaxation in the core plate rim hold-down bolts and whether the analysis will quantify the loss of preload/stress relaxation that will occur in these bolts during the period of extended operation.
- (b) Presuming that the analysis in response to Part (a) of this RAI will be a loss of preload/stress relaxation analysis, Option 2 of Commitment No. 7 does not identify whether the analysis will be based on the generic loss of preload/stress relaxation analysis in BWRVIP-25, which was approved in the staff's SE of December 7, 2000, or a plant-specific loss of preload/stress relaxation analysis applicable to the Fermi 2 core plate rim hold-down bolts.
- (c) Option 2 of LRA Commitment No. 7 does not require submittal of the applicable analysis for staff approval (i.e., if not already approved by the staff).

Request:

- (a) Clarify whether the specific analysis in Option 2 of LRA Table A.4, Commitment No. 7, will address loss of preload due to stress relaxation in the core plate rim hold-down bolts, and if so, whether the analysis will quantify the loss of preload/stress relaxation that will occur in these bolts during the period of extended operation. If not, justify why the analysis would not quantify the amount of preload loss/stress relaxation that would occur in the core plate rim hold-down bolts at the end of the period of extended operation.
- (b) Clarify whether the analysis referred to in this commitment will be a plant-specific loss of preload/stress relaxation analysis for the core plate rim hold-down bolts or the generic analysis loss of preload/stress relaxation analysis that was evaluated in BWRVIP-25 and approved in the staff's SE of December 7, 2000. If the analysis will be the generic analysis in BWRVIP-25, provide your basis why the analysis has not been identified as a TLAA for the LRA and evaluated (with justification) in accordance with one of the TLAA acceptance requirements in 10 CFR 54.21(c)(1)(i), (ii), or (iii) and justify why the generic core plate rim hold-down analysis is considered to be bounding and acceptable for the design and loadings of the core plate assembly at Fermi 2.
- (c) Explain why Option 2 of LRA Commitment No. 7 does not require the loss of preload/stress relaxation analysis to be submitted for staff's approval (i.e., if the analysis has not already been demonstrated to be applicable to the bolt design at Fermi 2 and approved by the staff).

Discussion:

The staff provided clarification related to its concern in draft RAI 4.1-2. The staff stated that it will revise the first sentence of the second paragraph in the Background section as follows: "The applicant provided its response to AAI No. 4 in LRA Appendix C."

The applicant provided clarification related to item (2) in the Background section.

The applicant understands the staff's concerns and will provide a response to the RAI.

This request will be sent as a formal RAI.

**DRAI 3.3.2.9-1**

Background:

LRA Tables 3.3.2-9 and 3.3.2-12 address carbon steel bolting in a lube oil (exterior) environment. The LRA states that the aging effects of loss of material and loss of preload will be managed through the Bolting Integrity Program. The LRA also states that for items that cite a generic Note G, the environment is not in the GALL Report for the component and material combination. LRA Section B.1.2 states that the Bolting Integrity Program is an existing Program, with enhancements, that will be consistent with GALL Report AMP XI.M18.

GALL Report AMP XI.M18 includes preventive measures to minimize loss of preload, such as proper torqueing of bolts and checking for uniformity of gasket compression. GALL Report AMP XI.M18 also recommends periodic inspections (at least once per refueling cycle) of closure bolting for signs of leakage to ensure the detection of age-related degradation due to loss of material and loss of preload.

Issue:

It is not clear whether the referenced bolts in a lube oil (exterior) environment are submerged. If the bolts are in a submerged environment it is not clear how the program will be able to detect leakage of submerged bolted connections; therefore, it is not clear how the program will detect loss of material and loss of preload for submerged bolted connections prior to loss of intended function.

Request:

For the AMR items in LRA Tables 3.3.2-9 and 3.3.2-12 that address carbon steel bolting in a lube oil (exterior) environment through the Bolting Integrity Program state whether the bolts are submerged. If the bolts are in a submerged environment, describe how the program will be capable of detecting both loss of material and loss of preload and also describe how the proposed bolting inspections will be capable of detecting loss of material in crevice locations (e.g., threaded regions or the shank below the bolt heads) that are not readily visible.

Discussion:

The staff provided clarification related to its concern in draft RAI 3.3.2.9-1. The applicant provided clarification regarding the definition of “submerged.”

The applicant understands the staff’s concerns and will provide a response to the RAI.

This request will be sent as a formal RAI.

**DRAI 3.5.2.2.1.3.1-1**

Background:

Section 54.21(a)(3) of 10 CFR requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. As described in the SRP-LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL Report and when evaluation of the matter in the GALL Report applies to the plant.

The AMR line item in LRA Table 3.5.2-1 (LRA page 3.5-64) for component type “Steel elements (inaccessible areas): drywell shell; drywell head; drywell shell in sand pocket region” to manage the loss of material due to corrosion aging effect makes reference to item 3.5.1-4 in LRA Table 3.5.1 and AMR line item II.B1.1.CP-63 in the GALL Report. Items 3.5.1-4 and 3.5.4-5 in LRA Table 3.5.1 refer to the further evaluation in LRA Section 3.5.2.2.1.3, item 1, that addresses loss of material due to general pitting, and crevice corrosion that could occur in steel elements of inaccessible areas for all types of pressurized water reactor (PWR) and BWR containments.

Issue:

AMR line item II.B1.1.CP-63 does not appear to exist in the GALL Report. Further, the component type description for the above mentioned AMR line item in LRA Table 3.5.2-1 does not appear to include or address the inaccessible portion of the drywell shell embedded in the concrete floor of the drywell.

Request:

- (1) Identify the appropriate AMR line item in the GALL Report and the corresponding item in LRA Table 3.5.1 that would apply to the material, environment and aging effect being managed by the line item in LRA Table 3.5.2-1 mentioned above for inaccessible areas of the Fermi 2 steel drywell, including the portion of the shell embedded in concrete.
- (2) Update the affected LRA tables, as applicable, based on the response to Request 1.

Discussion:

The staff provided clarification related to its concern in draft RAI 3.5.2.2.1.3.1-1.

The applicant noted a minor error in the second paragraph of the Background section. LRA Table 3.5.1, item 3.5.4-5 should be revised to item 3.5.1-5. The staffs acknowledged the applicant's comment.

The applicant understands the staff's concerns and will provide a response to the RAI.

This request will be sent as a formal RAI with the revision noted above.

**DRAI 3.5.2.2.1.3.1-2**

Background:

Section 54.21(a)(3) of 10 CFR requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. As described in SRP-LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL Report and when evaluation of the matter in the GALL Report applies to the plant.

LRA Section 3.5.2.2.1.3.1 addresses the further evaluation, corresponding to LRA Table 3.5.1, items 3.5.1-4 and 3.5.1-5, and corresponding GALL Report line items related to the loss of material due to general, pitting, and crevice corrosion of the inaccessible areas of drywell shell and torus of Mark I steel containments. SRP-LR Section 3.5.2.2.1.3.1 states, in part: "The GALL Report recommends further evaluation of plant-specific programs to manage this aging effect if corrosion is indicated from the IWE examinations."

Issue:

The further evaluation in LRA Section 3.5.2.2.1.3.1 does not address the plant-specific operating experience related to loss of material due to corrosion of the inaccessible areas of the drywell shell and torus of the Fermi 2 primary containment. The staff needs additional information to determine whether or not a plant-specific AMP is necessary to manage the aging effect.

Request:

- (1) Describe the plant-specific operating experience to-date related to the loss of material due to general, pitting, and crevice corrosion of the inaccessible areas of the Fermi 2 containment drywell shell and torus. Address its significance to justify whether or not a plant-specific program is necessary to manage the aging effect.

- (2) If a plant-specific AMP is needed, provide a description of the program. At a minimum, the description should include the AMP elements described in Branch Technical Position RLSB-1 in Appendix A.1 of the SRP-LR.

Discussion:

The staff provided clarification related to its concern in draft 3.5.2.2.1.3.1-2. The discussion included a description of “inaccessible areas of the Fermi 2 containment drywell shell and torus.”

The staff stated that it will add a third request to update the affected LRA tables and sections, as appropriate.

The applicant understands the staff’s concerns and will provide a response to the RAI.

This request will be sent as a formal RAI.

**DRAI 3.5.2.2.1.3.2-1**

Background:

Section 54.21(a)(3) of 10 CFR requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. As described in SRP-LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL Report and when evaluation of the matter in the GALL Report applies to the plant.

LRA Section 3.5.2.2.1.3.2 addresses the further evaluation, corresponding to LRA Table 3.5.1, item 3.5.1-6, and GALL Report line item II.B.1.1.CP-48, related to the loss of material due to general, pitting, and crevice corrosion of the steel torus shell of Mark I containments. SRP-LR Section 3.5.2.2.1.3.2 states, in part: “The GALL Report recommends further evaluation of plant-specific programs to manage this aging effect if corrosion is significant.”

Issue:

The further evaluation in LRA Section 3.5.2.2.1.3.2 does not address the plant-specific operating experience related to loss of material due to corrosion of the torus shell. The staff needs additional information to determine whether or not a plant-specific AMP is necessary to manage the aging effect.

Request:

1. Describe the plant-specific operating experience to-date related to the loss of material due to general, pitting, and crevice corrosion of the interior (submerged areas and vapor space areas) and exterior surfaces of the Fermi 2 steel torus shell.

Address its significance to justify whether or not a plant-specific program of the torus is necessary to manage this aging effect.

2. If a plant-specific AMP is needed, provide a description of the program. At a minimum, the description should include the AMP elements described in Branch Technical Position RLSB-1 in Appendix A.1 of the SRP-LR.

Discussion:

The staff provided clarification related to its concern in draft RAI 3.5.2.2.1.3.2-1.

The staff stated that it will add a third request to update the affected LRA tables and sections, as appropriate.

The applicant understands the staff's concerns and will provide a response to the RAI.

This request will be sent as a formal RAI.

**DRAI 3.5.2.2.1.3.3-3**

Background:

Section 54.21(a)(3) of 10 CFR requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. As described in SRP-LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL Report and when evaluation of the matter in the GALL Report applies to the plant.

LRA Section 3.5.2.2.1.3.3 addresses the further evaluation, corresponding to LRA Table 3.5.1, item 3.5.1-7, and GALL Report line item II.B.1.1.CP-109, related to the loss of material due to general, pitting, and crevice corrosion of torus ring girders and downcomers of Mark I containments. SRP-LR Section 3.5.2.2.1.3.3 states, in part: "The GALL Report recommends further evaluation of plant-specific programs to manage this aging effect if corrosion is significant."

Issue:

The further evaluation in LRA Section 3.5.2.2.1.3.3 does not address the plant-specific operating experience related to loss of material due to corrosion of the torus ring girders and downcomers from the existing containment inservice inspection program. The staff needs additional information to determine whether or not a plant-specific AMP is necessary to manage the aging effect.

Request:

1. Describe the plant-specific operating experience to-date related to the loss of material due to general, pitting and crevice corrosion of the Fermi 2 steel torus ring girders and downcomers. Address its significance to justify whether or not a plant-specific program is necessary to manage this aging effect.
2. If a plant-specific AMP is needed, provide a description of the program. At a minimum, the description should include the AMP elements described in Branch Technical Position RLSB-1 in Appendix A.1 of the SRP-LR.

Discussion:

The staff provided clarification related to its concern in draft 3.5.2.2.1.3.3-3. The staff noted a minor error on the numbering of the draft RAI.

The applicant provided clarification on their definition of “downcomers.”

The staff stated that it will add a third request to update the affected LRA tables and sections, as appropriate.

The applicant understands the staff’s concerns and will provide a response to the RAI.

This request will be sent as a formal RAI title “RAI 3.5.2.2.1.3.3-1.”

**LRA Table A.4, item 1: Operating Experience Review**

The staff requested clarification regarding the implementation schedule for LRA Table A.4, Item 1, Operating Experience Review.

The applicant stated that it intends to change the implementation date for Table A.4, item 1, to “Prior to March 31, 2016.”