UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
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LISLE, IL 60532-4352

June 10, 2015

Mr. Paul Fessler
Chief Nuclear Officer
DTE Energy Company
Fermi 2 - 210 NOC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI POWER PLANT, UNIT 2, LICENSE RENEWAL SCOPING, SCREENING, AND AGING MANAGEMENT INSPECTION REPORT 05000341/2015009

Dear Mr. Fessler:

On May 1, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed a License Renewal inspection at your Fermi Power Plant, Unit 2. The enclosed report documents the results of this inspection, which were discussed on May 1, 2015, with Mr. V. Kaminskas and other members of your staff.

The purpose of this inspection was to examine activities that support the license renewal application for Fermi Power Plant, Unit 2. The inspection addressed the processes of scoping and screening plant equipment to select equipment subject to an aging management review, and development and implementation of Aging Management Programs to support a period of extended operation. As part of the inspection, the NRC examined procedures and representative records, interviewed personnel, and visually examined accessible portions of various systems, structures, or components, to verify license renewal boundaries, and to observe any equipment aging effects.

The team concluded that the scoping, screening, and existing aging management license renewal activities, were generally conducted as described in Fermi Power Plant, Unit 2, license renewal application, as supplemented through your responses to requests for additional information from the NRC. The team also concluded that documentation supporting the application was generally in an auditable and retrievable form. In addition, the team concluded the implementation of the proposed Aging Management Programs, as described in the License Renewal Application with the proposed enhancements and, as supplemented through your responses to NRC requests for additional information and inspection observations, should provide reasonable assurance that the intended functions of vital plant systems, structures, and components will be maintained through the period of extended operation.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC’s Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Christine A. Lipa, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-341
License No. NPF-43

Enclosure:
Inspection Report 05000341/2015009
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50–341
License No:	NPF–43
Report No:	05000341/2015009
Licensee:	Detroit Edison Company
Facility:	Fermi Power Plant, Unit 2
Location:	Newport, MI
Dates:	April 13 through May 1, 2015
Inspectors:	Stuart Sheldon, Senior Reactor Engineer (Lead) Tom Bilik, Senior Reactor Engineer Jasmine Gilliam, Senior Reactor Engineer Gerard O'Dwyer, Reactor Engineer John Bozga, Reactor Engineer Jennifer Bishop, Reactor Engineer (Observer) Lionel, Rodriguez, Reactor Engineer (Observer)
Approved by:	Christine A. Lipa, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

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SUMMARY OF FINDINGS

Inspection Report 05000341/2015009; 04/13/2015 – 05/01/2015; Fermi Power Plant, Unit 2 License Renewal Inspection.

This inspection of the applicant's license renewal scoping, screening, and aging management processes was performed by five inspectors based in the Region III office. The team applied U.S. Nuclear Regulatory Commission (NRC) Manual Chapter 2516, and NRC Inspection Procedure 71002 as guidance for performing this inspection. No findings as defined in NRC Manual Chapter 0612 were identified.

NRC-Identified and Self-Revealing Findings

No findings were identified

Licensee-Identified Violations

No violations were identified.

REPORT DETAILS

1. INSPECTION SCOPE

This inspection was conducted by U.S. Nuclear Regulatory Commission (NRC) Region III inspectors. The inspection was performed in accordance with NRC Manual Chapter 2516, and NRC Inspection Procedure 71002, "License Renewal (LR) Inspection," dated November 23, 2011.

This inspection looked at both the applicant's scoping and screening methodology, and Aging Management Programs (AMPs), as described in the applicant's license renewal application (LRA) titled "Fermi 2 LRA," dated April 24, 2014, (ADAMS Accession Nos. ML14121A532, ML14121A535, ML14121A536, ML14121A538, ML14121A539, ML14121A540, ML14121A187, ML14121A188), and as revised in subsequent correspondences from the applicant to the NRC.

The Attachments to this report list the documents reviewed and the acronyms used.

2. VISUAL OBSERVATION OF PLANT EQUIPMENT

During this inspection, the team performed walkdowns of portions of plant systems, structures, and components (SSCs). These walkdowns were intended to determine the acceptability of the scope boundaries, to observe the current condition of the SSCs, and to assess the likelihood that a proposed AMP would successfully manage the associated aging effects. Specifically, the team conducted walkdowns of accessible portions of:

- Auxiliary Building;
- Auxiliary Building Ventilation Equipment Hoist;
- CO_2 Tank;
- Condensate Storage Tank and Combustible Turbine Generator Fuel Oil Tank;
- Combustion Turbine Generator (CTG) 11-1;
- CTG Fire Protection;
- CTG Fuel Tank;
- Diesel Fire Pump and Fuel Oil Tank;
- Diesel Fuel Oil Tank;
- Division 1 Core Spray;
- Electric Fire Pump;
- Emergency Diesel Generator 11;
- General Service Water Pump House;
- High-Pressure Coolant Injection;
- Masonry Walls in Reactor Building, Auxiliary Building and Turbine Building;
- Reactor Building;
- Residual Heat Removal (RHR) Complex
- RHR Ultimate Heat Sink Complex (Roof, Exterior, Reservoir areas and Pump Rooms);
- Shore Barrier;
- Spent Fuel Pool;
- Torus Water Management;
- Turbine Building; and
- Turbine Building Overhead Crane.

3. REVIEW OF SCOPING AND SCREENING METHODOLOGY

In order to assess the applicant's scoping and screening methodology, the team reviewed a sample of SSCs, including non-safety-related SSCs that the applicant determined were not within the scope of LR in accordance with Title 10, *Code of Federal Regulations* (CFR) Part 54.4(a)(2). Specifically, the team reviewed applicable documents, interviewed applicant staff, and conducted walkdowns of accessible portions of the following SSCs:

- CTG Fire Protection;
- Primary Containment;
- Reactor/Auxiliary Building Fire Detection;
- General Service Water (GSW)
- Biocide Injection;
- Reactor Water Cleanup;
- Torus Water Management; and
- Neutron Monitoring System.

Based on the portions of systems reviewed, the team concluded the applicant had performed scoping and screening for the not-in scope portions of the plant in accordance with the methodology described in the LRA and the rule.

4. REVIEW OF AGING MANAGEMENT PROGRAMS

The team assessed the adequacy of current implementation of existing AMPs credited in the applicant's LRA. This included verification the current AMPs would ensure aging effects would be managed so that there was reasonable assurance an SSC's intended function would be maintained throughout the period of extended operation. For those programs indicated by the applicant as being consistent with NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," the team confirmed the applicant's program included the GALL attributes. For those programs which the applicant indicated were new or being enhanced, the team confirmed commitments existed and were sufficient to support future implementation. For those programs where the applicant indicated they intended to take exception to the GALL, the team reviewed the exceptions against the GALL recommendations, and evaluated the acceptability of the applicant's proposal.

The team also conducted walkdowns of selected in-scope SSCs to assess how plant equipment was being maintained under the current operating license and to visually observe examples of non-safety-related equipment determined to be in-scope due to their proximity to safety-related equipment, and their potential for failure due to aging effects.

The inspector reviewed the following AMPs referenced by their section in the applicant's LRA.

(1) Aboveground Metallic Tanks (B.1.1)

The Aboveground Metallic Tanks AMP is a new program intended to be consistent with the program described in NUREG-1801, Section XI.M29, "Aboveground Metallic Tanks", as modified by LR-Interim Staff Guidance (ISG)-2012-02, Section D, with Appendix E. The program will manage material loss and cracking on the external surfaces of

aboveground metallic tanks that are sited on soil or concrete. At the time of this inspection, the aluminum condensate storage tank (CST), and the CTG fuel oil storage tank were the only tanks identified as being within the scope of this program.

Commitment 3, in Appendix A, of the LRA stated that CST internal inspections will be conducted in accordance with Table 4a, of LR-ISG-2012-02; and internal inspections of the CTG fuel oil tank will be conducted in accordance with NUREG-1801, XI.M30. This AMP will also manage the bottom surfaces of both tanks. The program will be implemented prior to the period of extended operation.

The team reviewed LR Program basis documentation, drawings, tank photos, Corrective Action Program Documents (CARDs), and effectiveness data. The team interviewed the AMP owner, other responsible applicant staff and associated LR contractors. The team conducted walkdowns of the in-scope CST and CTG fuel oil tank. During the walkdowns, the inspectors identified to the applicant personnel multiple examples of corrosion. While the applicant field personnel did not believe the conditions met the threshold for initiating CARDs, the inspectors discussed the issue with applicant management who subsequently directed CARDs to be initiated.

The team concluded implementation of the Aboveground Metallic Tanks AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(2) Bolting Integrity (B.1.2)

The Bolting Integrity AMP is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M18, “Bolting Integrity,” with some exceptions. The program manages the aging affects associated with closure bolting on pressure retaining joints within the scope of LR for loss of preload, cracking, and loss of material due to corrosion. This program credits visual inspection of pressure retaining bolted joints which is performed in accordance with the applicable requirements of American Society of Mechanical Engineers (ASME) Section XI, and plant operating experience and includes consideration of the guidance contained in NUREG-1339, “Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants,” Electric Power Research Institute (EPRI) documents NP-5769, “Degradation and Failure of Bolting in Nuclear Power Plants,” TR-104213, “Bolted Joint Maintenance and Application Guide,” and NP-5067, Volumes 1 and 2, “Good Bolting Practices.”

The team reviewed LR Program basis documentation, existing inspection procedures, responses to request for additional information (RAI), CARDs, and the LRA. The team also interviewed responsible applicant staff and walked down a sample of pressure retaining bolting of the piping systems located inside the RHR Complex for evidence of visible leakage or other age-related degradation. No significant concerns were identified during the walkdown.

The team concluded continued implementation of the Bolting Integrity AMP, as described in the LRA, with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(3) Boraflex Monitoring (B.1.3)

The Boraflex Monitoring Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M22, “Boraflex Monitoring.” The program manages the effect of reduction in neutron-absorbing capacity (change in material properties) in the Boraflex material affixed to spent fuel racks. The program uses the RACKLIFE computer predictive code to calculate the gamma dose absorbed by and the amount of boron carbide loss from the Boraflex panels. The program includes: (a) quarterly sampling and analysis for silica levels in the spent fuel pool water, and trending the results by using the RACKLIFE code; (b) performing periodic physical measurements and neutron attenuation testing of surveillance coupons; and (c) areal B-10 density measurement testing of the spent fuel storage racks, such as BADGER testing, at a frequency of at least once than every 5 years.

The team walked down the spent fuel pool area and reviewed LR Program basis documentation, existing procedures, recent surveillance results, calculations and CARDs. The team also interviewed responsible applicant staff.

The team concluded continued implementation of the Boraflex Monitoring Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(4) Buried and Underground Piping (B.1.4)

The Buried and Underground Piping AMP is a new program intended to be consistent with the program described in NUREG-1801, Section XI.M41, Buried and Underground Piping and Tanks, as modified by LR-ISG-2011-03, changes to the GALL Report Revision 2, AMP XI.M41. The program will manage the aging effects on external surfaces of buried and underground piping fabricated of aluminum, carbon steel, gray cast iron, and stainless steel through preventive and mitigative measures (e.g., coatings, backfill quality, and cathodic protection), and periodic inspection activities during opportunistic or directed excavations. There are no underground or buried tanks for which aging effects would be managed by the Buried and Underground Piping Program. Fermi 2 uses a cathodic protection system. Commitment 6 stated that soil testing will be conducted once in each 10-year period starting 10 years prior to the period of extended operation, if a reduction in the number of inspections recommended in Table 4a, of NUREG 1801, XI M41, is taken based on a lack of soil corrosivity.

The inspectors reviewed the applicable LR program basis documentation and existing procedures related to the program. The inspectors interviewed the buried and underground piping AMP owner, other relevant plant staff and associated LR contractors.

The inspectors concluded implementation of the Buried and Underground Piping AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(5) Boiling Water Reactor Control Rod Drive Return Line Nozzle (B.1.5)

The Boiling Water Reactor (BWR) Control Rod Drive (CRD) Return Line Nozzle Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M6, “BWR CRD Return Line Nozzle,” and ASME Code

Section XI, Subsection IWB, Table IWB 2500-1. The program manages cracking of the CRD return line nozzle using preventive, mitigative, and Inservice Inspection (ISI) activities. The CRD return line nozzle at Fermi was capped during construction prior to plant operation. The program relies on examinations that can detect the presence of cracking before the loss of intended function of the CRD return line nozzle. Cracking found during inservice inspections is evaluated in accordance with ASME Code Section XI requirements. The existing program will be enhanced to be consistent with Revision 2, of NUREG-1801, Section XI.M6, "BWR CRD Return Line Nozzle."

The team reviewed LR Program basis documentation, applicable RAI responses, existing procedures, surveillance results, and a CARD. The team also interviewed responsible applicant staff. The team was unable to observe the condition of the in-scope component because it was inaccessible at the time of this inspection.

During the inspection, the inspectors identified a discrepancy between the existing BWR CRD Return Line Nozzle Program, and the AMP described in the GALL. Specifically, the existing program allows visual inspections (VT) to be used for detecting applicable aging effects while Section XI.M6, of Revision 2, of NUREG-1801, only describes the use of liquid penetrant test or ultrasonic test (UT) examinations. To address the discrepancy, the applicant committed to prepare an amendment to the LRA including an enhancement for the BWR CRD Return Line Nozzle Program described in LRA Section B.1.5. The enhancement includes the revision of program implementing procedures to specify that UT examinations will be used to detect applicable aging effects. This issue was captured in CARD 15-23107, "Revisions to LRA Resulting from April 2015 NRC Inspection 71002." The applicant subsequently submitted this amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA - Set 32," dated May 19, 2015.

The team concluded continued implementation of the BWR CRD Return Line Nozzle Program, as described in the LRA, and with the enhancement described above, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(6) Boiling Water Reactor Feedwater Nozzle (B.1.6)

The BWR Feedwater Nozzle Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M5, "BWR Feedwater Nozzle" with one exception. The program manages cracking of the feedwater nozzles using inspection activities to monitor the effects of cracking due to cyclic loading. The feedwater nozzles were never clad, and include the improved sparger design. The program augments the examinations specified in the ASME Code, Section XI, with the recommendation and schedule of General Electric (GE) NE-523-A71-0594, Revision 1, and NUREG-0619, "BWR Feedwater Nozzle and CRD Return Line Nozzle Cracking," to perform periodic testing of critical regions of the feedwater nozzles. Cracking is evaluated and dispositioned in accordance with the ASME Code.

The team reviewed LR Program basis documentation, existing procedures, surveillance results, and a CARD. The team also interviewed responsible applicant staff. During the inspection, the inspectors identified a discrepancy between the existing BWR Feedwater Nozzle Program, and the AMP described in the GALL. Specifically, the existing program uses an inspection frequency based on Section 6.3, of GE NE-523-A71-0594, Revision 1, while Section XI.M5, of Revision 2, of NUREG-1801,

describes the inspection frequency as being in accordance with Table 6-1, of GE NE-523-A71-0594, Revision 1. Section 6.3, of GE NE-523-A-71-0591, Revision 1, allows the use on an inspection frequency based on ASME Section XI, for plants that comply with Appendix VIII, of ASME Section XI. Table 6-1, of GE NE-523-A71-0594, could require inspections to be performed more frequently than allowed by ASME Section XI. To address the discrepancy, the applicant committed to prepare an amendment to the LRA including an exception for the BWR Feedwater Nozzle Program described in LRA Section B.1.6. This issue was captured in CARD 15-23107, "Revisions to LRA Resulting from April 2015 NRC Inspection 71002." The applicant subsequently submitted this amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA - Set 32," dated May 19, 2015.

The team concluded continued implementation of the BWR Feedwater Nozzle Program, as described in the LRA and with the exception described above, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(7) Boiling Water Reactor Penetrations (B.1.7)

The BWR Penetrations Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M8, "BWR Penetrations." The program manages cracking of the instrument penetrations, CRD housing and in-core housing penetrations, and standby liquid control nozzles/core delta P nozzles due to cyclic loading or stress corrosion cracking (SCC) and intergranular (IG) SCC. The program is implemented by scheduling and performing leakage inspections (VT-2), and ultrasonic inspections, evaluating flaws, expanding the scope as required, and providing acceptance criteria in accordance with the guidelines of ASME Code Section XI, and NRC-approved BWRVIP-49-A, BWRVIP-47-A, and BWRVIP-27-A.

The team reviewed LR Program basis documentation, existing procedures, surveillance results, and a CARD. The team also interviewed responsible applicant staff.

The team concluded continued implementation of the BWR Penetrations Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(8) Boiling Water Reactor Stress Corrosion Cracking (B.1.8)

The BWR SCC Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M7, BWR SCC. The program manages IGSCC in nickel alloy, stainless steel, and cast austenitic stainless steel (CASS) reactor coolant pressure boundary piping and piping welds 4 inches or larger in nominal diameter containing reactor coolant at a temperature above 200 degrees Fahrenheit during power operation, regardless of code classification. Scheduled volumetric examinations are conducted to detect IGSCC, and leakage of coolant in accordance with the methods, inspection guidelines, and flaw evaluation criteria delineated in the ASME Code; NUREG-0313, Revision 2, NRC Generic Letter (GL) 88-01, and its Supplement 1; NRC approved BWRVIP-75-A; and other requirements specified per 10 CFR 50.55a with NRC-approved alternatives. The program also includes preventive measures such as induction heating stress improvement, solution annealing, and mechanical stress improvement process to minimize SCC.

The team reviewed the LR Program basis documentation, AMP documents, and the LRA. The team also interviewed the responsible applicant staff.

The team concluded continued implementation of the BWR SSC Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the license basis.

(9) Boling Water Reactor Vessel Inside Diameter Attachment Welds (B.1.9)

The BWR Vessel Inside Diameter (ID) Attachment Welds Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M4, BWR Vessel ID Attachment Welds.

The program manages cracking in structural welds for BWR reactor vessel internal integral attachments in conformance with the requirements of ASME Section XI, and guidelines of BWRVIP-48-A. The guidelines of BWRVIP-48-A, include inspection recommendations and evaluation methodologies for the attachment welds between the vessel wall, and vessel ID brackets that attach safety-related components to the vessel. The guidelines include information on the geometry of the vessel ID attachments; evaluate susceptible locations and safety consequences of failure; provide recommendations regarding the method, extent, and frequency of inspection; and discuss acceptable methods of evaluating the structural integrity significance of flaws detected during these examinations.

The program provides for repair and/or replacement, as needed, to maintain the ability to perform the intended function. The program is applicable to structural welds for BWR reactor vessel internal integral attachments and provides reasonable assurance of the long-term integrity, and safe operation of BWR vessel ID attachment welds.

The team reviewed the LR Program basis documentation, aging management review documents, AMP documents, responses to RAIs, implementing procedures, and the LRA. The team also interviewed the responsible applicant staff.

The team concluded continued implementation of BWR Vessel ID Attachment Welds Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the license basis.

(10) Boiling Water Reactor Vessel Internals (B.1.10)

The BWR Vessel Internals Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M9, BWR Vessel Internals.

The program manages cracking, loss of material due to wear, and reduction of fracture toughness for BWR vessel internal components using inspection and flaw evaluation. The program provides: (1) determination of the susceptibility of CASS components; (2) accounting for the synergistic effect of thermal aging and neutron irradiation; and (3) implementation of a supplemental examination program, as necessary. The program also addresses aging degradation of CASS and X-750 alloy. Management of the reactor vessel internals is implemented in accordance with ASME Section XI, and BWRVIP-94, “BWR Vessel and Internals Project, Program Implementation Guide.”

The team reviewed the LR Program basis documentation, AMP effectiveness documents, responses to RAIs, implementing procedures, corrective action document, and the LRA. The team also interviewed the responsible applicant staff.

The team concluded the implementation of BWR Vessel Internals Program with enhancements, as described in the LRA, should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the license basis.

(11) Compressed Air Monitoring (B.1.11)

The Compressed Air Monitoring AMP is an existing program which, with an enhancement, is intended to be consistent with NUREG-1801, Section XI.M24, “Compressed Air Monitoring," with an exception to monitor dew point quarterly as opposed to recording and trending daily dew point readings. The program manages material loss in compressed air systems by periodically monitoring air samples for moisture and contaminants, and inspecting internal surfaces within compressed air systems. Current program activities include periodic internal visual inspections of critical components are performed to detect signs of corrosion and air quality is monitored, and trended to determine if alert levels or limits are being approached or exceeded. The existing program will be enhanced to inspect the emergency diesel generator starting air system and control air system for loss of material due to corrosion.

The team reviewed LR Program basis documentation, AMP documents, existing procedures and surveillance results, and Corrective Action Resolution Documents (CARDs). The team also interviewed responsible applicant staff.

The team concluded the implementation of the proposed Compressed Air Monitoring AMP, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(12) Containment Inservice Inspection – IWE (B.1.12)

The ASME Section XI, Subsection IWE AMP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.S1, “ASME Section XI, Subsection IWE.” The program is credited in the LRA to provide for periodic examination of the drywell, the suppression chamber (torus), and the connecting piping (vent headers), their supports, containment hatches, airlocks, moisture barriers and pressure retaining bolting. In addition, the program requires periodic examination of penetrations, reinforcement and bellows. The leak tight integrity of containment seals and gaskets is determined by the Containment Leak Rate Program in accordance with 10 CFR Part 50, Appendix J

The program performs inspections using the primary ISI method as specified in IWE; visual examination (general visual, VT-3, VT-1). Limited volumetric examination and surface examination may also be necessary in some instances. The visual inspections monitor loss of material of the steel containment vessel surface areas, including welds and base metal and its integral attachments; metal shell; personnel and equipment access hatches; and pressure retaining bolting by inspecting for bending, twisting, stretching or deforming of bolts or studs, missing or loose bolts, studs, nuts, or washers, fractured bolts, studs, or nuts, degradation of protective coatings on bolting surfaces,

evidence of coolant leakage near bolting, localized excessive corrosion, and misalignment of connection or bolting; moisture barriers for Class MC components.

The team's review scope for this AMP included the AMP basis document, applicable NRC RAIs, implementing procedures and results of current inspections, and corrective action documents. The team also interviewed the program owner and the responsible site engineer. Fermi Unit 2 was at full power during this inspection period which precluded observation of physical condition of containment surfaces and components. Instead, the team reviewed recent outage related inspections and work orders where the condition of containment surfaces and components were assessed. The team did not identify any issues with completion of these work activities.

The team concluded continued implementation of the ASME Section XI, Subsection IWE AMP should provide reasonable assurance aging effects will be managed, consistent with the license basis, for the period of extended operation.

(13) Containment Leak Rate (B.1.13)

The Containment Leak Rate Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.S4, "Title 10 CFR Part 50, Appendix J." The program consists of tests performed in accordance with the regulations and guidance provided in 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B; Regulatory Guide 1.163, "Performance-Based Containment Leak-Testing Program"; Nuclear Energy Institute 94-01, "Industry Guideline for Implementing Performance-Based Options of 10 CFR Part 50, Appendix J"; and ANSI/ANS 56.8, "Containment System Leakage Testing Requirements."

The team reviewed LR Program basis documentation, AMP documents, existing procedures, surveillance results, and CARDs. The team also interviewed responsible applicant staff.

The team concluded continued implementation of the Containment Leak Rate Program, as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(14) Diesel Fuel Monitoring (B.1.14)

The Diesel Fuel Monitoring AMP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.M30, "Fuel Oil Chemistry". The program manages loss of material in piping, tanks, and other components exposed to an environment of diesel fuel oil by verifying the quality of the fuel oil source. Current program activities include sampling diesel fuel oil, inspecting low-flow areas where contaminants may collect. In addition the current program periodically samples, drains, cleans, and internally inspects the tanks. The existing program will be enhanced to update the frequency to monitor, trend, and inspect the diesel fuel oil and tanks. In addition, the applicant will revise program procedures to state that biocides or corrosion inhibitors may be added as a preventative measure or are added if periodic testing indicates biological activity or evidence of corrosion. This AMP with enhancement is intended to be consistent with the program described in NUREG-1801, Section XI.M30, "Fuel Oil Chemistry".

The team reviewed LR Program basis documentation, AMP documents, existing procedures and surveillance results, and CARDs. The team also interviewed responsible applicant staff and completed a walkdown. While reviewing material condition, corrective actions, and current periodic maintenance (PM) requirements of the Diesel Fire Pump Fuel Oil Tank, the team noted that the current frequency for draining, cleaning and inspection the tank was every 18 months based on internal operating experience. The licensee's enhancement for this tank would have changed the frequency to every 10 years. The team discussed this with the applicant and the applicant agreed to update the application to state "the diesel fire pump fuel oil tank draining. flushing, and inspection will continue at its frequency at the time of the enhancement implementation, until a PM evaluation of results from fuel oil samples and tank inspections indicates that the system will be capable of continuing to perform its function during the period of extended operation with a longer interval, not to exceed the 10-year interval for cleaning and internal visual inspection consistent with NUREG-1801. This issue was captured in CARD 15-23107, "Revisions to LRA Resulting from April 2015 NRC Inspection 71002." The applicant subsequently submitted this amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA-Set 32," dated May 19, 2015.

The team concluded the implementation of the proposed Diesel Fuel Monitoring AMP, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(15) Environmental Qualification of Electric Components (B.1.15)

The Environmental Qualification (EQ) of Electric Components AMP is an existing program, required by 10 CFR 50.49, which demonstrates that certain electrical components located in harsh environments are qualified to perform their safety function in those harsh environments. In the existing EQ Program components are refurbished, replaced, or their qualification is extended prior to reaching the aging limits established in the evaluation. This program will continue to ensure EQs of the applicable components. This program is consistent with NUREG-1801, Section X.E1, "EQ of Electric Components".

The team reviewed LR Program basis documents, program health report, condition reports, aging management review documents, and existing procedures. The team also interviewed the program owner to determine current practice of extending components EQs.

The team concluded continued implementation of the EQ of Electric Components AMP should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation

(16) External Surfaces Monitoring (B.1.16)

The External Surfaces Monitoring Program is an existing program that with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.M36, External Surfaces Monitoring of Mechanical Components, as modified by LR-ISG-2011-03, and LRISG- 2012-02, Appendix F. The program manages aging effects of components fabricated from metallic, elastomeric, and polymeric materials through periodic visual inspection of external

surfaces during system inspections and walkdowns for evidence of leakage, loss of material (including loss of material due to wear), cracking, fouling, and change in material properties.

Enhancements include revising the External Surfaces Monitoring Program procedures to clarify that periodic inspections will be performed at least once every 10 years of systems in scope, and subject to aging management review for LR in accordance with 10 CFR 54.4 (a)(1), and (a)(3). Inspections shall include areas surrounding the subject systems to identify hazards to those systems. Inspections of nearby systems that could impact the subject systems will include SSCs that are in scope and subject to aging management review for LR in accordance with 10CFR 54.4 (a)(2). Enhancements also include revising the procedures to inspect 100 percent of accessible components at least once per refueling cycle, and ensure required walkdowns include instructions and acceptance criteria to inspect for specific aging effects.

The team reviewed LR Program basis documentation, AMP documents, existing procedures and surveillance results, and CARDs. The team also interviewed responsible applicant staff.

The team concluded continued implementation of the External Surfaces Monitoring Program, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(17) Fatigue Monitoring (B.1.17)

The Fatigue Monitoring AMP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section X.M1, Fatigue Monitoring, with the following exception. NUREG-1801 recommends use of a design code limit for cumulative usage factors (CUFs). Fermi 2 applied more stringent design limits at high-energy line break (HELB) locations. Also, Fermi 2 includes an additional corrective action to evaluate the HELB analysis to address a HELB exclusion location with a CUF that increases to greater than the limit.

The program is intended to ensure that fatigue usage remains within allowable limits for components identified to have a Time Limited Aging Analysis. Program activities include monitoring and tracking the actual number of operational transients to ensure the number of cycles used in the design analysis is not exceeded, and component cumulative usage factors are maintained below the allowable limit.

The team reviewed LR Program basis documentation, existing procedures and surveillance results, CARDs, LR boundary drawings, and the LRA. The team also interviewed the AMP owner, other responsible applicant staff and associated LR contractors.

The team concluded continued implementation of the Fatigue Monitoring AMP, as described in the LRA with the proposed enhancements and the described exception, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(18) Fire Protection (B.1.18)

The Fire Protection AMP is an existing program that, with an enhancement, is intended to be consistent with the program described in NUREG-1801 XI.M26, “Fire Protection.” It is a Condition and Performance Monitoring Program that manages components and structures with a fire barrier intended function (carbon steel, concrete, masonry walls, fire resistant materials, and elastomer components). Current program requirements include periodic visual inspections and testing whose frequency is managed by the Technical Requirements Manual (TRM). This program will be enhanced to manage the aging of those components and to include the Halon and low-pressure carbon dioxide fire suppression systems and associated components into the program.

The team reviewed LR Program basis documents, program health report, condition reports, aging management review documents, and existing procedures. The team also interviewed the program owner to determine current condition and results of the inspection and surveillance requirements. To evaluate the material condition of components managed by this AMP, the team conducted walkdowns of the Halon tanks, carbon dioxide tanks, and the fuel oil storage tanks.

The team concluded the implementation of the Fire Protection AMP should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(19) Fire Water System (B.1.19)

The Fire Water System AMP is an existing program that, with an enhancement, is intended to be consistent with the program described in NUREG-1801, Section XI.M27, “Fire Water System." The program manages loss of material and biofouling for components in fire water systems. The program is implemented using inspection and monitoring activities, including flush test and testing or replacing sprinkler heads. The program is consistent with the National Fire Protection Association Standard 25. Program requirements are managed in accordance with the Updated Final Safety Analysis Report (UFSAR) and TRM. This program will be enhanced to include periodic visual inspections of fire water systems internal surface condition for evidence of loss of material.

The team reviewed LR Program basis documentation, AMP documents, existing procedures and surveillance results, CARDs, LR boundary drawings, and the LRA. The team also interviewed responsible applicant staff and conducted walkdowns of accessible portions of the fire water system, including components such as pumps, sprinklers, hose stations, and piping

The team concluded the implementation of the Fire Water System AMP, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the licensing basis, for the period of extended operation.

(20) Flow-Accelerated Corrosion (B.1.20)

The Fermi Flow Accelerated Corrosion (FAC) AMP is an existing program that is intended to be consistent with the program described in NUREG-1801, Section XI.M17, FAC, as modified by LR-ISG-2012-01. The program manages the loss of material due

to wall thinning caused by FAC for carbon steel piping and components through: (a) performing an analysis to determine systems susceptible to FAC; (b) conducting appropriate analysis to predict wall thinning; (c) performing wall thickness measurements based on wall thinning predictions and operating experience; and (d) evaluating measurement results to determine the remaining service life and the need for replacement or repair of components.

The current program will be enhanced to manage wall thinning due to various erosion mechanisms in treated water and steam systems for all materials that may be identified through industry or plant-specific operating experience. Enhancements will also include a requirement to specify that downstream components are monitored for wall thinning when susceptible upstream components are replaced with FAC-resistant materials.

The team reviewed the LR Program basis documentation, responses to RAIs, implementing procedures, program documents, procedures, and the LRA. The team also interviewed the FAC program owner, and reviewed the determination of systems susceptible to FAC.

The team concluded continued implementation of the FAC AMP, as described in the LRA with the proposed enhancements should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(21) Inservice Inspection (B.1.21)

The ISI Program is an existing program that is intended to be consistent with the program described in NUREG-1801, Section XI.M1, ASME Section XI, ISI, Subsections IWB, IWC, and IWD.

The ISI Program, Sub-Sections IWB, IWC, and IWD AMP is intended to manage the loss of material, cracking, and reduction in fracture toughness for ASME Class 1, 2, and 3 pressure-retaining components, including welds, pump casings, valve bodies, integral attachments, and pressure-retaining bolting, using volumetric, surface, and/or visual examination and leakage testing as specified in ASME Code Section XI, 2001 Edition with 2003 Addenda. The examinations, scheduling, acceptance criteria, flaw evaluation, and re-examinations are in accordance with the requirements identified in ASME Section XI with NRC-approved alternatives.

Additional limitations, modifications, and augmentations approved under the provisions of 10 CFR 50.55a with NRC-approved alternatives are included as a part of this program. Every 10 years this program is updated to the latest ASME Section XI Code Edition and addendum approved by the NRC per 10 CFR 50.55a. Repair and replacement activities for these components are covered in Subsection IWA of the ASME Code Edition of record.

The team reviewed the LR Program basis documentation, responses to RAIs, implementing procedures, ISI Program documents, completed ISI records, ISI Program health reports, and the LRA.

The team concluded the implementation of the ISI Program, as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(22) Inservice Inspection – IWF (B.1.22)

The ISI-IWF Program is an existing program that is intended to be consistent with the program described in NUREG-1801, Section XI.S3, ASME Section XI, Subsection IWF.

The ISI-IWF Program performs periodic visual examinations of ASME Class 1, 2, 3 and MC piping and component supports to determine general mechanical and structural condition or degradation of component supports, such as verification of clearances, settings, physical displacements, loose or missing parts, debris, corrosion, wear, erosion, or the loss of integrity at welded or bolted connections. The ISI-IWF Program is implemented through plant procedures which provide administrative controls, including corrective actions, for the conduct of activities that are necessary to fulfill the requirements of ASME Section XI, as mandated by 10 CFR 50.55a.

The program is currently on its third 10-year ISI inspection interval. The program was developed in accordance with ASME Section XI, 2001 Edition through the 2003 Addenda as approved by 10 CFR 50.55a. In accordance with 10 CFR 50.55a(g)(4)(ii), the Fermi 2 ISI Program is updated each successive 120-month inspection interval. The selection of component supports subject to examination is based upon Table IWF-2500-1, Examination Category F-A.

The team reviewed the LR Program basis documentation, implementing procedures, and the LRA. The team also interviewed the responsible applicant staff

The team concluded continued implementation of the ASME Section XI, ISI-IWF Program, as described in the LRA with the proposed enhancements should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(23) Inspection of Overhead Heavy- Load and Light-Load (Related to Refueling) Handling Systems (B.1.23)

The Inspection of Overhead Heavy-Load and Light-Load (Related to Refueling) Handling Systems AMP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG 1801, Section XI.M23, “Inspection of Overhead Heavy-Load and Light-Load (Related to Refueling) Handling Systems”

This program is intended to evaluate the effectiveness of maintenance monitoring activities for structural components, including structural bolting, that make up the bridge, the trolley, lifting devices, and rails in the rail system and includes cranes and hoists. This existing program credits visual inspections for loss of material on the structural components of the bridge, trolley, girders, bolting, and rails in the rail system and also manages loss of preload of associated bolted connections.

The team reviewed LR Program basis documentation, implementing inspection procedures, response to RAIs, Condition Reports, and the LRA. In addition, the team interviewed the responsible applicant staff and performed walkdowns of turbine building overhead crane and auxiliary building ventilation hoist for visible evidence of structural degradation and cracks. No significant concerns were identified during the walkdown.

During the inspection, the inspectors identified a discrepancy with the scope of lifting devices and determined that the reactor vessel head strongback, dryer/separator lifting

device, and spent fuel pool transfer cask lifting yoke meet the provisions of 10 CFR 54.4(a)(2), but were not included in scope. To address the discrepancy, the licensee agreed to amend the application to include these lifting devices as within the scope of LR and subject to aging management review. This issue is captured in CR 15-23107, "Revisions to LRA Resulting from April 2015 NRC Inspection 71002." The applicant subsequently submitted this amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA-Set 32," dated May 19, 2015.

The team concluded the implementation of the Overhead Heavy-Load and Light-Load (Related to Refueling) Handling Systems AMP, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(24) Internal Surfaces in Miscellaneous Piping and Ducting Components (B.1.24)

The Internal Surfaces In Miscellaneous Piping And Ducting Components AMP is a new program intended to be consistent with the program described in NUREG-1801, Section XI.M38, "Internal Surfaces in Miscellaneous Piping and Ducting Components," as modified by LR-ISG-2012-02, Sections B, F and G. The program will manage fouling, cracking, loss of material and change in material properties of internal surfaces of piping, piping elements and piping components, ducting components, and other components exposed to air-indoor uncontrolled, diesel exhaust, condensation, raw water, treated water, and waste water environments. The program is credited to manage the aging effects of loss of material, reduction of heat transfer, fouling and cracking for metallic components. This program will also manage elastomeric components exposed to condensation, fuel oil, lubricating oil, and treated water environments to manage the aging effects of loss of material, hardening, loss of strength and other changes in material properties. The program includes provisions for opportunistic visual inspections during program surveillances and maintenance activities of surfaces of components not managed under other AMPs, augmented by physical manipulation or pressurization to detect hardening or loss of strength of elastomers where appropriate.

The team reviewed the AMP basis document, applicable NRC requests and responses for additional information, implementing procedures, and UFSAR changes proposed for the AMP. The team also interviewed the AMP owner, other responsible applicant staff and associated LR contractors.

In response to the inspectors' questions related to the Service Water Integrity Program (SWIP), (B.1.41) the applicant initiated CARD 15-23107 with corrective actions to revise the LRA, and associated documents to state that the AMP specified for various Non-Safety-Related tubing would be changed from the SWIP AMP of Section B.1.41 to the "Internal Surfaces In Miscellaneous Piping and Ducting Components" AMP. The applicant subsequently submitted this amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA-Set 32," dated May 19, 2015.

The team concluded implementation of the Internal Surfaces in Miscellaneous Piping and Ducting Components AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(25) Masonry Wall (B.1.25)

The Masonry Wall Program is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.S5," Masonry Walls." The program manages masonry walls for loss of material and cracking and is implemented as part of the structures monitoring AMP (B.1.42). This AMP relies on inspection activities and was based on guidance provided in IE Bulletin 80-11, "Masonry Wall Design," and NRC Information Notice 87-67, "Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11."

The program will be enhanced to identify in-scope masonry walls and to include requirements for qualification of personnel involved with the inspection and evaluation of masonry walls.

The team reviewed LR Program basis documentation, implementing inspection procedures, response to RAIs, CARDs, and the LRA. In addition, the team interviewed the responsible applicant staff and performed walkdowns of a sample of masonry walls in the reactor building, auxiliary building and turbine building for visible evidence of structural degradation and cracks. No significant concerns were identified during the walkdown.

The team concluded continued implementation of the Masonry Wall Program, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(26) Metal Enclosed Bus Inspection (B.1.26)

The Metal Enclosed Bus (MEB) Inspection AMP is a new program that is intended to be consistent with the program described in NUREG-1801, Section XI.E4, "MEB". The program includes inspections of internal and external portions of MEB to identify age-related degradation of the bus, bus connections, the bus enclosure, the bus insulation, and the bus insulators. This program will inspect the internal portions of the MEB for cracks, corrosion, foreign debris, excessive dust buildup, and evidence of water intrusion. The bus insulation will be visually inspected for signs of reduced insulation resistance, such as embrittlement, cracking, chipping, melting, swelling, discoloration, or surface contamination, which may indicate overheating or aging degradation. The internal bus insulating supports will be visually inspected for structural integrity and signs of cracks. A sample of accessible bolted connections will be inspected for increased resistance of connection. The sample will be 20 percent of the connection population with a maximum sample size of 25. The first inspection on connection resistance, using thermography or measurement, will be completed prior to the extended period of operation, and every 10 years thereafter unless visual inspection is used. If visual inspection is used then the first inspection will be completed prior to the extended period of operation, and every 5 years thereafter.

The team reviewed LR Program basis documents and confirmed the applicant had a commitment in place to implement the program prior to the start of the period of extended operation. The team also completed walkdowns and interviewed the program owner to determine how and when the testing and monitoring requirements for this AMP will be developed and implemented.

The team concluded implementation of the MEB Inspection AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(27) Neutron-Absorbing Material Monitoring (B.1.27)

The Neutron-Absorbing Material Monitoring Program is an existing program intended to be consistent with the program described in NUREG-1801, Section XI.M40, "Monitoring of Neutron-Absorbing Materials Other than Boraflex." The program relies on periodic inspection, testing, and other monitoring activities to assure that degradation of the neutron-absorbing material (Boral) used in spent fuel pools, that could compromise the criticality analysis, will be detected. The program monitors loss of material and changes in dimension such as blisters, pits, and bulges that could result in a loss of neutron absorbing capability. The parameters monitored include physical measurements and geometric changes in test coupons. The frequency of testing will be based on the condition of the neutron-absorbing material, justified with plant-specific operating experience, prior to the period of extended operation, at a minimum of once every 10 years in the period of extended operation.

The team walked down the spent fuel pool area and reviewed LR Program basis documentation, existing procedures, recent surveillance results, calculations and CARDs. The team also interviewed responsible applicant staff.

The team concluded continued implementation of the Neutron-Absorbing Material Monitoring Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(28) Non- Environmentally Qualified Cable Connections (B.1.28)

The Non-EQ Electrical Cables Connections AMP is a new program that is intended to be consistent with the program described in NUREG-1801, Section XI.E6, "Electrical Cables Connections Not Subject to 10 CFR 50.49 EQ Requirements." Cable connections associated with this program are those connections which are susceptible to age-related degradation that are not subject to the requirements of 10 CFR 50.49. The program will perform a one-time inspection, before the period of extended operation, on a sample of the connections. The one-time inspection verifies that increased resistance of connection due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, or oxidation is not an aging effect that requires periodic testing. The program consists of a representative sample of electrical connections within the scope of LR. Testing may include thermography, contact resistance testing, or other appropriate testing methods without removing the connection insulation, such as heat shrink tape, sleeving, insulating boots, etc. A representative sample of non-EQ electrical cable connections will be selected based on application (medium and low-voltage), circuit loading (high-loading), connection type, and location (high-temperature, high-humidity and vibration). The sample tested will be 20 percent of the population with a maximum sample size of 25 connections. The technical basis for the sample selected will be documented.

The team reviewed LR Program basis documents, CARDs and confirmed the applicant had a commitment in place to implement the program prior to the start of the period of extended operation. The team also interviewed the Non-EQ Electrical cables

connections program owner to determine how and when the testing and monitoring requirements for this AMP will be developed and implemented.

The team concluded implementation of the Non-EQ Electrical Cables Connections AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(29) Non-Environmentally Qualified Inaccessible Power Cables (400 V to 13.8 kV) (B.1.29)

The Non-EQ Inaccessible Power Cables AMP is a new program that is intended to be consistent with the program described in NUREG-1801, Section XI.E3,"Inaccessible Power Cables Not Subject to 10 CFR 50.49 EQ Requirements." The program will manage the aging effect of reduced insulation resistance on inaccessible power cables (400V- 13.8 KV) that have a LR intended function. The cables that are included in this program are routed underground in conduits, duck banks or direct buried. In scope cables exposed to significant moisture will be tested, using a proven commercially available test, at least every 6 years. The program will also include periodic inspections of manholes within scope of this program at least once every year. In addition, inspections of manholes for water after events such as heavy rains or flooding will be performed. Inspection frequency of the manholes will be adjusted as necessary.

The team reviewed the LR Program basis documents, CARDs, and confirmed the applicant had a commitment in place to implement the program prior to the start of the period of extended operation. The team also interviewed the Non-EQ Inaccessible Power Cables Program owner. .

The team concluded implementation of the Non-EQ Inaccessible Power Cables AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(30) Non-Environmentally Qualified Instrumentation Circuits Test Review (B.1.30)

The Non-EQ Instrument Circuits Test Review is a new program that is intended to be consistent with the program described in NUREG-1801, Section XI.E2, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements Used in Instrumentation Circuits." The program will manage the aging effect of applicable cables in the Neutron Monitoring and Process Radiation Monitoring Systems. This AMP will provide reasonable assurance that the intended function of sensitive, high-voltage, low-level current cables exposed to adverse localized equipment environments can be maintain consistent with the current licensing basis through the extended period of operation. This will be accomplished my reviewing calibration and surveillance testing results every 10 years with the first review occurring prior to the extended period of operation. For sensitive instrumentation circuit cables that are disconnected during instrument celebration testing, using a proven method for detecting deterioration for the insulation system will occur at least once every 10 years, with the first test occurring before the period of extended operation.

The team reviewed the LR Program basis documents and confirmed the applicant had a commitment in place to implement the program prior to the start of the period of extended operation. The team also interviewed the staff responsible for Non-EQ instrumentation circuits subject to sensitive, high-voltage, and low-level signals, to determine current practice and test procedures to be developed under the program.

The team concluded implementation of the Non-EQ Instrument Circuits Test Review as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(31) Non-Environmentally Qualified Insulated Cables and Connections (B.1.31)

The Non-EQ Insulated Cables and Connections AMP is a new program that is intended to be consistent with the program described in NUREG-1801, Section XI.EI. "Insulation Material for Electrical Cables and Connections not Subject to 10 CFR 50.59 EQ Requirements." The program will be a Conditioning Monitoring Program that provides reasonable assurance that intended functions of insulated cables and connections exposed to adverse localized environments (cause by heat, radiation, or moisture) can be maintained consistent with the current licensing basis through the period of extended operation. Accessible insulated cables and connections within scope of LR installed in an adverse localized environment will be visually inspected, at least every 10 years, for cable and connection jacket surface anomalies such as embrittlement, discoloration, cracking, swelling, or surface contamination. If unacceptable conditions or situation is identified the applicant will enter it into the Corrective Action Program.

The team reviewed the LR Program basis documents and confirmed the applicant had a commitment in place to implement the program prior to the start of the period of extended operation. The team also completed walkdowns and interviewed the Non-EQ Insulated Cables and Connections Program owner to determine how and when the testing and monitoring requirements for this AMP will be developed and implemented.

In addition, the team was following up on an issue previously identified during an audit. It was noted that a large number of birds were observed near a cable bus (Calvert Bus). Although the Calvert Bus is in-scope of LR the reviewers were concerned that bird droppings contain chemicals, and this condition was not being evaluated as a localized adverse with aging potential aging effects on the bus. The applicant has committed to update adverse localized environments to include chemical contamination from bird droppings. This issue was captured in CARD 15-23107, "Revisions to LRA Resulting from April 2015 NRC Inspection 71002." The applicant subsequently submitted this amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA-Set 32," dated May 19, 2015.

The team concluded implementation of the Non-EQ Insulated Cables and Connections AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(32) Oil Analysis (B.1.32)

The Lubricating Oil Analysis Program is an existing program that, with enhancements is intended to be consistent with the program described in NUREG-1801 XI, M39, "Lubricating Oil Analysis Program." The program includes surveillance and monitoring procedures for maintaining lubricating oils within established limits. The program maintains oil contaminants (primarily water and particulates) within limits to preserve the operating environment. Oil testing activities include periodic sampling, analysis, and trending of results.

The inspectors reviewed the program basis documentation, aging management review documents, and existing procedures. The inspectors also interviewed the AMP owner,

other responsible applicant staff and associated LR contractors. The inspectors verified that the applicant performed adequate historic reviews of plant specific experience to determine aging effects.

The team concluded continued implementation of Lubricating Oil Analysis Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(33) One-Time Inspection (B.1.33)

The One-Time Inspection Program is a new program intended to be consistent with the program described in NUREG-1801, Section XI.M32, "One-Time Inspection." Inspections that verify unacceptable degradation is not occurring will be performed within the 10 years prior to the period of extended operation. This program consists of a one-time inspection of selected components to: (a) verify the effectiveness of an AMP that is designed to prevent or minimize aging to the extent that it will not cause the loss of intended function during the period of extended operation; (b) verify unacceptable degradation is not occurring; and (c) trigger additional actions that ensure the intended functions of affected components are maintained during the period of extended operation. Determination of the sample size will be 20 percent of the components in each material-environment-aging effect group up to a maximum of 25 components. Identification of inspection locations will be based on the potential for the aging effect to occur. Examination techniques will use established Non-Destructive Examination (NDE) methods with a demonstrated history of effectiveness in detecting the aging effect of concern, including visual, ultrasonic, and surface techniques. Acceptance criteria will be based on applicable ASME or other appropriate standards, design basis information, or vendor-specified requirements and recommendations. Any indication or relevant condition of degradation will be evaluated.

The team reviewed LR Program basis documentation and interviewed responsible applicant staff.

The team concluded continued implementation of the One-Time Inspection Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(34) One-Time Inspection – Small-Bore Piping (B.1.34)

The One-Time Inspection – Small-Bore Piping Program is a new program intended to be consistent with the program described in NUREG-1801, Section XI.M35, "One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program." The program will augment ASME Code, Section XI (2001 Edition with 2003 Addenda) requirements, and is applicable to small-bore ASME Code Class 1 piping and components with a nominal pipe size diameter less than four inches (NPS 4), and greater than or equal to one inch (NPS 1) in systems that have not experienced cracking of ASME Code Class 1 small-bore piping. Fermi 2 has not experienced cracking of ASME Code Class 1 small-bore piping less than NPS 4, and greater than or equal to NPS 1 due to stress corrosion, cyclical (including thermal, mechanical, and vibration fatigue) loading, or thermal stratification and thermal turbulence.

The team reviewed LR Program basis documentation, reviewed operating experience and interviewed responsible applicant staff.

The team concluded continued implementation of the One-Time Inspection – Small-Bore Piping Program, as described in the LRA, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(35) Periodic Surveillance and Preventive Maintenance (B.1.35)

The Periodic Surveillance and Preventive Maintenance (PSPM) Program is an existing site specific condition monitoring program. There is no corresponding program described in NUREG-1801. The program manages aging effects not managed by other AMPs, including loss of material, fouling, loss of material due to wear, and loss of sealing. Any indication or relevant condition of degradation detected is evaluated. Inspections occur at least once every 5 years during the period of extended operation.

The team reviewed program basis documentation, existing procedures, surveillance results, and CARDs. The team also interviewed responsible applicant staff.

The team concluded continued implementation of the PSPM Program as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(36) Protective Coating Monitoring and Maintenance (B.1.36)

The Protective Coating Monitoring and Maintenance Program is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG 1801, Section XI.S8, “Protective Coating Monitoring and Maintenance Program.” The program manages the aging of Service Level I coatings applied to carbon steel and concrete surfaces inside containment (e.g., steel containment vessel shell, structural steel, supports, penetrations, and concrete walls and floors). Specifically, this program ensures coatings remain adhered to the intended surfaces so as to not adversely affect the function of the emergency core cooling suction strainers. It addresses coating selection, application, inspection, and maintenance. In addition, it relies on visual examinations, condition assessments, and repair of coatings. The LRA describes this AMP as comparable with Revision 2, of Regulatory Guide (RG) 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water Cooled Nuclear Power Plants,” which was identified as an acceptable method for developing this AMP by Section XI.S8, of NUREG-1801.

The team reviewed LR Program basis documentation, existing procedures and inspection results, CARDs, and the LRA. The team also interviewed responsible applicant staff. Fermi Unit 2 was at full power during this inspection period which precluded observation of physical condition of coatings. Instead, the team reviewed recent outage related inspections and work orders where the condition of Service Level I coatings were assessed. The team did not identify any issues with completion of these work activities.

The team concluded implementation of the Protective Coating Monitoring and Maintenance Program, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed for the period of extended operation consistent with the licensing basis.

(37) Reactor Head Closure Studs (B.1.37)

The Reactor Head Closure Studs AMP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.M3, "Reactor Head Closure Studs" with the following exception. NUREG-1801 recommends use of bolting material for closure studs that has an actual measured yield strength less than 1,034 megapascals (150 kilo-pounds per square inch [ksi]). Fermi 2 cannot verify actual measured yield strength of bolting material for closure studs.

The program manages cracking due to SCC or IGSCC, and loss of material due to wear or corrosion for reactor head closure stud bolting (studs, washers, nuts, bushings, and threads in flange) using ISI per ASME Section XI, 2001 Edition, 2003 Addendum, and preventive measures to mitigate cracking. The program follows examination and inspection requirements to detect and size cracks and detect loss of material. Acceptance criteria and evaluation of indications are in accordance with ASME Section XI, and other requirements specified per 10 CFR 50.55a with NRC-approved alternatives.

Preventive actions include avoiding the use of metal-plated stud bolting, use of an acceptable surface treatment, use of stable lubricants, and use of bolting materials with low-susceptibility to SCC. The program uses visual, surface, and volumetric examinations as required by ASME Section XI. The program also relies on recommendations to address reactor head closure studs degradation listed in NUREG-1339, and NRC RG 1.65.

The team reviewed the LR Program basis documentation, aging management review documents, implementing procedures, completed ISI records, and the LRA. The team also interviewed the responsible applicant staff.

The team concluded continued implementation of the Reactor Head Closure Studs AMP, as described in the LRA with the proposed enhancements and exception, should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the license basis.

(38) Reactor Vessel Surveillance (B.1.38)

The Reactor Vessel Surveillance AMP is an existing program that, with an enhancement, is intended to be consistent with the program described in NUREG-1801, Section XI.M31, "Reactor Vessel Surveillance," with the following exception. NUREG-1801 recommends that the Reactor Vessel Surveillance Program shall have at least one capsule with projected neutron fluence equal to or exceeding the 60-year peak reactor vessel wall neutron fluence prior to the end of the period of extended operation. A capsule meeting this qualification is not expected to be obtained prior to the end of the period of extended operation. This exception is justified because the provisions set forth in RG 1.99, Revision 2, are acceptable for embrittlement evaluation.

The program manages the aging effect of reduction of fracture toughness of reactor vessel materials. The program will be enhanced to ensure that new fluence projections through the period of extended operation, and the latest vessel beltline adjusted reference temperature tables are provided to the BWRVIP program prior to the period of extended operation.

The team reviewed LR Program basis documentation, applicable RAI responses, implementing procedures, the LRA, and plant specific operating history documents. In addition, the team interviewed the AMP owner, other responsible applicant staff and associated LR contractors.

The team concluded continued implementation of the Reactor Vessel Surveillance AMP, as described in the LRA with the enhancement, and one exception should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the licensing basis.

(39) Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.1.39)

The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants AMP is an existing program that with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.S7, “RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants.”

The program manages the aging effects of the Fermi 2 shore barrier, general service water pump house and residual heat removal complex structures associated with emergency cooling water systems or flood protection. In addition to reinforced concrete, this program includes steel piling, structural steel, bolting, and miscellaneous steel components associated with the water-control structures. This program relies on inspection and surveillances based on Revision 1 of RG 1.127. This program is implemented as part of the structures monitoring AMP (B.1.42).

The applicant has described numerous enhancements to the program in the LRA.

The team reviewed LR Program basis documentation, implementing procedures, response to RAIs, CARDs, and the LRA. The team also interviewed responsible applicant staff and performed a walk down of accessible portions of the shore barrier, GSW pump house and RHR complex for evidence of structural steel loss of material, and loose structural bolting. No significant concerns were identified during the walkdown.

The team concluded continued implementation of the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants AMP, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed for the period of extended operation consistent with the licensing basis.

(40) Selective Leaching (B.1.40)

The Selective Leaching AMP is a new program intended to be consistent with the program described in NUREG-1801, Section XI.M33, "Selective Leaching." The program includes inspections to verify the absence of selective leaching to ensure the integrity of components that may be susceptible to this aging mechanism. These components include those made of gray cast iron and copper alloy (with greater than 15 percent zinc or greater than 8 percent aluminum) exposed to raw water, treated water, waste water or soil. This AMP will include visual examination, supplemented by

hardness measurement or other appropriate examination methods, of a representative component sample to determine if preferential removal of one of the alloying elements from a material in an aqueous environment was occurring.

The team reviewed the associated AMP basis document, plant specific operating history documents including corrective action documents, scoping and screening reports, and the LRA. In addition, the team interviewed responsible applicant and site staff. The team was unable to review the implementing documents associated with this new program because they were being developed at the time of this inspection.

The team concluded implementation of the Selective Leaching AMP as described in the LRA should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(41) Service Water Integrity (B.1.41)

The SWIP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.M20, "Open-Cycle Cooling Water System." The guidelines of NUREG 1801, Section X1.M20, are based on the recommendations of GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment." The program manages loss of material and fouling for safety-related service water system components fabricated from carbon steel, copper alloys, and stainless steel exposed to raw water as described in the Fermi 2 response to NRC GL 89-13.

The team reviewed LR Program basis documentation, existing procedures and surveillance results, CARDs, LR boundary drawings, and the LRA. The team also interviewed the AMP owner, other responsible applicant staff and associated LR contractors. The team also conducted walkdowns of accessible portions of the safety-related service water SSCs, including pumps, strainers, piping, mechanical draft cooling equipment and portions of the exterior and interior of the safety-related RHR facility. During the walkdowns, the inspectors identified to the applicant personnel multiple examples of corrosion in the plant closed cooling water systems. While the applicant field personnel did not believe the conditions met the threshold for initiating CARDs, the inspectors discussed the issue with applicant management who subsequently directed CARDs to be initiated.

The NRC inspector reviewed the docketed letter NRC-15-0030, dated March 19, 2015, which contained revised LRA Table 3.3.2-17-11, "Process Sampling System, Non-Safety-Related Components Affecting Safety-Related Systems, Summary of Aging Management Evaluation" and revised LRA Table 3.3.2-17-13, "GWS System, Non-Safety-Related Components Affecting Safety-Related Systems, Summary of Aging Management Evaluation". The inspector noted that the letter indicated that the LRA tables had been revised to state that Non-Safety-Related tubing had been added to both tables with the applicable AMP specified as the SWIP. The inspector identified to the applicant that the SWIP, NUREG-1801, Section XI.M20 Program and NRC GL 89-13 only addressed safety-related SSCs. The inspector questioned the applicant on whether the SWIP discussed in the LRA and other associated LR documents should state that Non-Safety-Related components would also be managed in the SWIP. The applicant responded that the docketed letter was in error and included in CARD 15-23107 corrective actions to amend the LRA and associated documents to state that the AMP for the Non-Safety-Related tubing would be changed from the SWIP to the "Internal

Surfaces In Miscellaneous Piping and Ducting Components" AMP of section B.1.24. The applicant subsequently submitted this amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA-Set 32," dated May 19, 2015.

The inspector also questioned why the GSW System was in the scope of LR but most of the heat exchangers cooled by the GSW System on LR drawing LRA-M-2010 were indicated as not in the scope of LR. The licensee identified that the T41 Reactor Building and U41 Turbine Building Closed Cooling Water System heat exchangers needed further review to determine if they needed to be in the scope of LR and initiated CARD 15-23108 to perform the review and potentially revise the LRA if necessary. The applicant subsequently submitted an amendment in letter NRC-15-0056, "Response to NRC RAI for the Review of the Fermi 2 LRA-Set 32" to add a line item for stainless steel coils in an air (external) and raw water (internal) environment to Table 3.3.2-17-33, and to add a line item for copper alloy coils in a raw water (internal) environment to Table 3.3.2-17-28.

This existing program will include two enhancements as described in the LRA. These enhancements were specified in Commitment 33 as revising SWIP procedures to include inspections to determine to determine if loss of material due to erosion is occurring in the system and to stipulate that administrative controls are in accordance with the Fermi 2 10 CFR Part 50, Appendix B, Quality Assurance Program.

The team concluded the implementation of the SWIP, as described in the LRA with the proposed enhancements, and LRA revisions identified above should provide reasonable assurance that the aging effects will be managed for the period of extended operation consistent with the licensing basis.

(42) Structures Monitoring (B.1.42)

The Structures Monitoring AMP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.S6, "Structures Monitoring." The program is intended to implement the requirements of 10 CFR 50.65. This program was based on Revision 2 of Nuclear Management and Resources Council 93 01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and Revision 2 of RG 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." This program relies on periodic visual inspections and condition monitoring of concrete structures, steel components, elastomers, and masonry block walls. This program also includes elements of the masonry walls AMP (i.e., B.1.25) and Water Control Structures AMP (i.e., B.1.39).

The applicant has described numerous enhancements to the program in the LRA.

The team reviewed LR Program basis documentation, implementing procedures, applicable RAI responses, and the LRA. In addition, the team interviewed the responsible applicant staff and performed walkdowns for evidence of material loss or loose bolting inside the Auxiliary Building and RHR Complex. No significant concerns were identified during the walkdown.

The team concluded continued implementation of the Structures Monitoring AMP, as described in the LRA with the proposed enhancements, should provide reasonable assurance the aging effects will be managed, consistent with the license basis, for the period of extended operation.

(43) Water Chemistry Control – Boiling Water Reactor (B.1.43)

Water Chemistry Control - BWR AMP is an existing program that is intended to be consistent with the program described in NUREG-1801, Section XI.M2, “Water Chemistry.” The program manages loss of material, cracking, and fouling in components exposed to a treated water environment through periodic monitoring and control of water chemistry. The Water Chemistry Control - BWR Program monitors and controls water chemistry parameters such as pH, chloride, conductivity, and sulfate. EPRI Report 1016579 is used to provide guidance.

The team reviewed LR Program basis documentation, the LRA, plant specific operating history documents, recent surveillance results, and CARDs. The team compared implementing procedures against industry guidance to verify the applicant’s program was consistent with NUREG-1801, Section XI.M2, In addition, the team interviewed the AMP owner, other responsible applicant staff and associated LR contractors.

The team concluded continued implementation of the Water Chemistry Control - BWR AMP, as described in the LRA, should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the licensing basis.

(44) Water Chemistry Control – Closed Treated Water Systems (B.1.44)

Water Chemistry Control - Closed Treated Water Systems AMP is an existing program that, with enhancements, is intended to be consistent with the program described in NUREG-1801, Section XI.M21A, “Closed Treated Water Systems.” The program manages loss of material, cracking, and fouling in components exposed to a closed treated water environment, through monitoring and control of water chemistry, including the use of corrosion inhibitors, chemical testing, and visual inspections of internal surface condition. The EPRI Closed Cycle Cooling Guideline (1007820), industry guidance, and vendor recommendations are used to establish the program.

The team reviewed LR Program basis documentation, the LRA, plant specific operating history documents, recent surveillance results, and CARDs. The team compared implementing procedures against industry guidance to verify the applicant’s program was consistent with NUREG-1801, Section XI.M21A. In addition, the team interviewed the AMP owner, other responsible applicant staff and associated LR contractors.

The team concluded continued implementation of the Water Chemistry Control - Closed Treated Water Systems AMP, as described in the LRA, should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the licensing basis.

(45) Coating Integrity Program (B.1.45)

The Coating Integrity Program is a new program that is intended to be consistent with the program described in NUREG-1801, Section XI.M42, “Internal Coatings/Linings for In-Scope Piping”, and LR-ISG-2013-01, “Aging Management of Loss of Coating or Lining Integrity for Internal Coatings/Linings on In-scope Piping, Piping Components, Heat Exchangers, and Tanks,” dated November 6, 2014, with exceptions. The program manages the aging effects of coatings/linings applied to the internal surfaces of in-scope piping, piping components, heat exchangers, and tanks. This AMP will rely on periodic visual inspections of coatings/linings applied to the internal surfaces of in-scope piping,

piping components, heat exchangers, and tanks. In addition for the coatings/linings that do not meet the acceptance criteria, physical testing is performed where possible in conjunction with visual inspection.

The team reviewed LR Program basis documentation, response to RAIs, CARDs, responses to RAIs and the LRA. In addition, the team interviewed the responsible applicant staff. The team was unable to review the implementing documents associated with this new program because they were being developed at the time of this inspection.

The team concluded implementation of the Coating Integrity, as described in the LRA should provide reasonable assurance the aging effects will be managed for the period of extended operation, consistent with the license basis.

5. EXIT MEETING SUMMARY

On May 1, 2015, the team presented the inspection results to Mr. V. Kaminskas and other members of the applicant's staff. The applicant acknowledged the issues presented. The inspectors confirmed none of the potential report input discussed was considered proprietary.

The team noted that proprietary documents were reviewed during the course of the inspection. The applicant confirmed all such proprietary documents were returned or the copies destroyed and the likely content of the report would not involve the proprietary material.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

V. Kaminskas, Vice President, Nuclear Generation
L. Peterson, Director, Nuclear Engineering
L. Goodman, License Renewal Project Manager
A. Rudolph, License Renewal Coordinator
J. Thorson, Manager, Performance Engineering
J. Tibai, License Renewal – Mechanical
T. Dong, License Renewal- Structural and Electrical
K. Lynn, License Renewal – Licensing
R. Westmoreland - License Renewal
G. Keel, License Renewal
A. Cox, Contractor
H. Rideout, Contractor
A. Taylor, Contractor
W. Bichhnelr, Contractor
R. Rucker, Contractor

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened, Closed, and Discussed

None

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC team reviewed the documents in their entirety, but rather, that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

LICENSE RENEWAL DOCUMENTS

Corrective Action Documents (Written as a Result of the Inspection)

- 15-22719; NRC Identified Significant Corrosion and paint Failure on CTG Fuel Oil Tank; dated April 15, 2015
- 15-22732; NRC identified Debris on Grating Over UHS reservoir During LRA Walkdown-RHR Facility Roof; dated April 15, 2015
- 15-22759; NRC Identified Rust on MDCT Fan Motor C11 and Components Associated with the Fan and Inquired if an Evaluation Existed; dated April 16, 2015
- 15-22763; NRC Identified-Concrete Spalling in Walls Above South RHR Division 1 Reservoir; dated April 16, 2015
- 15-22764; NRC Identified Rusted N2 Bottles for MCDT Fan Brakes (E1156C001A/ E1156C001C) on RHR Facility Roof; dated April 16, 2015
- 15-22766; NRC Identified Oil and Debris on MCDT Fan Brake Piping During LRA Walkdown of RHR Facility Roof – Division I; dated April 16, 2015
- 15-22776; NRC Identified Significant Corrosion in Pump Seal Areas of EDG 12 Service Water Pump and EESW South Pump; dated April 15, 2015
- 15-22779; NRC Identified Scraping on Overhead Service Water Supply Line to EDG 11 Heat Exchanger; dated April 17, 2015
- 15-22787; Evidence of a Leak at X80N463 (DFP Room Sprinkler Flow Switch); dated April 20, 2015
- 15-22850; Soot Seen on the Wall of the Diesel Fire Pump Room; dated April 20, 2015
- 15-22916; Evaluate NUREG/CR-6726 for Applicability to Fermi 2 IWE Program; dated April 23, 2015
- 15-23035; NRC Identified-LRA Walkdown-Correct Drawing A-2002-01; dated April 28, 2015
- 15-23107; Revisions to License Renewal Application Resulting from April 2015 NRC Inspection 71002; dated April 30, 2015
- 15-23108; NRC Questions on GSW Heat Exchangers Not In-Scope For License Renewal Required Evaluation; dated April 30, 2015
- 15-23128; NRC Question Related to Low-Voltage Cable Submergence During License Renewal Interview; dated April 30, 2015

License Renewal Application

- Letter from J. Todd Conner, DTE Energy Company to NRC Document Control Desk; Fermi 2 License Renewal Application; dated April 24, 2014 (ML14121A532)

License Renewal Basis Documents

- 12-LRD02; Aging Management Program Evaluation Report Class I Mechanical; Rev. 1
- 12-LRD03; Aging Management Program Evaluation Report Non-Class I Mechanical; Rev. 2
- 12-LRD04; Aging Management Program Evaluation Results, Electrical; Rev. 2
- 12-LRD05; Aging Management Program Evaluation Report Civil/Structural; Rev. 1

- 12-LRD09; Operating Experience Review Report - Aging Management Program Effectiveness; Rev. 1

License Renewal Drawings

- 6M721-4100; Diagram of Torus Water Management System; Rev. AM
- LRA-M-2010, Diagram General Service Water, Rev. CX
- LRA-M-2010-1, Diagram General Service Water, Rev. 0
- LRA-M-2052, RHRSW Division 1 RHR Complex, Rev. 0
- LRA-M-2053, RHRSW Division 2 RHR Complex, Rev. 0
- LRA-M-2083, RHR Division 2, Rev. 0
- LRA-M-2084, RHR Division 1, Rev. 0
- LRA-M-5357, EECW Division 2, Rev. 0
- LRA-M-5444, EECW Division 1, Rev. 0
- LRA-M-N-2050, Equipment Drains and Floor Drains Div 1 and 2 RHR Complex, Rev. N
- LRA-M-N-2052, P&ID RHRSW System Division 1 RHR Complex, Rev. AD
- LRA-M-N-2053, P&ID RHRSW System Division 2 RHR Complex, Rev. AH
- LRA-M-N-2054, System Diagram Service Water, Makeup, Decant and Overflow Systems Division 1 and 2 RHR Complex, Rev. V

License Renewal Miscellaneous Documents

- 12-AMM01; Aging Management Review of the Reactor Vessel; Rev. 1
- 12-AMM02; Aging Management Review of the Reactor Vessel Internals; Rev. 0
- NRC-15-0032; Response to NRC RAI for the Review of the Fermi 2 License Renewal Application – Set 25; dated April 2015
- NRC-15-0056; Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application - Set 32; dated May 19, 2015

2. CURRENT PLANT DOCUMENTS

Calculations

- 000N2862; Spent Fuel Pool Criticality Analysis Sensitivity Study; Rev 0
- DC-5922; NUREG 0619 RPV Feedwater Nozzle Crack Growth Reevaluation; dated October 31, 1997

Corrective Action Documents

- 94-0204; Unusual Surface Conditions Identified on RPV Cladding and Nozzles; dated May 19 1994
- 00-15663, CTG Fuel Oil Storage Tank had piping and valves needing removal, dated April 25, 2000
- 02-14797; BWRVIP-104; BWR Vessel Internal Project Evaluation and Recommendation to Address Shroud Support Capacity; dated October 3, 2002
- 04-23330; Monroe Power Plant Fuel Systems Monorail Hoist Failure; dated July 26, 2004
- 04-24294; Out of Specification New Fuel Oil Analysis on EDG 13 and EDG 14 Fuel Oil; dated September 24. 2004
- 04-26003; Protective Coating Around Joints in Waterboxes Needs to be Removed and Re-Applied; dated November 24, 2004
- 05-20359; Replace EDG 13 Jacket Coolant; dated January 21, 2015

- 05-21976; P5002 System Exceeds its Maintenance Rule Performance Criteria; dated March 24, 2005
- 05-24585; Flow Accelerated Corrosion (FAC) in Carbon Steel Condenser Nozzles; dated August 4, 2005
- 05-25094; The RWCU Resin Feed Tank Coating is Flaking Off; dated September 2, 2005
- 05-26142; Maintenance Crane/Hoist Inspection Procedure Changes Required; dated November 2, 2005
- 06-25291; Age Related Degradation of Cable to LP Valve Unitized Actuator; dated August16, 2006
- 07-22666; Forward Pump Drain Total Iron Adverse Trend; dated May 15, 2007
- 07-25665; Flaking Paint Inside HSO Vacuum Tank; dated October 3, 2007
- 07-25811; Maintenance Rule Structural Walkdown Findings; dated October 6, 2007
- 07-26112; Maintenance Rule Structural Walkdown Finding; dated October 13, 2007
- 07-26785; NRC Identified Issues in Torus; dated October 29, 2007
- 07-27043; Panel Bolts Hanging Loose; dated November 6, 2007
- 07-27267; Support W-R30-N5177-G14 Has One Anchor Nut Missing; dated November 12, 2007
- 07-27733; INPO Trends 3rd Quarter 2007-Instrument Air Line Failures; dated November 30, 2007
- 08-21804; Repair of Degrade Protective Coatings in Torus; dated March 14, 2008
- 08-22634; NRC Information Notice 2008-06; Instrument Air System Failure Resulting in Manual Trip; dated April 21, 2008
- 08-23745; Evaluate Appendix J, Type C Acceptance Criteria; dated June 6, 2008
- 08-24046; TBCCW Shows Intermittent HOOS Dissolved Oxygen; dated June 19, 2008
- 08-25168; Biodiesel Detected in Fuel Oil; dated August 12, 2008
- 09-21519; Indications of an Air Leak into TBCCW at the East Station Air Compressor; dated March 11, 2009
- 09-22205; B2100-F010B Failed LLRT; dated April 3, 2009
- 09-22447; Torus Interior Degraded Coating Repairs; dated April 7, 2009
- 09-22973; Torus Coating Degraded on RHR Test Return Line; dated April 19, 2009
- 09-23021; Degraded Moisture Seal; dated April 20, 2009
- 09-23951; Review of Fermi 2 Sand Cushion Investigation History; dated May 18, 2009
- 09-25161; Increased Trend in Forward Pump Drain Total Iron; dated July 2, 2009
- 09-26161; Implementation of a Pre-Outage Assessment of the Refueling Bridge and Rx Building Overhead Crane Prior to Each Outage; dated August 11, 2009
- 09-27158; Repeated Wetting and Drying has Degraded the Torus's Protective Clothing; dated September 9, 2009
- 09-27996; Crane and Heavy Lift Inspection-NRC Operating Experience Smart Sample Program; dated October 13, 2009
- 09-28339; INPO/BWRVIP Review Visit/ Recommendation 1 (Inspection Quality); date November 27, 2009
- 10-20712; Potential Flow Accelerated Corrosion Found in Shell of MSRs; dated January 27, 2010
- 10-25539; Document Applicability of NRC Information Notice 2010-12, Containment Liner Corrosion to Fermi; dated July 1, 2010
- 10-27554; NRC Unresolved Item Regarding Reactor Building Crane, Support Structure and Superstructure; dated August 27, 2010
- 10-27652; Boral Coupon Test Results; dated August 31, 2010
- 10-29800; Degraded Torus Earthquake Tie Attached to Bay 9; dated October 30, 2010
- 10-30087; Loose Flaking / Coatings Inside Torus; dated November 4, 2010

- 10-30130; Spring Can E41-3172-G01 Found More Than 5% Out of Tolerance; dated April 7, 2011
- 10-30178; Indication Noted in Control Rod Guide Tube 06-35 (Weld CRGT-2); dated November 5, 2010
- 10-30281; Flow Accelerated Corrosion in MSR; dated September 27, 2010
- 10-30301; Degraded Gaskets on the North Drywell Equipment Hatch; dated November 8, 2010
- 10-31980; Chemistry Excursion Following CFD H Placed in Service; dated December 18, 2010
- 11-21607; Condenser Leak SW Hotwell Quad; dated February 11, 2011
- 11-30471; Document Applicability of NRC Information Notice 2011-15; dated November 23, 2011
- 12-22315;B2103F019 Exceeded The Maximum Allowable Leakage in its LLRT; dated March 27, 2012
- 12-22478; Missing Environmental Qualification Bases for Conduit Seals using EYS Fittings; dated March 30, 2012
- 12-23185; Conditions Identified During Torus Underwater Diving Inspections; dated April 13, 2012
- 12-23820; Feedwater Nozzle and Sparger Condition Monitoring; dated April 26, 2012
- 12-24714; Remove Grating at the Four Sand Cushion Drains for Accesses to Perform Inspections; dated May 25, 2012
- 13-20060; RVIM Self-Assessment Critical Attribute #6 Identified Program Implementation Deficiency. Inspections Performed on N9 Nozzle in RF15 Did Not Meet ASME Or BWRVIP Guidelines Established In BWRVIP-03; dated January 2, 2013
- 13-28631, NRC Identified Corrosion In EECW and RBCCW Systems During UHS Inspection, dated December 5, 2013
- 14-21411; B2100F076B As-Found Leakage Exceeds Procedure Limit; dated February 19, 2014
- 14-21973; Coating Damage Identified in the Channels of N3014B023 during the As-Left Inspection in RFO-16; dated March 4, 2014
- 14-28018; Self-Assessment Deficiency – Compliance with MLS04, R27, Steps 5.5.2 and 5.7.2; dated October 13, 2014
- 15-22263; Effluent at Cracks in Concrete Structures Needs to be Sampled & Tested for LR; dated March27, 2015

Drawings

- 6C721-40; Shore, Barrier, Plan and Sections; Rev. N

Miscellaneous

- BWRVIP-03; BWR Vessel and Internals Project; Rev. 3
- BWRVIP-94NP (1024452); BWR Vessel and Internals Project, Program Implementation Guide; Rev. 2
- CHS-AUX-03; Reactor Building Closed Cooling Water System; Rev. 13
- CHS-AUX-20; Emergency Diesel Jacket Closed Cooling Water; Rev. 1
- CHS-PRI-01; Condensate Chemistry Specifications; Rev. 22
- CHS-PRI-03; Feedwater Chemistry Specifications; Rev. 15
- CHS-PRI-06; Reactor Water Chemistry Specifications; Rev. 22
- CHS-PRI-07; Torus Chemistry Specifications; Rev. 7
- DAG 156; Product Data Sheet, Graphite Dry Lubricant for Nuclear Reactors

- Electric Power Research Institute EPRI TR-107514; Age Related Degradation Inspection Method and Demonstration; dated April 1998
- EPG-06; Engineering Program Guide Flow-Accelerated Corrosion (FAC); dated December 2006
- F2S82-5866; Letter Regarding Preservice Inspection of RPV Studs and Nuts; dated October 18, 1982
- Inspection Requirement Form, Rev. AK
- ISI-NDE-Program; Inservice Inspection-Nondestructive Examination (ISI-NDE) Procedure (Plan) for Fermi 2 Power Plant; Rev. 7
- LER 2007-001-00; Excessive Feedwater Check Valve Leakage ay Containment Penetration; dated October 7, 2007
- MQA11; Quality Assurance Conduct Manual; Rev. 35
- NET-300010-01; BADGER Test Campaign at Enrico Fermi Power Plant 2; Rev. 0
- NET-300023-01; Inspection and Testing of Boraflex Surveillance Coupons from the Fermi 2 Generating Station; Rev 0
- NET-300058-01; Inspection and Testing of Boral Surveillance Coupons from the Fermi 2 Generating Station; Rev. 0
- Oil Sample Data Sheet Chemistry Report 0795-14-G, Mobilgrease 28, dated October 6, 2014
- Oil Sample Data Sheet Chemistry Report 0796-14-G, Mobilgrease 28, dated October 6, 2014
- PEP22; 10CFR 50 Appendix J, Option B Program; Rev. 0
- Program Health Report – Inservice Inspection NDE Program; dated 3rd Quarter 2012
- Program Health Report - Inservice Inspection NDE Program; dated 4th Quarter 2012
- Program Health Report – Reactor Vessel Internals Management Program; dated 4th Quarter 2009
- Self-Assessment of the Inservice Inspection (ISI-NDE) and Containment Inspection (IWE) Programs for Pre-NRC Readiness; dated January 5, 2012
- SIL 409; In-Core Dry Tube and LRPM Cracks and Plunger Spring Can Setting; Rev. 4
- TMIS-08-0131; Self-Assessment of the Flow Accelerated Corrosion Program; dated December5, 2008
- NRC-03-0061; Inservice Inspection Summary Report; dated August 8, 2003
- DD-2011-01; Deviation Disposition for Variance from BWRVIP-25 Guidance on Performing Recommended Inspections on Core Plate Bolting; dated March 30, 2011
- NPRP-11-0016; Corrosion Rate Trending; dated January 10, 2011
- NPRP-11-0022; Corrosion Rate Trending; dated September 7, 2011
- NPRP-12-0057; Corrosion Rate Trending; dated May 2, 2012
- NPRP-13-0077; Corrosion Rate Trending; dated July 8, 2012
- PM Program 1st Quarter 2013 Health Report; dated May 8, 2013
- PM Program 2nd Quarter 2013 Health Report; dated July 19, 2013
- 4th Quarter Fire Protection Program System Health Report; dated February 12, 2015
- TMPE-08-0005; Results of Maintenance Rule Periodic Inspection of Existing Structures in Accordance with MMR14; dated January 9, 2008

Procedures

- 35.000.240; Bolting and Torquing; Rev. 41
- 35.129.002; Station Air Compressor- General Maintenance; Rev. 35
- 39.NDE.008; Ultrasonic Thickness Measurement; Rev. 23
- 39.NDE.014; Grid Marking of Components; Rev. 27
- 39.NDE.016; Chrome Testing; Rev. 0
- 43.000.004; Visual Examination of Component Supports; Rev. 32
- 43.000.016; Performance of ISI-NDE Inspections; Rev. 28

- 43.000.017; Reactor Pressure Vessel-Invessel Internals Inspection; Rev. 24
- 43.401.100; Integrated Leak Rate Test - Type A-General; Rev. 31
- 43.401.200; Integrated Leak Rate Test - Type B-General; Rev. 35
- 43.401.300; Integrated Leak Rate Test - Type C-General; Rev. 54
- 43.401.500; Local Leakage Rate Testing For Penetration X-7A, X-7B, X-7C, and X-7D; Rev. 38
- 57.000.19; Spent Fuel Storage Rack Management Guidelines; Revs. 5,6
- 74.000.19; Chemistry Routine Surveillances; Rev. 24
- 77.000.72; IAS and NIAS Sampling and Analysis; Rev. 7
- 77.000.81; Sampling EDG Fuel Oil Tanks; Rev. 1
- EN-FAP-LR-012; Operating Experience Review for License Renewal; Rev. 2
- MCE03; Chemistry Sampling and Analysis; Rev. 13
- MES23; Engineering Support Conduct Manual, Inservice Inspection and Testing; Revs. 18-19
- MES24; Engineering Support Conduct Manual, Nondestructive Examination; Rev. 8
- MES25; Engineering Support Conduct Manual, Visual Examination; Rev. 7
- MES26; Flow Accelerated Corrosion Prediction, Detection, and Correction; Rev. 15
- MES28; Leakage Reduction And Primary Containment Leakage Rate Programs; Rev. 19
- MES30; Repair and Replacement Programs; Rev. 10
- MES33; Conduct of the Environmental Qualification Program; Rev. 9
- MES47; Reactor Vessel Internals Management (RVIM) Program; Rev. 8
- MES51; Preventive Maintenance Program; Rev. 15
- MES60; Electrical Cable Monitoring Program; Rev. 5
- MGA07; Records Management; Rev. 19
- MQA13; QA Conduct Manual, Trending; Rev. 9
- MQA13; Trending; Rev. 10
- NE-1.16.9-EQE; Environmental Qualification Program Manual; Rev. 5
- PEP06; Section XI Inservice Inspection Program, Revs. 2-3
- PEP16; Appendix A-Feedwater Sparger; Rev 7
- PEP16; Appendix IX-Incore Housing/Guide Tube and Dry Tube; Rev. 10
- PEP16; Appendix VII-Core Plate delta P and SLC Lines; Rev. 7
- PEP16; Appendix VIII-Control Rod Internal Housing; Rev. 7
- PEP16; Appendix X-Instrument Penetration; Rev. 7
- PEP16; Reactor Vessel Internals Management Program; Rev. 7
- PEP19; Flow Accelerated Corrosion Program Notebook; Rev. 2
- Self- Assessment of Reactor Vessel Internals Management Program; dated October 22, 2008

Surveillances

- 1301796; UT Examination of RPV Studs #48, #49, #50, #51, dated November 11, 2001
- 14-010; Fermi 2 RPV Internal Examination, EVT-1 Core Spray Piping Az. 1200 and 2400 (Div. 2), dated March 10, 2014
- 14-024; System Leakage Test Sub-package L-Reactor Pressure Vessel System Leakage Test Examination of Components; dated March 21, 20014
- MT-026; MT Examination Report Sheet, RPV Studs #48, #49, #50, #51; dated November 10, 2001
- MT-S14-009; MT of N30-3258-Main Steam Circ Weld; dated February 18, 2014
- RFO13-44; Ultrasonic Examination-Nozzle to Safe End; dated April 7, 2009
- UT-F10-001; UT of Closure Head Studs; dated October 29, 2010
- UT-F10-006; UT of Threads in Flange Stud Holes; dated October 29, 2010
- UT-S12-029; N21-2336-Feedwater Loop B Circ Weld (CS); dated April 6, 2012
- UT-S12-031; N4E Nozzle Inside Radius Section; dated April 7, 2012

- UT-S12-032; N4E Nozzle Inner Bore Region; dated April 7, 2012
- UT-S12-033; N4F Nozzle Inside Radius Section; dated April 7, 2012
- UT-S12-034; N4F Nozzle Inner Bore Region; dated April 7, 2012
- UT-S12-036; (N4E) F.W. Nozzle-to-Vessel Weld; dated April 7, 2012
- UT-S12-039; N-9 CRD Ref. Nozzle-to-Vessel Weld; dated April 10, 2012
- UT-S12-047; CRD Return Nozzle-to-Safe End Butt Weld (DM); dated April 10, 2012
- UT-S14-017; UT of G33-3096-RWCU Circ Weld; dated February 21, 2014
- UT-S14-019; UT of N30-3258-Main Steam Circ Weld; dated February 17, 2014
- VT-S12-004; VT-3 of Spring Can; dated March 27, 2012
- VT-S12-009; VT-3 of Pump Base Anchor; dated March 27, 2012
- VT-S12-015; VT-3 of 4" Wall Penetration X-10 RCIC; dated April 3, 2012
- VT-S14-017; VT-3 of RB Spring Can Hanger; dated February 15, 2014

Work Orders and Work Requests

- Chemistry Work Order 38570721, Sample and Analysis of Newly Received Grease, dated October 14, 2014
- PM E517, Perform External CTG Fuel Oil Tank Inspection Template
- PM EL96, Perform Building Lightning Protection Inspection Template
- WO 000Z053016; Replace the Remaining Section of Nozzle Piping; dated March 31, 2006
- WO 1138030328; Perform 43.401.100 Type A PCILRT; dated November 10, 2007
- WO 25883684; Maintenance Rule Structural Walkdown Finding; dated November 29, 2007
- WO 26166643; Support W-R30-N5177-G14 Has One Anchor Nut Missing; dated December 11, 2007
- WO 28049354; Perform 43.000.004 VT of Div. 1 Component Anchors; dated March 28, 2009
- WO 29550151; Replace East Station Air Compressor Aftercooler; dated June 11, 2009
- WO 30927432; RPV Bolting Inspection; dated October 28, 2010
- WO 30959367; Repair/Replace Spool MK-R30-N-2182-7; dated October 15, 2010
- WO 30959367; Repair/Replace Spool MK-R30-N-2182-7; dated November 27, 2010
- WO 31185864; Replace Center Station Air Compressor Aftercooler; dated May 11, 2011
- WO 34357899; Disassemble and Inspect-Replace Valve Disc Soft Seat; dated April 22, 2012
- WO 34393684; Perform 43.000.005 Visual Exam (VT-2) During RX Vessel System Leakage Test; dated March 21, 2014
- WO 34542841; Remove Grating at the Four Sand Cushion Drains For Accesses to Perform Inspections; dated December 24, 2013
- WO 37205249; Perform Leakage Inspection of Drywell Sand Cushion Drain Lines; dated February 24, 2015
- WR 000Z000736; Drain, Clean, Flush and Repair Associated Lines or Valves; dated April 26, 2000

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AMP	Aging Management Program
ANS	American Nuclear Society
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
BWR	Boiling Water Reactor
CARD	Corrective Action Resolution Document
CASS	Cast Austenitic Stainless Steel
CFR	*Code of Federal Regulations*
CST	Condensate Storage Tank
CRD	Control Rod Drive
CTG	Combustion Turbine Generator
CUF	Cumulative Usage Factor
EPRI	Electric Power Research Institute
EQ	Environmental Qualification
FAC	Flow Accelerated Corrosion
GALL	Generic Aging Lessons Learned
GE	General Electric Company
GL	Generic Letter
GSW	General Service Water
HELB	High-Energy Line Break
ID	Inside Diameter
IGSCC	Intergranular Stress Corrosion Cracking
ISG	Interim Staff Guidance
ISI	Inservice Inspection
LR	License Renewal
LRA	License Renewal Application
MEB	Metal Enclosed Bus
NDE	Non-Destructive Examination
NPS1	Nominal Pipe Size Diameter Greater Than or Equal to One Inch
NPS4	Nominal Pipe Size Diameter Less Than Four Inches
NRC	U.S. Nuclear Regulatory Commission
PM	Periodic Maintenance
PSPM	Periodic Surveillance and Preventive Maintenance
RAI	Request for Additional Information
RG	Regulatory Guide
RHR	Residual Heat Removal
SCC	Stress Corrosion Cracking
SSC	System, Structure, and Component
SWIP	Service Water Integrity Program
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing (Inspections)
VT	Visual Testing (Inspections)
ksi	Kilo-pounds Per Square Inch (1000 Pounds Per Square Inch)
kV	Kilo-volt (1000 Volts)

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Sincerely,

/RA/

Christine A. Lipa, Chief
Engineering Branch 2
Division of Reactor Safety

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