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

December 19, 2014

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

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE FERMI 2 LICENSE RENEWAL APPLICATION – SET 12 (TAC NO. MF4222)

Dear Mr. Kaminskas:

By letter dated April 24, 2014, DTE Electric Company (DTE or the applicant) submitted an application pursuant to Title10 of the *Code of Federal Regulations* (10 CFR) 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.

These requests for additional information were discussed with Ms. Lynne Goodman, and a mutually agreeable date for the response is January 28, 2015. However, the applicant requested 2 additional days (January 30, 2015) to provide the responses for requests for additional information 4.2.2-1 and 4.2.2-2. The staff agreed with this request. If you have any questions, please contact me at 301-415-3301 or e-mail 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 w/encl: ListServ

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6400 North Dixie Highway
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Daneira Meléndez-Colón, Project Manager
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ADAMS Accession No.: ML14342A986

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DATE	12/17/14	12/17/14	12/18/14	12/19/14	12/19/14

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SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE FERMI 2, LICENSE RENEWAL APPLICATION – SET 12 (TAC NO. MF4222)

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FERMI 2
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION SET 12
(TAC NO. MF4222)

RAI B.1.16-1

Background:

Generic Aging Lessons Learned (GALL) Report aging management program (AMP) XI.M36, "External Surfaces Monitoring of Mechanical Components," recommends inspections for leakage to identify cracking of stainless steel external surfaces exposed to air environments containing halides.

License Renewal Application (LRA) Section B.1.16 identifies an enhancement to the External Surfaces Monitoring Program to revise the program procedures to ensure that walkdowns will include inspections for leakage to detect cracking in stainless steel components exposed to air containing halides. LRA Tables 3.3.2-3, 3.3.2-10, and 3.3.2-11 contain aging management review (AMR) items for cracking of gas-filled outdoor stainless steel and aluminum components that are managed with the External Surfaces Monitoring Program.

Issue:

For components that have a gaseous internal environment, it is not clear to the staff how walkdowns of external surfaces will be able to detect leakage as an indicator of cracking.

Request:

State the inspection parameters and the inspection methods that will be used to determine whether cracking is present in the gas-filled, outdoor aluminum and stainless steel components in LRA Tables 3.3.2-3, 3.3.2-10, and 3.3.2-11.

RAI B.1.16-2

Background:

LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," revised GALL Report AMP XI.M36, "External Surfaces Monitoring of Mechanical Components," to include recommendations for managing reduced thermal insulation resistance due to moisture intrusion. LR-ISG-2012-02 states that one acceptable means of managing this aging effect is by performing visual inspections of insulation jacketing to ensure that there is no damage that would permit moisture in-leakage, provided that the jacketing had been installed with procedures that include configuration controls (e.g., minimum overlap, location of seams).

LRA Section B.1.16 does not describe any inspection activities to ensure that thermal insulation retains its ability to reduce heat transfer. During the staff's audit of the External Surfaces Monitoring Program, the staff found that the program basis document, FERMI-RPT-12-LRD03, states that thermal insulation is not credited with an intended function of heat transfer reduction. However, LRA Table 3.5.2-4 includes an AMR item for fiberglass, calcium silicate, Fiberfrax ceramic fiber Durablanket, and Insulfrax insulation with an intended function of "providing insulating characteristics to reduce heat transfer." This insulation is managed for loss of material and change in material properties with the Structures Monitoring Program.

Issue:

Neither GALL Report AMP XI.S6, "Structures Monitoring," nor LRA Section B.1.42, "Structures Monitoring," includes activities to manage reduced thermal insulation resistance due to moisture intrusion. Thus, it is not clear to the staff whether the Structures Monitoring Program is capable of effectively managing this aging effect.

Request:

For the thermal insulation in LRA Table 3.5.2-4, describe the insulation configuration and the activities in the Structures Monitoring Program that will be used to manage reduced thermal insulation resistance due to moisture intrusion. Specifically, identify whether the insulation is jacketed and, if so, whether the jacketing had been installed with procedures that include insulation configuration controls (e.g., minimum overlap, location of seams). In addition, describe the parameters that will be monitored or inspected to ensure that the thermal function of the insulation is maintained. As appropriate, revise the LRA to describe the activities that manage the thermal performance of the insulation.

RAI B.1.20-1

Background:

GALL Report AMP XI.M17, "Flow-Accelerated Corrosion," states that the program relies on implementation of the Electric Power Research Institute (EPRI) guidelines in Nuclear Safety Analysis Center (NSAC)-202L, "Recommendations for an Effective Flow Accelerated Corrosion Program." GALL Report AMP XI.M17 also states that the program should use a predictive code, such as CHECWORKS™, to provide assurance that aging effects caused by flow-accelerated corrosion are adequately managed. The NSAC-202L guidelines state that the application of appropriate quality assurance measures is essential to an effective Flow-Accelerated Corrosion Program.

LRA Section B.1.20 states that the Flow-Accelerated Corrosion Program is consistent with GALL Report AMP XI.M17 and relies on implementation of the guidelines in NSAC-202L. Based on documents provided during the staff's onsite audit, the applicant implements the program through Engineering Support Conduct Manual, MES26, "Flow-Accelerated Corrosion Prediction, Detection, and Correction," which states that predictive analyses are performed using the CHECWORKS™ software. MES26 Section 6.7, "Outage Screening / Acceptance Criteria," requires component thicknesses to be estimated at the next refueling outage based on Enclosure B, "Wear and Estimated Life Calculations." This enclosure requires re-examination,

repair, or replacement if the wall thickness is less than the design minimum value, and it provides three options for calculating the flow-accelerated corrosion wear rate to determine the projected thickness at future refueling outages. The first option states that wear can be calculated using the CHECWORKS™ computer software, whereas the other two options calculate wear using wall thicknesses measurements based on engineering evaluations of ultrasonic testing data.

Issue:

Based on discussions held during the staff's onsite audit, the Flow-Accelerated Corrosion Program evaluates wall thinning for both safety-related and nonsafety-related components. According to the applicant's designation, CHECWORKS™ is categorized as a Class B software and therefore it is not appropriate for safety-related design work. For safety-related components, only results from software categorized as Class A may be used to demonstrate that the design wall thickness will be met at the next refueling outage. Otherwise, the other options included in the Flow-Accelerated Corrosion Program, which use(s) wall thickness measurements based on an engineering evaluation of ultrasonic testing data, are to be used for safety-related applications.

Request:

For safety-related components that are included in the Flow-Accelerated Corrosion Program, demonstrate how the wear values calculated by computer software (i.e., CHECWORKS™) are independently checked and verified. Alternatively, where the design minimum value of the predicted wall thickness is being verified through the use of MES26, Enclosure B, Option 1, justify the use of Class B computer software for safety-related design work.

RAI B.1.20-2

Background:

Section 54.21(a) of 10 CFR requires an integrated plant assessment to demonstrate that the effects of aging will be adequately managed such that the intended functions will be maintained consistent with the CLB for the period of extended operation. NUREG-1800, Revision 2, "Standard Review Plan for License Renewal Applications for Nuclear Power Plants" (SRP-LR) Section A.1.2.3.1 states that the scope of the program should include the specific structures and components that are being managed by the program. During its review of documents provided during the onsite audit, the staff noted that the "scope of program" program element description in FERMI-RPT-12-LRD03, "Aging Management Program Evaluation Report, Non-Class 1 Mechanical," Section 4.8, refers to Program Notebook PEP19, "Flow-Accelerated Corrosion," as one of the sources of information for the Flow-Accelerated Corrosion Program. The staff also noted that PEP19 discusses outage scope selection and specifies the "Feedwater Heater Shell Susceptibility Review" as one of the items to be reviewed.

Issue:

LRA Table 3.4.2-2 includes items for piping and valve bodies that are being managed by the Flow-Accelerated Corrosion Program. However, for carbon steel heat exchanger shells

internally exposed to steam, this table only states that loss of material is being managed by the Water Chemistry Control – BWR Program. Although the applicant appears to manage the feedwater shells for loss of material through its Flow-Accelerated Corrosion Program, the LRA only states that these components are being managed for loss of material through the Water Chemistry Control – BWR Program. Therefore, it is not clear as to how the effects of aging will be adequately managed for these components.

Request:

Clarify whether the feedwater heater shells are being managed for loss of material by the Flow-Accelerated Corrosion Program. If they are not, justify why the Water Chemistry Control – BWR Program alone will adequately manage loss of material for these components. If the feedwater heater shells are being managed by the Flow-Accelerated Corrosion Program, modify the appropriate portions of the LRA and program documents to accurately reflect which AMP(s) will apply to these components.

RAI B.1.24-1

Background:

Fermi 2's CLB includes its response, dated January 26, 1990, to Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment." GL 89-13 addresses issues related to transferring heat from safety-related components to the ultimate heat sink and includes both the air side and water side of applicable air-to-water heat exchangers. For testing of heat transfer capability, GL 89-13 specifies a minimum test frequency of every 5 years. Fermi 2's Engineering Support Conduct Manual MES52, "GL 89-13 Safety-Related Service Water Monitoring Program," provides a cross-reference of GL 89-13 activities to ongoing Fermi 2 activities and includes a table with the air-side preventive maintenance tasks for various engineered safety features (ESF) fan coil units.

LRA Table 3.3.2-11, "Heating, Ventilation, and Air Condition Systems," includes AMR items for reduction of heat transfer due to fouling in heat exchanger fins and tubes exposed to indoor air, outdoor air, and condensation environments. LRA Table 3.3.2-11 states that these components will be managed by the Internal Surfaces in Miscellaneous Piping and Ducting Components Program. LRA Section B.1.24 describes the Internal Surfaces in Miscellaneous Piping and Ducting Components Program as a new program that will use sampling and opportunistic visual inspections and states that a representative sample of 20 percent of a population will be inspected every 10 years during the period of extended operation. Based on discussions with Fermi 2 personnel during the staff's onsite audit of the program, these AMR items represent the air side of the ESF fan coil units

Issue:

Because the Internal Surfaces in Miscellaneous Piping and Ducting Components Program only includes a minimum 20 percent sample that will be inspected every 10 years, it is not clear to the staff whether the program's inspection frequency for the air side of the ESF room coolers will be consistent with GL 89-13.

Request:

Provide additional information on the aging management activities for the ESF fan coil units included in MES52. Identify the AMR item(s) and the AMPs for these components and discuss the associated inspection frequency. Provide justification if the inspection frequency for each ESF fan coil unit will not be consistent with GL 89-13.

RAI B.1.34-1

Background:

GALL Report AMP XI.M35, "One-Time Inspection of ASME Code Class 1 Small-Bore Piping," states, under the "detection of aging effects" program element, that "[t]his inspection should be performed at a sufficient number of locations to ensure an adequate sample. This number, or sample size, is based on susceptibility, inspectability, dose considerations, operating experience, and limiting locations of the total population of ASME Code Class 1 small-bore piping locations." LRA Sections B.1.34 and A.1.34 do not provide the total number of in-scope small-bore piping welds.

Issue:

The LRA does not provide the weld population. It is not clear to the staff how the inspection sample will be selected and thus whether a sufficient number of locations will be inspected to ensure that cracking will be adequately managed.

Request:

Provide the population of in-scope small-bore piping welds for each weld type (e.g., butt welds and socket welds). Based on the population, justify the adequacy of the selected sample size for each type of weld.

RAI B.1.41-1

Background:

Section 54.21(a) of 10 CFR requires an integrated plant assessment to demonstrate that the effects of aging will be adequately managed such that the intended functions will be maintained consistent with the CLB for the period of extended operation. SRP-LR Section A.1.2.1 states that the determination of applicable aging effects should be based on degradation mechanisms that have occurred. LRA Section B.1.41 states that the Service Water Integrity Program manages loss of material and fouling of various components exposed to a service water environment as described in the applicant's response to GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment." The "detection of aging effects" program element in FERMI-RPT-12-LRD03, "Aging Management Program Evaluation Report Non-Class 1 Mechanical," Section 4.12, states that the Service Water Integrity Program manages loss of material in various components and fouling in various heat exchangers. However, LRA Table 3.3.2-3 indicates that loss of material is the only aging effect that is

managed for the flow control nozzles exposed to raw water in the service water system. Fouling is not identified as an aging effect requiring management for these nozzles.

The applicant currently implements preventive maintenance task No. H145 to periodically perform visual inspections of the mechanical draft cooling tower spray nozzles to verify that the nozzles are not plugged and that spray patterns are adequate. Based on information provided during the onsite audit, previous preventive maintenance activities have identified plugged nozzles on multiple occasions. The staff also noted that there may be other aging management activities associated with other components related to the applicant's commitments in response to GL 89-13 that were not included in the LRA (e.g., residual heat removal reservoir inspections).

Issue:

Although the applicant has performed inspections to manage fouling of the spray nozzles in the mechanical draft cooling towers, the activities to manage this aging effect are currently not described in the LRA. Consequently, it is not clear to the staff as to whether the applicant's integrated plant assessment demonstrates that the effects of aging will be adequately managed for these components. In addition, it is not clear whether the LRA reflects all of the aging management activities that are implemented in accordance with the GL 89-13 commitments.

Request:

Given that plugging/fouling of mechanical draft cooling tower spray nozzles has occurred at Fermi 2, either include fouling of these spray nozzles as an aging effect requiring management (by updating the LRA and associated program basis documents, as appropriate), or justify how the nozzles' intended functions will be maintained consistent with current licensing basis without managing fouling. In addition, identify whether there are any activities to manage aging effects in other components associated with the response to GL 89-13 that were not included in the LRA. If any such activities are identified, either include these activities as additional aging management review items (by updating the LRA and associated program basis documents), or justify why the intended functions of the components associated with these activities will be maintained consistent with the current licensing basis without managing the aging effects.

RAI 4.2.2-1

Background:

LRA Section 4.2.2 addresses the applicant's time-limited aging analyses (TLAA) of its adjusted reference temperatures (ARTs). LRA Table 4.2-2 describes the ART values of the reactor vessel beltline materials and other data related to the beltline materials and ARTs (e.g., material chemistry, chemistry factor, 52-EFPY (effective full-power years) fluence, initial reference temperature for nil-ductility transition (RT_{NDT}), and RT_{NDT} shift). The LRA states that the ART values in LRA Table 4.2-2 are calculated in accordance with RG 1.99 Position 1.1 (i.e., by using the chemistry factor tables and fluence factor described in RG 1.99).

In comparison, LRA Table 4.2-3 describes the ART values of the surveillance plate and weld for the applicant's reactor vessel materials based on the surveillance data of the Boiling Water

Reactor Vessel and Internals Project (BWRVIP) Integrated Surveillance Program (ISP). LRA Section 4.2.2 states that the representative surveillance plate and weld materials were evaluated for 52 EFPY in accordance with RG 1.99 Position 2.1 (surveillance data available) to generate the ART values in LRA Table 4.2-3. The LRA and onsite documentation also indicate that the reactor vessel surveillance data are described in BWRVIP-135, Revision 2, "Integrated Surveillance Program (ISP) Data Source Book and Plant Evaluations."

Issue:

LRA Table 4.2-3 describes ART values and associated fluences of the surveillance plate and weld materials. However, LRA Table 4.2-3 is inconsistent with LRA Table 4.2-2 because it does not address other related data (e.g., material chemistry, chemistry factor, initial RT_{NDT} and RT_{NDT} shift). The staff cannot determine the adequacy of the ARTs with insufficient data for the surveillance materials.

In addition, the LRA does not clearly address whether the ART values of the surveillance materials are used in the other neutron embrittlement TLAAs (e.g., LRA Section 4.2.3 for pressure-temperature limits; Section 4.2.5 for circumferential weld inspection relief; and Section 4.2.6 for axial weld failure probability), or are provided for information only.

Request:

1. Provide the material chemistry, chemistry factor, initial RT_{NDT}, RT_{NDT} shift and other related data for the surveillance materials in a consistent format with LRA Table 4.2-2, or justify why LRA Table 4.2-3 for the surveillance materials does not contain this data.

2. As part of the response, identify the specific heat of the surveillance material which was used to generate credible surveillance data, and the applicant's reactor vessel material which is represented by the credible surveillance material.

3. Clarify whether ART values based on credible surveillance data, per RG 1.99 Position 2.1, are used as the data of limiting materials in the other neutron embrittlement TLAAs (e.g., LRA Sections 4.2.3, 4.2.5 and 4.2.6). If credible surveillance data are not used, confirm whether the conclusions of these TLAAs are not affected by the use of credible ART values.

RAI 4.2.2-2

Background:

LRA Table 4.2-2 describes the ARTs of the reactor vessel beltline components and other data related to the ARTs (e.g., material chemistry, chemistry factor, 52-EFPY fluence, RT_{NDT}, and RT_{NDT} shift). LRA Section 4.2.1 indicates that N16 water level instrumentation nozzles are reactor vessel beltline components because the peak fluence for these nozzles is 3.77×10^{17} n/cm^2 ($E > 1$ MeV) at 52 EFPY, exceeding the threshold fluence of 10^{17} n/cm^2 for beltline components.

Issue:

LRA Table 4.2-2 does not describe the ART and other related data of the N16 nozzles which are reactor beltline components. The staff cannot determine the adequacy of the ART calculations due to the omission of ART data on the N16 instrumentation nozzles.

Request:

Provide the ART and other related data of N16 nozzles in a format consistent with the other beltline components described in LRA Table 4.2-2.

RAI 4.2.2-3

Background:

LRA Table 4.2-2 describes the ARTs of the reactor vessel beltline components. The staff also noted that the following reference indicates that due to insufficient material information, the applicant determined the initial RT_{NDT} (i.e., unirradiated reference temperature) of N16 water level instrumentation nozzles using NRC Branch Technical Position MTEB 5-2, paragraph B.1.1(4).

- Section 3.2 of GE Hitachi Nuclear Energy Report, NEDO-33785, Revision 1, "DTE Energy/Enrico Fermi Plant 2 Pressure and Temperature Limits Report Up To 24 and 32 Effective Full-Power Years," October 2012 (ADAMS Accession Number ML13004A135)

The reference document above also indicates that testing for one N16 nozzle material, performed at a single temperature (10 °F), generated a minimum Charpy V-notch energy of 30 ft-lbs. This reference further indicates that the initial RT_{NDT} of the N16 nozzles was determined to be 30 °F, which is 20 °F above the test temperature, based on NRC Branch Technical Position MTEB 5-2, paragraph B.1.1(4). The NRC position, which the applicant used, is currently referred to as NRC Branch Technical Position (BTP) 5-3, paragraph 1.1(4), as described in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 5.

Issue:

A recent letter from AREVA Inc. to the NRC (ADAMS Accession No. ML14038A265), dated January 30, 2014, addresses a potential non-conservatism in NRC BTP 5-3, paragraph 1.1(4). The letter indicates that unirradiated RT_{NDT} as estimated according to paragraph 1.1(4) may not result in a conservative bounding estimate of unirradiated RT_{NDT}. The LRA and onsite documentation do not clearly address how the applicant will resolve this concern about the potential non-conservatism in the initial RT_{NDT} of N16 water level instrumentation nozzles.

Request:

Explain why the initial RT_{NDT} of N16 nozzles in LRA Section 4.2.2 is adequate given the potential non-conservatism in NRC BTP 5-3, paragraph 1.1(4). As part of the response, confirm

whether the applicant's ART analysis uses a potentially non-conservative BTP 5-3 position (i.e., position 1.1(3)(a), 1.1(3)(b) or 1.1(4)) to determine initial RT_{NDT} for any other reactor vessel materials.

RAI 3.1.2.1.1-1

Background:

LRA Table 3.1.1, item 3.1.1-105, addresses steel piping, piping components and piping elements exposed to concrete. The GALL Report recommends no aging effect requiring management or AMP if certain concrete attributes and plant-specific operating experience are met for this component group. The LRA states that this item is not used because there are no steel reactor coolant pressure boundary (RCPB) piping components exposed to concrete. However, in reference to small bore field-run RCPB piping, UFSAR Section 5.2.1.19 states, "[h]ydrostatic testing, prior to erection, is required for any pipe spool that is embedded in concrete or installed in an inaccessible location."

Issue:

While the UFSAR does not state that steel piping is embedded in concrete, it is not clear to the staff whether an oversight had occurred during the development of the LRA.

Request:

Reconcile the statement associated with LRA Table 3.1.1, item 3.1.1-105, with UFSAR Section 5.2.1.19. If RCPB piping is embedded in concrete, state how the applicable aging effects will be managed or the basis for why there are no aging effects.