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10 CFR 50.55a

May 27, 2021
NRC-21-0007

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

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

Subject: Response to Request for Additional Information Regarding Revised Relief Request RR-A39 for the Fourth Ten-Year Inservice Inspection Interval

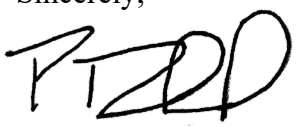
References:
1) DTE Letter NRC-20-0054, "Submittal of Revised Relief Request RR-A39 for the Fourth Ten-year Interval," dated December 30, 2020 (ML20365A043)
2) NRC E-mail Capture, "Fermi 2 - Request for Additional Information for Revised Relief Request RR A-39 (EPID L-2020-LLR-0161)," dated May 4, 2021 (ML21126A053)
3) Notice of Meeting between the NRC staff and the Electric Power Research Institute, dated April 20, 2021 (ML21111A087)

In Reference 1, DTE submitted a revision to NRC-approved relief request RR-A39 regarding the use of Boiling Water Reactor Vessel Internals Project guidelines in lieu of ASME Code requirements. In the Reference 2 email from Mr. Surinder Arora to Ms. Margaret Offerle dated May 4, 2021, the NRC sent DTE a Request for Additional Information (RAI) regarding the revised relief request. The response to the first question, RAI-1, is enclosed. The response to the second question, RAI-2, will be provided by separate letter by July 2, 2021 to allow for the response to incorporate relevant information from the upcoming May 27, 2021 meeting identified in Reference 3.

No new commitments are being made in this submittal.

Should you have any questions or require additional information, please contact Ms. Margaret M. Offerle, Manager – Nuclear Licensing, at (734) 586-5076.

Sincerely,



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Enclosure: 1) Response to Request for Additional Information

cc: NRC Project Manager
NRC Resident Office
Regional Administrator, Region III

Enclosure 1 to
NRC-21-0007

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

Response to Request for Additional Information

Response to Request for Additional Information

By letter dated December 30, 2020 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML20365A043), DTE Electric Company (DTE or the licensee) submitted revised relief request RR-A39 for the Fourth Ten-Year Inservice Inspection Interval at the Enrico Fermi Nuclear Generating Station, Unit 2 (Fermi 2). DTE requested authorization to utilize BWRVIP Guidelines in lieu of the applicable Section XI requirements for Examination Categories B-N-1 and B-N-2. The revised submittal proposes the use of BWRVIP-25-R1-A, BWRVIP-41-R4-A, and BWRVIP-48-R1 in lieu of the previous revisions of these documents as approved in the original submittal per letter dated July 20, 2019.

Regulatory Basis

Pursuant to Title 10 of the Code of Federal Regulations (10 CFR), Part 50, Paragraph 50.55a(z)(1), the licensee proposed to utilize BWRVIP Guidelines in lieu of the applicable Section XI requirements for Examination Categories B-N-1 and B-N-2. 10 CFR 50.55a(z)(1) requires the licensee to demonstrate that the proposed alternative provides an acceptable level of quality and safety.

The NRC staff needs to issue requests for additional information (RAIs) to complete its review of the licensee's proposed alternative.

Requests for Additional Information

RAI-1

Issue

The NRC staff's safety evaluation for BWRVIP-41, Revision 4A, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," establishes Condition #2 requiring licensees to comply with the requirements of an NRC-approved Hydrogen Water Chemistry program (e.g., BWRVIP-62-A).

The BWR fleet implements chemical mitigation as a technique to minimize applicable SCC growth rates in RCS systems. There are three mitigation methods used that include:

1. *Hydrogen Water chemistry (HWC);*
2. *Noble Metal Chemical Addition (NMCA);*
3. *On-line Noble Chemical Addition (ONLC)*

If a licensee opts to implement ONLC, inspection credits can be taken if the licensee conforms to the staff's criteria addressed in Section 4.0 of the supplemental final SE of BWRVIP-62A, "BWR Vessel and Internals Project, Technical Basis for Inspection Relief for BWR Internal Components with Hydrogen Injection," (ADAMS Accession No. ML18142A019).

Request

Identify which type of chemical mitigation method is used at Fermi 2 and provide a comprehensive description of how this methodology is implemented. As part of the description, include a discussion of how the program complies with the conditions issued as part of the NRC staff's safety evaluation and supplemental final safety evaluation for BWRVIP-62-A.

DTE RESPONSE

Fermi 2 has employed an Online NobleChem™ (OLNC) Chemistry Injection System for mitigating intergranular stress corrosion cracking (IGSCC) in BWR Internals since March 2011. A solution of sodium hexahydroxyplatinate ($Na_2Pt(OH)_6$) is injected into the A & B feedwater lines, transporting platinum throughout the reactor vessel and associated internal components. The platinum plates out on reactor vessel internal surfaces and catalyzes the recombination of hydrogen and oxygen to form water. Less hydrogen injection is required in comparison with moderate Hydrogen Water Chemistry (mHWC), though hydrogen injection remains necessary. Reapplication occurs every 9 to 16 months. General Electric-Hitachi (GEH) recommendations to avoid OLNC injections 60 days following a refueling outage, or in the 6 months prior to a refueling outage, are currently implemented at Fermi 2.

To credit effective OLNC for inspection relief of vessel internal components, the requirements for a Category 3a Noble Metal Chemical Addition (NMCA) Plant must be met in accordance with the NRC safety evaluation (SE) for BWRVIP-62-A and the supplemental SE for BWRVIP-62-A (2018 Update), including the following conditions:

1) Primary Parameter: Measured Electrochemical Potential (ECP) less than or equal to -230 millivolts (mV)
2) Primary Parameter: Measured catalyst loading greater than or equal to a specific proprietary value
3) Secondary Parameter: Measured or calculated hydrogen-to-oxygen molar ratio greater than or equal to 3
4) Secondary Parameter: Hydrogen Water Chemistry (HWC) availability greater than or equal to a specific proprietary value

Fermi 2 plant-specific results for each of the four parameters above are provided in the following subsections to demonstrate that the requirements of BWRVIP-62-A are met.

1) Primary Parameter: Measured ECP less than or equal to -230 millivolts (mV)

The most current cycle-to-date ECP is shown below for the current operating cycle (Cycle 21):

Data date range: August 2020 – April 2021
Average ECP: -477 mV (Standard Hydrogen Electrode (SHE))
Minimum ECP: -487 mV (SHE)
Maximum ECP: -470 mV (SHE)

ECP data for Cycle 20 was very similar to, but slightly less than, the Cycle 21 cycle-to-date ECP data.

In the original NRC SE for BWRVIP-62-A, the NRC staff required that an ECP probe be installed in the lower head region in order to credit HWC in the lower head region. Fermi 2 currently does not have an ECP probe installed in the lower head region of the RPV nor credits HWC for relief in the lower head region. If HWC credit for the lower head region was desired in the future in accordance with BWRVIP-62-A (2018 Update), an ECP probe would have to be installed or relief would have to be requested in accordance with 10 CFR 50.55a(z).

2) Primary Parameter: Measured catalyst loading greater than or equal to a specific proprietary value

Fermi 2 has verified adequate vessel artifact catalyst loading for Category 3a NMCA Plants using noble metal samples gathered from fuel channel fasteners and the core shroud outer diameter. The latest samples from the core shroud indicated an average total noble metal catalyst loading of 0.59 $\mu g/cm^2$ for Cycle 19.

3) Secondary Parameter: Measured or calculated hydrogen-to-oxygen molar ratio greater than or equal to 3

Fermi 2 has a measured Molar Ratio of 110.6. Fermi 2 also calculates the value using BWRVIP-202, "BWR Vessel and Internals Application (BWRVIA) for Radiolysis and ECP Analysis Version 3.1." Three values are developed at the beginning of an operating cycle: BOC (beginning of cycle), MOC (middle of cycle), and EOC (end of cycle). The values selected are the downcomer S1 Carryunder region from the upper downcomer location which is considered the most conservative location by the BWRVIP. The three values are quantified as follows:

BOC Molar Ratio = 6.28
MOC Molar Ratio = 5.80
EOC Molar Ratio = 4.41

4) Secondary Parameter: Hydrogen Water Chemistry (HWC) availability greater than or equal to a specific proprietary value

The availability of HWC/HWC+OLNC during normal operation for the past five operating cycles is provided in Table 1 on the following page.

Cycle	Month/Day/Year to Month/Day/Year	Availability (%)
16	5/5/12 – 2/10/14	96.3
17	4/5/14 – 9/27/15	97.7
18	11/28/15 – 3/18/17	98.7
19	4/20/17 – 9/22/18	98.1
20	10/27/19 – 03/21/20	99.4
21	7/29/20 – 4/30/21 (cycle-to-date) 7/29/20 – 2/5/22 (EOC projection on 4/30/21)	97.5 98.6

Table 1. Fermi 2 HWC Availability History

As indicated above, the Fermi 2 values for all four parameters above support the applicability of BWRVIP-62-A. In addition to the four parameters discussed above, BWRVIP-62-A (2018 Update) also provides requirements for Category 3a NMCA Plants regarding: final feedwater (FFW) H_2 flow rate/concentration, reactor water oxygen concentration, the performance of a hydrogen benchmark test, and supplemental reactor water conductivity monitoring. All of these additional requirements are also met for Fermi 2.