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DTE Energy

10 CFR 54

January 20, 2015
NRC-15-0005

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 10 (TAC No. MF4222)," dated December 17, 2014 (ML14342A868)

Subject: Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 10

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. The Enclosure to this letter provides the DTE response to the request for additional information (RAI).

Two new commitments are being made in this submittal. The new commitments are in Item 12, Fatigue Monitoring, of LRA Table A.4 as indicated in the response to RAI B.1.17-2.

In addition, a revision has been made to a commitment previously identified in the LRA. The revised commitment is in Item 3, Aboveground Metallic Tanks, in LRA Table A.4 as indicated in the response to RAI B.1.1-1.

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 January 20, 2015

Vito A. Kaminskas
Site Vice President
Nuclear Generation

Enclosure: DTE Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 10

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 to
NRC-15-0005

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

DTE Response to NRC Request for Additional Information
for the Review of the Fermi 2 License Renewal Application – Set 10

RAI B.1.1-1

Background

Generic Aging Lessons Learned (GALL) Report aging management program (AMP) XI.M29, "Aboveground Metallic Tanks," recommends that sealant or caulking be applied to outdoor tanks at the external interface between the tank and concrete foundation. The function of the sealant or caulk is to minimize the amount of water and moisture penetrating the interface between the tank and concrete foundation. The GALL Report, as revised by LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," further states that sealant or caulking is not necessary if the configuration of both the tank bottom and foundation is sloped in such a way that water cannot accumulate. License Renewal Application (LRA) Section B.1.1 states that, "[i]n accordance with installation and design specifications, the tanks do not employ caulking or sealant at the concrete/tank interface."

The LRA further states that the design of the condensate storage tank (CST) foundation is a concrete ring with the aluminum tank bottom in contact with graded sand. During the AMP audit the staff noted that the design also incorporates drains to facilitate the removal of water from the interior of the concrete ring foundation. However, the top surface of the concrete ring is not sloped to prevent water and moisture intrusion at the outside interface of the ring foundation.

Issue

It is not clear to the staff if the applicant's Aboveground Metallic Tanks Program contains the appropriate preventive actions to manage this aging effect associated with the CST. The accumulation of water or moisture at the outside interface of the ring foundation could result in the loss of material or cracking of the aluminum.

Request

In the absence of caulking or sealant, state how the aging effects of loss of material and cracking of the aluminum in the proximity of the interface between the tank and concrete foundation will be managed during the period of extended operation for the CST.

Response:

As stated in License Renewal Application (LRA) Section B.1.1, the condensate storage tank (CST) design and installation specifications did not include caulking or sealant at the interface of the CST and its concrete ring foundation. Although not specified, there does appear to be caulking in some places at the concrete/tank interface. However, this caulking is not being credited to prevent the intrusion of water or moisture. The tank insulation prevents access to the concrete/tank interface and is expected to prevent the intrusion of water and moisture.

Within the 10 years prior to the period of extended operation, a volumetric examination will be performed on a sampling basis to assess the condition of the outer portion of the tank bottom that is in contact with the concrete ring foundation. Four 1-foot sections of the interface between the tank and concrete ring foundation will be examined for cracking and loss of material. If cracking and loss of material are not present, then further volumetric examination is not necessary to demonstrate that water and moisture intrusion are not causing aging effects on the aluminum tank bottom.

To ensure that the insulation continues to protect the concrete/tank interface, subsequent inspection may be conducted of the exterior surface of the insulation. The inspection of the exterior surface of insulation will be consistent with GALL Report AMP XI.M29 Aboveground Metallic Tanks, as modified by LR-ISG-2012-02 "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion under Insulation" as described in element 4 "Detection of Aging Effects".

If cracking or loss of material are detected, additional inspections or assessments will be conducted in accordance with the Corrective Action Program.

The LRA will be revised to reflect this response.

LRA Revisions:

LRA Sections A.1.1, A.4, and B.1.1 are revised as shown on the following pages. Additions are shown in underline and deletions are shown in strike-through.

A.1.1 Aboveground Metallic Tanks Program

The Aboveground Metallic Tanks Program is a new program that will manage loss of material and cracking for outdoor tanks within the scope of license renewal that are sited on soil or concrete. Preventive measures to mitigate corrosion and cracking were applied during construction, such as using the appropriate materials, protective coatings, and elevation as specified in design and installation specifications. For the painted carbon steel combustion turbine generator (CTG) fuel oil tank, the program will monitor the external surface condition for indications and precursors of loss of material. For the insulated aluminum condensate storage tank (CST), the program will monitor the condition of a representative sample of the tank external surface for signs of loss of material and cracking, using visual inspections and surface examinations. Exterior portions of the tanks will be inspected in accordance with Table 4a, "Tank Inspection Recommendations," identified in LR-ISG-2012-02. There are no indoor tanks included in this program.

CST internal inspections will be conducted in accordance with Table 4a, identified above. Internal inspections of the CTG fuel oil tank will be conducted in accordance with NUREG-1801, XI.M30.

This program will also manage the bottom surfaces of both in-scope aboveground metallic tanks, which are on concrete ring foundations and sand. The program will require ultrasonic testing (UT) of the tank bottoms to assess the thickness against the thickness specified in the design specification. UT of the tank bottoms will be performed whenever the tanks are drained or at intervals not less than those recommended in Table 4a during the period of extended operation. In accordance with installation and design specifications, the tanks do not employ caulking or sealant at the concrete/tank interface. Caulking or sealant at the concrete/tank interfaces is not credited in the installation and design specifications.

Within the ten years prior to the period of extended operation, a volumetric examination of four 1-foot sections of the interface between the CST and concrete ring foundation will be performed for cracking and loss of material. If cracking and loss of material are not present, this program will conduct subsequent inspections of the exterior surface of the insulation.

This program will be implemented prior to the period of extended operation, with initial inspections within the ten years prior to the period of extended operation.

A.4 LICENSE RENEWAL COMMITMENT LIST

No.	Program or Activity	Commitment	Implementation Schedule	Source
3	Aboveground Metallic Tanks	Implement new Aboveground Metallic Tanks Program that will manage loss of material and cracking for outdoor tanks within the scope of license renewal that are sited on soil or concrete. CST internal inspections will be conducted in accordance with Table 4a of LR-ISG-2012-02; internal inspections of the CTG fuel oil tank will be conducted in accordance with NUREG-1801, XI.M30. This program will also manage the bottom surfaces of both in-scope aboveground metallic tanks. Within the ten years prior to the period of extended operation, a volumetric examination of four 1-foot sections of the interface between the CST and concrete ring foundation will be performed for cracking and loss of material. If cracking and loss of material are not present, this program will conduct subsequent inspections of the exterior surface of the insulation.	Prior to September 20, 2024, or the end of the last refueling outage prior to March 20, 2025, whichever is later. Initial inspections will be performed within the ten years prior to March 20, 2025.	A.1.1

B.1.1 ABOVEGROUND METALLIC TANKS

The Aboveground Metallic Tanks Program is a new program that will manage loss of material and cracking for outdoor tanks within the scope of license renewal that are sited on soil or concrete. Preventive measures to mitigate corrosion and cracking were applied during construction, such as using the appropriate materials, protective coatings, and elevation as specified in design and installation specifications. For the painted carbon steel combustion turbine generator (CTG) fuel oil tank, the program will monitor the external surface condition for indications and precursors of loss of material. For the insulated aluminum condensate storage tank (CST), the program will monitor the condition of a representative sample of the tank external surface for signs of loss of material and cracking using visual inspections and surface examinations. Exterior portions of the tanks will be inspected in accordance with Table 4a, "Tank Inspection Recommendations," identified in LR-ISG-2012-02. There are no indoor tanks included in this program.

CST internal inspections will be conducted in accordance with Table 4a, identified above. Internal inspections of the CTG fuel oil tank will be conducted in accordance with NUREG-1801, XI.M30.

This program will also manage the bottom surfaces of both in-scope aboveground metallic tanks, which are on concrete ring foundations and sand. The program will require ultrasonic testing (UT) of the tank bottoms to assess the thickness against the thickness specified in the design specification. The UT testing of the tank bottoms will be performed whenever the tanks are drained or at intervals not less than those recommended in Table 4a during the period of extended operation. ~~In accordance with installation and design specifications, the tanks do not employ caulking or sealant at the concrete/tank interface.~~ Caulking or sealant at the concrete/tank interfaces is not credited in the installation and design specifications.

Within the ten years prior to the period of extended operation, a volumetric examination of four 1-foot sections of the interface between the CST and concrete ring foundation will be performed for cracking and loss of material. If cracking and loss of material are not present, this program will conduct subsequent inspections of the exterior surface of the insulation.

This program will be implemented prior to the period of extended operation, with initial inspections within the ten years prior to the period of extended operation.

RAI B.1.1-2

Background

The staff's review of plant-specific operating experience revealed that there have been multiple instances of degradation of the insulation and jacketing on the roof of the CST. The degradation included separations in the sheet metal seams, loss of flashing, and loss of insulation due to weather. In 2013 the CST roof insulation was completely removed and pre-fabricated insulation was installed. The as-found condition of the CST aluminum roof was not documented in the work order. LRA Section B.1.1 states that the external surfaces of the CST will be inspected in accordance with LR-ISG-2012-02, Table 4a. Note 9 of Table 4a recommends that a minimum of 25 1-square-foot sections or 20 percent of the surface area of insulation, a portion of which will be on the tank roof, be removed to permit inspection of the exterior surface of the tanks during each 10-year period of extended operation.

Issue

The aluminum roof of the CST has been exposed to weather on multiple occasions and it is unclear if there is any degradation under the pre-fabricated insulation. As a result, it is unclear to the staff whether the proposed extent of inspections for corrosion under insulation for the CST will be adequate to provide reasonable assurance that the CST will meet its current licensing basis (CLB) intended function during the period of extended operation.

Request

Provide an assessment of the condition of the aluminum roof under the pre-fabricated insulation of the CST tank. If the condition of the roof under the pre-fabricated insulation is unknown or it is degraded, state the basis for why the proposed bare metal inspections of the CST roof will be sufficient to provide reasonable assurance that the CST will meet its CLB intended functions during the period of extended operation.

Response:

In 2013, a work order was initiated to repair the insulation on the roof of the condensate storage tank (CST). This was performed by complete removal of the old roof insulation and installation of pre-fabricated insulation. The CST roof was exposed for a period of time during this work. Although not explicitly noted in the work order documentation, the supervisor of the work indicated that a visual examination of the CST roof identified no abnormalities.

License Renewal Application (LRA) Section B.1.1 states that the CST external surfaces will be inspected in accordance with Table 4a of LR-ISG-2012-02. Based on the as-found good condition of the aluminum tank roof in 2013, these inspections will provide reasonable assurance that the CST will meet its current licensing basis during the period of extended operation.

LRA Revisions:

None.

RAI B.1.1-3

<u>*Background*</u>

The updated final safety analysis report (UFSAR) supplement (LRA Section A.4) contains a commitment (Commitment No. 3) to implement the Aboveground Metallic Tanks Program, "[p]rior to September 20, 2024, or the end of the last refueling outage prior to March 20, 2025." LR-ISG-2012-02, Table 3.0-1, recommends that the program be implemented 10 years prior to the period of extended operation. The recommendation to implement the program 10 years prior to the period of extended operation is to support the inspections recommended in LR-ISG-2012-02, Table 4a. The guidance provided in Table 4a includes inspections of all tank interior and exterior surfaces, including tank tops and bottoms, in timeframes ranging from within 5 to 10 years prior to the period of extended operation. LRA Section B.1.1 states that the CST will be inspected in accordance with LR-ISG-2012-02, Table 4a.

<u>*Issue*</u>

The implementation schedule for the Aboveground Metallic Tanks Program is not consistent with LR-ISG-2012-02, Table 4a, which recommends that inspections commence in the 10-year period prior to the period of extended operation.

<u>*Request*</u>

State the basis for why the implementation schedule for the Aboveground Metallic Tanks Program does not state that inspections will commence in the 10-year period prior to the period of extended operation.

Response:

License Renewal Application (LRA) Section A.4, Item 3, will be revised under "Implementation Schedule" to indicate that the initial inspections will be performed within the 10 years prior to the period of extended operation. This revision was included in the response to RAI B.1.1-1.

LRA Revisions:

LRA Section A.4 is revised as shown in the response to RAI B.1.1-1.

RAI B.1.9-1

Background

The operating experience discussion in LRA Section B.1.9 summarizes plant-specific inspection results from 2001, 2005, and 2012. It specifically states that, "In 2005, shroud support weld examinations as well as other inspections of reactor vessel internal welds and components were performed as scheduled by the Reactor Vessel Internals Management (RVIM) program."

Issue

The LRA provides the results of the inspections in 2001 and 2012; however, it does not provide the results for the 2005 inspection. In addition, during its onsite audit of the program, the staff discovered that no such inspection was performed in 2005.

Request

Provide clarification as to whether there have been any inspections of the BWR vessel inside diameter attachment welds in addition to the ones performed in 2001 and 2012. If there have been any inspections, provide the results and state whether any flaws were detected. Update the LRA as appropriate.

Response:

The second operating experience item for License Renewal Application (LRA) Section B.1.9 refers to vessel internal inspection in 2005. Shroud support visual and ultrasonic examinations were performed in RF11 (2006), rather than 2005. There have been no relevant indications noted during any of the examinations for the shroud support welds. LRA Section B.1.9 is being revised to change "2005" to "2006".

LRA Revisions:

LRA Section B.1.9 is revised as shown on the following page. Additions are shown in underline and deletions are shown in strike-through.

B.1.9 BWR VESSEL ID ATTACHMENT WELDS

Operating Experience

The following examples of operating experience provide objective evidence that the BWR Vessel ID Attachment Welds Program will be effective in ensuring that component intended functions are maintained consistent with the current licensing basis during the period of extended operation.

- Inspections of the shroud support welds as recommended by BWRVIP-38 were completed in 2001 during RF08. Based on no indications on the core shroud support welds, re-inspection dates were established based on the requirements of BWRVIP-38.

- In ~~2005~~ 2006, shroud support weld examinations as well as other inspections of reactor vessel internal welds and components were performed as scheduled by the Reactor Vessel Internals Management (RVIM) program. The BWRVIP has developed guidelines for inspection of internal components.

RAI B.1.10-1

Background

The recommendations in GALL Report AMP XI.M9, "BWR Vessel Internals," states that the control rod drive (CRD) housing and lower plenum components are subject to the guidelines in BWRVIP-47-A for inspection and evaluation. GALL AMP XI.M9 also states that BWRVIP-58-A provides guidelines for the repair design criteria of the CRD housing and that BWRVIP-57-A provides guidelines for the repair design criteria of the lower plenum components.

LRA AMP B.1.10, "BWR Vessel Internals," states that the BWR Vessel Internals AMP, with enhancements, is consistent with the recommendations in GALL AMP XI.M9.

Issue

During its onsite audit of the program, the staff noted that the program documents reference BWRVIP-58-A and BWRVIP-57-A as guidelines for the repair design criteria of the CRD housing and the lower plenum components. The program documents also reference BWRVIP-55-A as repair design criteria guidelines for these components. However, the plant procedures only reference BWRVIP-55-A. The staff is unclear about the inconsistency in the plant documents regarding these guidelines.

Request

1. *Identify the specific BWR Vessel Internals Programs (VIP) guidelines that are being used for repairs of the CRD housings and the lower plenum components in the plant design. Clarify whether these guidelines are within the scope of the BWR Vessel Internals Program for the LRA and whether the guidelines have been incorporated into the specific plant procedure that will be used to implement the BWRVIP during the period of extended operation.*

2. *Identify any additional BWRVIP guidelines being relied upon for the BWRVIP beyond those in GALL Report AMP XI.M9. For these additional BWRVIP guidelines, provide the responses to any applicable license renewal applicant action items.*

Response:

1. Program document PEP16 will be revised to reference the same BWRVIP reports as Aging Management Program Report FERMI-RPT-12-LRD02 pertaining to repairs for lower plenum components and control rod housings.

    1) BWRVIP-55-A addresses Control Rod Drive (CRD) Housing, Control Rod Drive Stub Tube, Incore Housing, Incore Guide Tube, and Incore Stabilizer.

2) BWRVIP-57-A addresses reactor vessel water level instrument penetrations (including the nozzle, safe end, and nozzle to vessel shell weld).

3) BWRVIP-58-A addresses one example of weld repair specific to CRD housing penetrations.

PEP16 will be revised to reflect the following:

- Appendix VIII (Control Rod Internal Housing) is associated with BWRVIP-55-A and BWRVIP-58-A.
- Appendix IX (In Core Housing / Guide Tube & Dry Tube) is associated with BWRVIP-55-A.
- Appendix X (Instrument Penetrations) is associated with BWRVIP-57-A.

The revisions to PEP16 are being performed as part of the Corrective Action Program.

2. DTE participates in the BWRVIP. Implementation guidance is currently defined in BWRVIP-94NP Revision 2 (Program Implementation Guide). Section 1.4 (Utility Requirements) of this document states that any BWRVIP guidelines containing "mandatory" or "needed" guidance shall be implemented by member utilities to the fullest extent possible. A list of current BWRVIP reports containing mandatory or needed guidance is provided in the table below. This information is included in PEP16. All BWRVIP guidelines that have license renewal applicant action items have been identified in LRA Appendix C, Response to BWRVIP Applicant Action Items.

Doc Number	Rev	BWRVIP Doc Title
BWRVIP-02-A	2	BWR Core Shroud Repair Design Criteria
BWRVIP-03	16	BWR Vessel and Internals Project, Reactor Pressure Vessel and Internals Examination Guidelines
BWRVIP-04-A	A	BWR Vessel and Internals Project, Guide for Format and Content of Core Shroud Repair Design Submittals
BWRVIP-14-A	A	BWR Vessel and Internals Project, Evaluation of Crack Growth in BWR Stainless Steel RPV Internals
BWRVIP-16-A	A	BWR Vessel and Internals Project, Internal Core Spray Piping and Sparger Design Criteria
BWRVIP-18	1-A	BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines
BWRVIP-19-A	A	BWR Vessel and Internals Project, Internal Core Spray Piping and Sparger Design Criteria
BWRVIP-25	0	BWR Core Plate Inspection and Flaw Evaluation Guidelines
BWRVIP-26-A	A	BWR Top Guide Inspection and Flaw Evaluation Guidelines

Doc Number	Rev	BWRVIP Doc Title
BWRVIP-27-A	A	BWR Standby Liquid Control System / Core Plate ΔP Inspection and Flaw Evaluation Guidelines
BWRVIP-34-A	A	BWR Vessel and Internals Project, Technical Basis for Part Circumference Weld Overlay Repair of Vessel Internal Core Spray Piping
BWRVIP-38	0	BWR Shroud Support Inspection and Flaw Evaluation Guidelines
BWRVIP-41	3	BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines
BWRVIP-42	1	BWR Vessel and Internals Project, LPCI Coupling Inspection and Flaw Evaluation Guidelines – Not applicable
BWRVIP-47-A	A	BWR Lower Plenum Inspection and Flaw Evaluation Guidelines
BWRVIP-48-A	A	BWR Vessel and Internals Project, Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines
BWRVIP-49-A	A	BWR Vessel and Internals Project, Instrument Penetration Inspection and Flaw Evaluation Guidelines
BWRVIP-50-A	A	BWR Vessel and Internals Project, Top Guide/Core Plate Repair Design Criteria
BWRVIP-51-A	A	BWR Vessel and Internals Project, Jet Pump Repair Design Criteria
BWRVIP-52-A	A	BWR Vessel and Internals Project, Shroud Support and Vessel Bracket Repair Design Criteria
BWRVIP-53-A	A	BWR Vessel and Internals Project, Standby Liquid Control Line Repair Design Criteria
BWRVIP-55-A	A	BWR Vessel and Internals Project, Lower Plenum Repair Design Criteria
BWRVIP-56-A	A	BWR Vessel and Internals Project, LPCI Coupling Repair Design Criteria – Not applicable
BWRVIP-57-A	A	BWR Vessel and Internals Project, Instrument Penetrations Repair Design Criteria
BWRVIP-58-A	A	BWR Vessel and Internals Project, CRD Internal Access Weld Repair
BWRVIP-59-A	A	BWR Vessel and Internals Project, Evaluation of Crack Growth in BWR Nickel Base Austenitic Alloys in RPV Internals
BWRVIP-60-A	A	BWR Vessel and Internals Project, Evaluation of Stress Corrosion Crack Growth in Low Alloy Steel Vessel Materials in the BWR Environment

Doc Number	Rev	BWRVIP Doc Title
BWRVIP-62	1	BWR Vessel and Internals Project, Technical Basis for Inspection Relief for BWR Internal Components with Hydrogen Injection
BWRVIP-74-A	A	BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines for License Renewal
BWRVIP-76	1	BWR Core Shroud Inspection and Flaw Evaluation Guidelines
BWRVIP-80	A	BWR Vessel and Internals Project, Evaluation of Crack Growth in BWR Shroud Vertical Welds
BWRVIP-84	0	BWR Vessel and Internals Project, Guidelines for Selection and Use of Materials for Repairs to BWR Internal Components
BWRVIP-94NP	2	BWR Vessel and Internals Project, Program Implementation Guide
BWRVIP-95-A	A	BWR Vessel and Internals Project, Guide for Format and Content of BWRVIP Repair Design Submittals
BWRVIP-97-A	A	BWR Vessel and Internals Project, Guidelines for Performing Weld Repairs to Irradiated BWR Internals
BWRVIP-99-A	A	BWR Vessel and Internals Project, Crack Growth Rates in Irradiated Stainless Steels in BWR Internal Components
BWRVIP-100-A	A	BWR Vessel and Internals Project, Updated Assessment of the Fracture Toughness of Irradiated Stainless Steel for BWR Core Shrouds
BWRVIP-121-A	A	RAMA Fluence Methodology Procedures Manual
BWRVIP-138	1-A	BWR Vessel and Internals Project, Updated Jet Pump Beam Inspection and Flaw Evaluation Guidelines
BWRVIP-139	A	BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines
BWRVIP-158-A	A	Flaw Proximity Rules for Assessment of BWR Internals
BWRVIP-159	0	BWR Vessel and Internals Project, HWC/NMCA Experience Report and Application Guidelines
BWRVIP-180	0	Access Hole Cover Inspection and Flaw Evaluation Guidelines
BWRVIP-181-A	A	Steam Dryer Repair Design Criteria
BWRVIP-182-A	A	BWR Vessel and Internals Project, Guidance for Demonstration of Steam Dryer Integrity for Power Uprate – Not applicable
BWRVIP-183	0	Top Guide Grid Beam Inspection and Flaw Evaluation Guidelines

Doc Number	Rev	BWRVIP Doc Title
BWRVIP-190	1	BWR Vessel and Internals Project, Volume 1: BWR Water Chemistry Guidelines – Mandatory, Needed, and Good Practice Guidance and Volume 2: BWR Water Chemistry Guidelines - Technical Basis
BWRVIP-194	0	BWR Vessel and Internals Project, Methodologies for Demonstrating Steam Dryer Integrity for Power Uprate – Not applicable
BWRVIP-200	0	BWR Vessel and Internals Project, Implementation Plan for Two-sided Inspection of BWR Shroud Welds
BWRVIP-205	0	Bottom Head Drain Line Inspection and Evaluation Guidelines
BWRVIP-217	0	Access Hole Cover Repair Design Criteria
BWRVIP-222	0	Accelerated Inspection Program for BWRVIP-75-A Category C Dissimilar Metal Welds

LRA Revisions:

None.

RAI B.1.17-2

Background

GALL Report AMP X.M1, "Fatigue Monitoring," prevents fatigue time-limited aging analyses (TLAAs) from becoming invalid by assuring that the fatigue usage resulting from actual operational transients does not exceed the American Society of Mechanical Engineers (ASME) Code Section III design limit of 1.0. Crack initiation is assumed to have started when the fatigue usage factor reaches a value of 1.0 (the Code design limit). The applicant's Fatigue Monitoring Program monitors the number of occurrences of plant transients in order to ensure that cumulative fatigue usage remains below component design limits based on fatigue crack initiation. However, LRA Table 4.1-1, "List of Fermi 2 TLAAs and Resolution," includes a flaw evaluation TLAA to be managed during the period of extended operation using the Fatigue Monitoring Program. The flaw evaluation TLAA is the main steam bypass lines discussed in LRA Section 4.7.6. Flaw evaluation involves flaw growth analyses; therefore the fatigue usage factor of 1.0 based on crack initiation has been exceeded or is not applicable.

GALL Report AMP X.M1, "Fatigue Monitoring," recommends tracking the number of each plant design transient that significantly contributes to the fatigue usage factor. The events being counted by the applicant's Fatigue Monitoring Program are included in LRA Table 4.3-1, "Analyzed Transients with Projects." The staff noted that Table 4.3-1 includes events that are being counted for the main steam bypass lines that are based on operating time as opposed to plant transients.

Issue

(1) LRA Table 4.1-1 contains a flaw evaluation TLAA that will be managed by the Fatigue Monitoring Program during the period of extended operation. The applicant's Fatigue Monitoring Program tracks plant transients to ensure that cumulative fatigue usage remains below component design limits based on fatigue crack initiation. The applicant's Fatigue Monitoring Program does not have an enhancement to ensure that analyses other than cumulative fatigue usage remain valid and within acceptable limits during the period of extended operation. It is unclear to the staff if flaw evaluations and flaw growth analyses are within the scope of the applicant's Fatigue Monitoring Program.

Request

(1a) Identify all TLAAs that will use the Fatigue Monitoring Program to ensure that any analyses or design limit other than a fatigue usage factor for crack initiation is not exceeded during the period of extended operation.

(1b) Justify using the Fatigue Monitoring Program to ensure that any analysis or design limit is not exceeded, other than a fatigue usage factor for crack initiation.

(1c) If the Fatigue Monitoring Program is being used to ensure that any analysis or design limit other than a fatigue usage factor for crack initiation is not exceeded, update the AMP as appropriate.

Issue

(2) LRA Table 4.3-1 contains events other than plant transients that will be tracked by the Fatigue Monitoring Program during the period of extended operation. The applicant's Fatigue Monitoring Program does not have an enhancement to track cycles other than plant transients. It is unclear to the staff if tracking events other than plant design transients are within the scope of the applicant's Fatigue Monitoring Program.

Request

(2a) Identify all events and cycles that will be tracked by the Fatigue Monitoring Program during the period of extended operation that are not plant design transients.

(2b) Justify using the Fatigue Monitoring Program for tracking events and cycles that are not plant transients. State the basis for the adequacy of the Fatigue Monitoring Program's capability to track events and cycles that are not plant transients.

(2c) If events and cycles other than plant transients are being tracked during the period of extended operation, update the program elements of the Fatigue Monitoring Program to reflect the applicable events and cycles.

Response:

(1a) "Determination of high energy line break locations" and the "Main steam bypass lines cumulative operating time" are the TLAAs identified for Fermi 2 that will use the Fatigue Monitoring Program to ensure that an analysis or design limit other than a fatigue usage factor for crack initiation is not exceeded during the period of extended operation. Although the "Determination of high energy line break locations" TLAA is not a fatigue usage analysis that prevents crack initiation, it does entail fatigue usage analyses that determine cumulative usage factors (CUFs) based on assumed numbers of critical thermal and pressure transients. The "Main steam bypass lines cumulative operating time" is not a fatigue usage analysis. The evaluation included a flaw evaluation based on an assumed flaw and a vibration service life evaluation.

(1b & 2b) The Fatigue Monitoring Program monitors and tracks the number of critical thermal and pressure transients to ensure that the fatigue usage remains within allowable limits. This is directly applicable to the TLAA for determination of high-energy line break locations because the Fatigue Monitoring Program is monitoring the number of transients to ensure the fatigue usage remains within an allowable limit. An exception is provided in LRA Section B.1.17 because for high-energy line break locations, the CUF limit is not the design code limit and an additional corrective action is necessary. DTE monitors the time the main steam bypass is in operation to ensure that bypass operations are within the established limit. The Fatigue Monitoring Program has the necessary administrative infrastructure to readily monitor and track the operating time of the main steam bypass line. It is therefore an appropriate aging management program to track the main steam bypass lines cumulative operating time.

(2a) The events listed in LRA Table 4.3-1 are plant design transients except the one listed under "Main steam bypass line time of operation at 30%–45% open (days)" [the corresponding TLAA is "Main steam line cumulative operating time"]. Although "Reactor recirculation pump "A" hot standby (hours idle with backflow)" and "Reactor recirculation pump "B" hot standby (hours idle with backflow)" monitor time instead of number of cycles, they are plant design transients. The time limit was determined by dividing the number of cycles that results in a fatigue usage of 1.0 for the pump shaft by the cycle rate. The cycle rate used for this calculation was determined from test results.

(1c & 2c) An enhancement to the Fatigue Monitoring Program will be added to include the Main Steam Bypass line cumulative operating time.

The fatigue monitoring program may be revised in response to RAI Set 17 (ML14356A212) or after the Environmentally Assisted Fatigue calculations are performed to periodically assess fatigue rather than count cycles for specific components.

LRA Revisions:

LRA Sections A.1.17, A.4, and B.1.17 are revised as shown on the following pages. Additions are shown in underline and deletions are shown in strike-through.

A.1.17 Fatigue Monitoring Program

The Fatigue Monitoring Program will be enhanced as follows.

- After the EAF calculations are completed, revise the Fatigue Monitoring Program procedures to state that the program counting of the cycle limits maintains the cumulative fatigue usage below the design limit through the period of extended operation, with consideration of the reactor water environmental fatigue effects.
- Revise Fatigue Monitoring Program procedures so that the scope of the program includes monitoring the operating hours for the main steam bypass operation at the 30%-45% valve open position and perform trending to ensure that the operating time for the main steam bypass operation remains below the design limit during the period of extended operation.
- Revise Fatigue Monitoring Program procedures to provide for corrective actions to prevent the operating time for the main steam bypass from exceeding the analysis during the period of extended operation. Acceptable corrective actions include repair of the component, replacement of the component, or a more rigorous analysis of the component to demonstrate that the service life will not be exceeded during the period of extended operation.

A.4 LICENSE RENEWAL COMMITMENT LIST

No.	Program or Activity	Commitment	Implementation Schedule	Source
12	Fatigue Monitoring	Enhance Fatigue Monitoring Program as follows: e. Revise Fatigue Monitoring Program procedures so that the scope of the program includes monitoring the operating hours for the main steam bypass operation at the 30%-45% valve open position and perform trending to ensure that the operating time for the main steam bypass operation remains below the design limit during the period of extended operation. f. Revise Fatigue Monitoring Program procedures to provide for corrective actions to prevent the operating time for the main steam bypass from exceeding the analysis during the period of extended operation. Acceptable corrective actions include repair of the component, replacement of the component, or a more rigorous analysis of the component to demonstrate that the service life will not be exceeded during the period of extended operation.	Part (b): At least two years prior to March 20, 2025. Remainder: Prior to September 20, 2024.	A.1.17

B.1.17 FATIGURE MONITORING

Enhancements

Element Affected	Enhancement
6. Acceptance Criteria	After the EAF calculations are completed, revise the Fatigue Monitoring Program procedures to state that the program counting of the cycle limits maintains the cumulative fatigue usage below the design limit through the period of extended operation, with consideration of the reactor water environmental fatigue effects.
1. Scope of Program 2. Preventive Actions 3. Parameters Monitored or Inspected 4. Detection of Aging Effects 5. Monitoring and Trending 6. Acceptance Criteria 7. Corrective Actions	Revise Fatigue Monitoring Program procedures so that the scope of the program includes monitoring the operating hours for the main steam bypass operation at the 30%-45% valve open position and perform trending to ensure that the operating time for the main steam bypass operation remains below the design limit during the period of extended operation. Revise Fatigue Monitoring Program procedures to provide for corrective actions to prevent the operating time for the main steam bypass from exceeding the analysis during the period of extended operation. Acceptable corrective actions include repair of the component, replacement of the component, or a more rigorous analysis of the component to demonstrate that the service life will not be exceeded during the period of extended operation.