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December 30, 2020 10 CFR 50.55a
NRC-20-0054

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: Submittal of Revised Relief Request RR-A39 for the Fourth Ten-Year Inservice Inspection Interval

References:
1) DTE Letter NRC-19-0016, "Submittal of the Inservice Inspection / Nondestructive Examination Program Relief Requests for the Fourth Ten-year Interval," dated February 28, 2019 (ML19059A327)
2) NRC Letter, "Fermi 2 - Proposed Alternative from the Requirements of the ASME BPV Code Regarding the Inservice Examination of Class 1 Components (EPID L-2019-LLR-0022)," dated July 20, 2019 (ML19204A253)

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (z)(1), DTE Electric Company (DTE) hereby requests NRC approval of a relief request for the fourth ten-year interval of the Inservice Inspection (ISI) / Nondestructive Examination (NDE) program at Fermi 2 which started on May 2, 2019 and is scheduled to end on May 1, 2029 unless the provisions of IWA-2430 are used to extend the interval.

In Reference 1, DTE submitted relief request RR-A39 regarding the use of Boiling Water Reactor Vessel Internals Project guidelines in lieu of ASME Code requirements. Relief request RR-A39 was approved by the NRC in Reference 2. The approved relief request currently refers to the use of BWRVIP-25, BWRVIP-41-R3, and BWRVIP-48-A. Newer revisions of these documents, specifically BWRVIP-25-R1-A, BWRVIP-41-R4-A, and BWRVIP-48-R1, have been issued. In the case of BWRVIP-25-R1-A and BWRVIP-41-R4-A, the newer revisions have been approved by the NRC. In the case of BWRVIP-48-R1, the newer revision has not been reviewed and approved by the NRC, but has been evaluated in accordance with NEI 03-08, "Guideline for the Management of Materials Issues," Revision 3, Appendix C, "Document Screening." Relief request RR-A39 is proposed to be revised to allow for use of BWRVIP-25-R1-A, BWRVIP-41-R4-A, and BWRVIP-48-R1 rather than the older revisions as previously

approved. No other changes to the previously approved relief request are being proposed. The revised relief request RR-A39 is enclosed.

No new commitments are being made in this submittal.

DTE requests approval within one year of the date of 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,

Peter Dietrich
Senior Vice President and Chief Nuclear Officer

Enclosure: Fermi 2 Revised Relief Request RR-A39: Use of Boiling Water Reactor Vessel Internals Project Guidelines in Lieu of ASME Code Requirements

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

Enclosure to
NRC-20-0054

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

Fermi 2 Revised Relief Request RR-A39: Use of Boiling Water Reactor Vessel Internals Project Guidelines in Lieu of ASME Code Requirements

Revised Relief Request RR-A39
Alternative in Accordance with 10 CFR 50.55a(z)(1) –
Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Components Affected

ASME Code Class:	Code Class 1
References:	ASME Code Section XI, 2013 Edition
Examination Category:	B-N-1 and B-N-2
Item Numbers:	B13.10, B13.20, B13.30 and B13.40
Description:	Use of Boiling Water Reactor Vessel Internals Project (BWRVIP) Guidelines in Lieu of ASME Code Requirements
Components:	Code Item Numbers: B13.10-Vessel interior (B-N-1), B13.20-Interior attachments, within beltline region (B-N-2), B13.30-Interior attachments beyond beltline Region (B-N-2) and B 13.40-Core support structure (B-N-2)

2. Applicable Code Edition and Addenda

ASME Code Section XI, 2013 Edition

3. Applicable Code Requirements

ASME Code Section XI requires the examination of components within the Reactor Pressure Vessel. These examinations are included in Table IWB-2500-1, Examination Categories B-N-1 and B-N-2 and identified with the following Item Numbers:

B 13.10 Examine accessible areas of the reactor vessel interior each inspection period (B-N-1) by the VT-3 method as defined in IWA-2213 of ASME Code Section XI.

B 13.20 Examine interior attachment welds within the beltline region each inspection interval (B-N-2) by the VT-1 method as defined in IWA-2211 of ASME Code Section XI.

B 13.30 Examine interior attachment welds beyond the beltline region each inspection interval (B-N-2) by the VT-3 method as defined in IWA-2213 ASME Code Section XI.

B 13.40 Examine surfaces of the welded core support structure each inspection interval (B-N-2) by the VT-3 method as defined in IWA-2213 of ASME Code Section XI.

These examinations are performed to assess the structural integrity of the reactor vessel interior, its welded attachments and the welded core support structure within the boiling water reactor pressure vessel.

The components/welds listed in Table 1, "Comparison of ASME Code Section XI Table IWB-2500-1 Examination Category B-N-1 and B-N-2 Requirements to BWRVIP Guidance Requirements," are subject to this request for alternative. Table 1 provides only an overview of the requirements. For more details, refer to ASME Section XI, Table IWB-2500-1 and the appropriate Boiling Water Reactor Vessel and Internals Project (BWRVIP) document.

4. Reason for Request

DTE Electric Company (DTE) is requesting NRC approval of this proposed alternative to the ASME Code Section XI requirements provided above for Fermi 2 on the basis that the use of the BWRVIP Guidelines discussed below will provide an acceptable level of quality and safety.

The BWRVIP Inspection and Evaluation (I&E) Guidelines have recommended aggressive specific inspections by BWR operators to completely identify material condition issues with BWR components. A wealth of inspection data has been gathered during these inspections across the BWR industry. The BWRVIP I&E Guidelines focus on specific and susceptible components, specify appropriate inspection methods capable of identifying real anticipated degradation mechanisms, and require re-examination at conservative intervals. In contrast, the ASME Code Section XI inspection requirements were prepared before the BWRVIP initiative and have not evolved with BWR inspection experience. The scope of the BWRVIP guidelines meet or exceed that of ASME Section XI and in many instances include components that are not part of the ASME Section XI jurisdiction.

5. Proposed Alternative

Pursuant to 10 CFR 50.55a(z)(1), DTE requests authorization to utilize the alternative requirements of the BWRVIP Guidelines in lieu of the requirements of ASME Code Section XI, examination requirements for Examination Categories B-N-1 and B-N-2.

DTE will satisfy the Examination Category B-N-1 and B-N-2 requirements as described in Table 1 in accordance with BWRVIP Guideline requirements. The proposed alternative is detailed in Table 1, "Comparison of ASME Code Section XI Table IWB-2500-1 Examination Category B-N-1 and B-N-2 Requirements to BWRVIP Guidance Requirements," and shows a comparison between the existing ASME Code Section XI and BWRVIP requirements that will be used under this alternative. Specifically, DTE will satisfy the Examination Category B-N-1 and B-N-2 requirements at Fermi 2 as described in Table 1 in accordance with BWRVIP Guidelines in lieu of the associated ASME Code Section XI requirements, including examination method, examination volume, frequency, training, successive and additional examinations, flaw evaluations, and reporting.

Not all of the components addressed by the BWRVIP Guidelines are components that require ASME Code Section XI examinations, but the particular Guidelines that are applicable to ASME Code Section XI components are listed below along with the BWRVIP-94NP Administrative Guide that Fermi 2 will use to implement this alternative:

BWRVIP Guidelines Used for Section XI Code Examinations (Part of this Request)	
BWRVIP-03NP	"BWR Vessel and Internals Project, Reactor Pressure Vessel and Internal Examination Guidelines"
BWRVIP-06-R1-A	"BWR Vessel and Internals Project, Safety Assessment of BWR Internals"
BWRVIP-14-A	"BWR Vessel and Internals Project, BWR Evaluation of Crack Growth in BWR Stainless Steel RPV Internals"
BWRVIP-18-A-R2	"BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines," (Licensee Renewal (LR) Safety Evaluation Report (SER) updated to Revision 2 in the annual update of May 9, 2016)
BWRVIP-25-R1-A(1)	"BWR Core Plate Inspection and Flaw Evaluation Guidelines"
BWRVIP-26-A	"BWR Top Guide Inspection and Flaw Evaluation Guidelines"
BWRVIP-27-A	"BWR Standby Liquid Control System/Core Plate ΔP Inspection and Flaw Evaluation Guidelines"
BWRVIP-38	"BWR Shroud Support Inspection and Flaw Evaluation Guidelines"
BWRVIP-41-R4-A	"BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines"
BWRVIP-47-A	"BWR Lower Plenum Inspection and Flaw Evaluation Guidelines"
BWRVIP-48-R1(2)	"Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines"
BWRVIP-49-A	"Instrument Penetration Inspection and Flaw Evaluation Guidelines"
BWRVIP-74-A	"BWR Reactor Vessel Inspection and Flaw Evaluation Guidelines"
BWRVIP-76-R1-A(3)	"BWR Core Shroud Inspection and Flaw Evaluation Guidelines" (LR) SER updated to Revision 1-A in the annual update of May 9, 2016)
BWRVIP-94NP	"BWR Vessel and Internals Project "Program Implementation Guide"
BWRVIP-100-A(3)	"Updated Assessment of the Fracture Toughness of Irradiated Stainless Steel for BWR Core Shrouds"

Notes:

(1) Based on the renewed license for Fermi 2 *Enhancement 3* of LRA Section B.1.10 and SER Section 3.0.3.2.3, BWRVIP-25 shall be met by submittal of an analysis justifying the elimination of inspections for the core plate bolting or an analysis determining acceptance criteria for continued examination per BWRVIP-25. The analysis is to be submitted to the NRC no later than 2 years prior to the period of extended operation). The NRC-approved guidance in BWRVIP-25-R1-A will be considered when addressing this license renewal commitment.

(2) Currently, there are no existing BWRVIP Guidelines or ASME Code Section XI requirements regarding the feedwater spargers except for BWRVIP-48 which governs inspection of reactor vessel internal attachment welds, namely the feedwater sparger brackets. Fermi 2 will continue to use inspections modeled after the guidance of NUREG-0619 on the feedwater spargers outside of this request.

(3) If flaw evaluations are required for BWRVIP-76-R1-A examinations, the fracture toughness values of BWRVIP-100NP-A will be utilized.

Table 1 compares current ASME Code Section XI, Table IWB-2500-1, Examination Category B-N-1 and B-N-2 requirements with the above current BWRVIP Guideline requirements, for BWR/4s as applicable, to Fermi 2.

In addition to the items in Table 1, a detailed Table 2, "Vessel Attachment Welds – Fabricated either from E-308/E-309 (Furnace Sensitized) Austenitic Stainless Steel or Inconel 182 Material," is included in this request. Table 2 lists inspection results for specific vessel attachment welds, fabricated with these materials, that have an increased concern for cracking. These welds have been examined under the inspection strategy found in Section 3 of BWRVIP-48-A and BWRVIP-38.

When a BWRVIP Guideline refers to ASME Section XI, the technical requirements of ASME Section XI as described by the BWRVIP Guideline will be met, but the examination is under the auspices of the BWRVIP Program as defined by BWRVIP-94NP, "BWRVIP Vessel and Internals Project Program Implementation Guide." When implementing the guidance of BWRVIP-94, Fermi 2 will meet the following:

> "When BWRVIP Guidelines are approved by the Executive Committee and are initially distributed, or subsequently revised, each utility shall modify their vessel and internals program documentation to reflect the new requirements and shall implement the guidance within two refueling outages, unless a different schedule is identified by the BWRVIP at the time of document distribution. Implementation is to be based on the date of the distribution/notification letter to the members. Implementation means not only incorporating the requirements into the utility program, but also performing the initial or baseline inspection and evaluation requirements.
>
> However, if new guidance approved by the Executive Committee includes revisions to NRC approved guidance that are less conservative than those approved by the NRC, this less conservative guidance shall be implemented only after NRC approves the change. 'NRC approved' generally means the document was submitted to the NRC for review and approval and a final Safety Evaluation (SE) has been issued and is to be incorporated into a publication of a '-A' document or equivalent."

Therefore, where the revised version of a BWRVIP Inspection Guideline continues to also meet the requirements of the version of the BWRVIP Inspection Guideline that forms the safety basis for the NRC authorized proposed alternative to the requirements of 10 CFR 50.55a, it may be implemented. Otherwise, the revised Guidelines will only be implemented

after NRC approval of the revised BWRVIP Guidelines or a plant-specific request for an alternative has been approved. Attachment 1, "Comparison of Code Examination Requirements to BWRVIP Examination Requirements," represents the most current comparison at the time of this request.

Any deviations from the referenced BWRVIP Guidelines for the duration of the proposed alternative will be appropriately documented and communicated to the NRC, per the BWRVIP Deviation Disposition Process. Currently, DTE has an active deviation for the core plate bolting under BWRVIP-25. This deviation was resubmitted to the BWRVIP and the NRC (Reference 1) specifically to extend its interval of applicability until 1) the revised BWRVIP-25 is approved by the NRC or 2) some other NRC approved solution is implemented. The NRC-approved guidance in BWRVIP-25-R1-A will be considered during future resolution of this Deviation.

Inspection services, by an Authorized Inspection Agency, will be applied to the proposed alternative actions of this alternative request.

In the event that conditions are identified that require repair/replacement activities and the component is within the jurisdiction of ASME Code Section XI (welded attachments to the RPV or Core Support Structure), the repair/replacement activities will be performed in accordance with ASME Code Section XI, Article IWA-4000. Subsequent examinations will be in accordance with the applicable BWRVIP Guideline.

As part of the BWRVIP initiative, the BWR reactor internals and attachments were subjected to a safety assessment to identify those components that provide a safety function and to determine if long-term actions were necessary to ensure continued safe operation. The safety functions considered are those associated with (1) maintaining a coolable geometry, (2) maintaining control rod insertion times, (3) maintaining reactivity control, (4) assuring core cooling, and (5) assuring instrumentation availability. The results of the safety assessment are documents in BWRVIP-06-R1-A, "BWR Vessel and Internals Project, Safety Assessment of BWR Internals," which has been approved by the NRC. As a result of BWRVIP-06-R1-A, component specific BWRVIP guidelines were developed providing appropriate examination and evaluation requirements to address the specific component safety function and potential degradation mechanism.

6. Basis for Use

The BWRVIP Guidelines to be used at Fermi 2 that are listed in this request for ASME Code Section XI components have been designated for use in accordance with the LR SER, (Reference 2). Revisions to the listed BWRVIP Guidelines will be implemented as applicable in accordance with the latest revision of BWRVIP-94NP.

BWRs now examine reactor internals in accordance with BWRVIP Guidelines. These Guidelines have been written to address the safety significant vessel internal components and to examine and evaluate the examination results for these components using appropriate

methods and reexamination frequencies. The BWRVIP has established a reporting protocol for examination results and deviations. The NRC has agreed with the BWRVIP approach in principal and has issued SERs for many of these Guidelines (References 3 through 18).

As additional justification, Attachment 1, "Comparison of ASME Code Section XI Examination Requirements to BWRVIP Examination Requirements," provides specific examples that compare the inspection requirements of ASME Code Section XI Item Numbers B13.10, B13.20, B13.30, and B13.40 in Table IWB-2500-1, to the inspection requirements in the BWRVIP documents. Specific BWRVIP documents are provided as examples. This comparison also includes a discussion of the inspection methods and where they are applied. Results of specific BWRVIP examinations are provided in Attachment 2, "Fermi 2 – Reactor Internals Inspection History through RF19," and the respective outage dates and durations are provided in Attachment 3, "Past Refuel Outage Dates." Attachment 3 has been updated to reflect the recently completed refueling outage (RF20). However, results from RF20 inspections have not been added to Attachment 2 because the BWRVIP has changed the submittal requirements for outage summary data. Attachment 2 is no longer updated each outage. The BWRVIP will continue to report inspection results to the NRC outside this request. Attachment 2 is retained in this relief request for historical purposes.

In this revision to the relief request, DTE is proposing to utilize BWRVIP-25-R1-A, BWRVIP-41-R4-A, and BWRVIP-48-R1 rather than BWRVIP-25, BWRVIP-41-R3, and BWRVIP-48-A, respectively. In the case of BWRVIP-25-R1-A and BWRVIP-41-R4-A, the newer revisions have been explicitly reviewed and approved by the NRC (References 7 and 11, respectively).

In the case of BWRVIP-48-R1, the newer revision (Reference 19) has not been reviewed and approved by the NRC, but has been evaluated in accordance with NEI 03-08, "Guideline for the Management of Materials Issues," Revision 3, Appendix C, "Document Screening." Although a complete version of BWRVIP-48-R1 (Reference 19) has not been submitted to the NRC, relevant portions of BWRVIP-48-R1 have been submitted to the NRC to support its use in similar relief requests at other plants (Reference 20). The technical changes to BWRVIP-48, Revision 1 are listed in Table F-1, "Revision Details BWRVIP-48, Revision 1," of that document. The principal change in BWRVIP-48, Revision 1 is the update to the periodic inspection strategy of the Core Spray Piping bracket attachment in Table 3-2, "Bracket Attachment Inspection Recommendations." The revision changes the inspection interval from 100% every four refueling cycles to 100% every 10 years. The technical justification for changing the inspection interval is documented in BWRVIP-48, Revision 1, Appendix E, Section E.4, "Qualitative Risk Assessment for Extension of the Core Spray Piping Bracket Attachment Weld Examination Interval in Rev. 1 to BWRVIP-48." Table F-1 and Section E.4 of BWRVIP-48-R1 were provided to the NRC in Attachments 1 and 2, respectively, of Reference 20. Note that in the original submittal for this relief request (Reference 21), DTE did request to utilize BWRVIP-48-R1. In a response to a request for additional information (RAI) from the NRC (Reference 22), DTE discussed the differences between the two versions similar to above, but elected to change the request to only discuss BWRVIP-48-A since BWRVIP-48-R1 was not available to the NRC at the

time. Now that the relevant portions of BWRVIP-48-R1 have been made available to the NRC via Reference 20, DTE has elected to request to utilize BWRVIP-48-R1.

Therefore, based on the Safety Evaluations of many of the BWRVIP Guidelines and the comparisons performed demonstrating the use of these Guidelines above, DTE concludes that this alternative request to the ASME Code Section XI requirements will avoid unnecessary inspections, while in some cases conserving radiological dose, because the inspections will then be focused on the most recent BWR experience available. Thus, this request, when authorized, will provide an acceptable level of quality and safety and will not adversely impact the health and safety of the public.

7. Duration of Proposed Alternative

Upon authorization by the NRC, this request for an alternative to use the BWRVIP Guidelines in lieu of ASME Code Section XI requirements will be implemented during the Fourth Ten-Year ISI Interval beginning on May 2, 2019 and ending on May 1, 2029 unless the provisions of IWA-2430 are used to extend the interval (which will include a portion of the period of extended operation beginning March 21, 2025).

8. Precedent

The NRC has previously authorized this request for Fermi 2 for the Fourth Ten-Year ISI Interval (References 21-23):

- NRC Letter to DTE, "FERMI 2 - PROPOSED ALTERNATIVE FROM THE REQUIREMENTS OF THE ASME BPV CODE REGARDING THE INSERVICE EXAMINATION OF CLASS 1 COMPONENTS (EPID L-2019-LLR-0022)," dated July 20, 2019 (ADAMS Accession No. ML19204A253).

The only proposed technical changes in this revised relief request relative to that previously approved above are the use of BWRVIP-25-R1-A, BWRVIP-41-R4-A, and BWRVIP-48-R1 rather than BWRVIP-25, BWRVIP-41-R3, and BWRVIP-48-A, respectively. In addition, a few minor editorial changes/corrections have been made and Attachment 3 has also been updated to include the dates associated with RF20 for information only. Revisions from the original request (References 21 and 22) are indicated with revision bars in the margin.

9. References

1. DTE Electric Company Letter, NRC-15-0104, "Notification of Revision to BWRVIP Core Plate Deviation Disposition," dated December 22, 2015 (ML15356A601)

2. Safety Evaluation Report Related to the License Renewal of Fermi 2, Docket No. 50-341, DTE Electric Company, dated July 2016, (ADAMS Accession No. ML16190A241)

3. Letter BWRVIP to USNRC, dated February 8, 2017, (BWRVIP-03NP, Revision 19), "BWR Vessel and Internals Project, Reactor Pressure Vessel and Internals Examination Guidelines," EPRI Technical Report 3002008095. Provided to USNRC for INFORMATION ONLY as this report is updated periodically, (ADAMS Accession No. ML17054C666)

4. U.S. Nuclear Regulatory Commission Approval Letter for Technical Report BWRVIP-06, Revision 1-A, "BWR (Boiling Water Reactor) Vessels and Internals Project, Safety Assessment of BWR Reactor Internals," Electric Power Research Institute Technical Report 1019058 (TAC NO. ME4044)

5. Letter BWRVIP to USNRC, dated January 31, 2009, Final Report, (BWRVIP-14NP-A), "BWR Vessel and Internals Project, Evaluation of Crack Growth in BWR Stainless Steel RPV Internals," (ADAMS Accession No. ML101880724) and Re-transmitted to USNRC on May 12, 2009, as BWRVIP-14-A, (ADAMS Accession No. ML091390008)

6. Letter USNRC to BWRVIP, dated February 22, 2016, Final Safety Evaluation for Electric Power Research Institute Boiling Water Reactor Vessel and Internals Project Technical Report 1016568, (BWRVIP-18-A-R2), "BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines," (TAC No. MF8809) and (ADAMS Accession No. ML16011A190)

7. Letter USNRC to BWRVIP, dated March 23, 2020, Final Proprietary Safety Evaluation for "BWRVIP-25, Revision 1: BWR Vessel and Internals Project, BWR Core Plate Inspection and Flaw Evaluation Guidelines," (ADAMS Accession Nos. ML19290G703 and ML19290G733)

8. Letter USNRC to BWRVIP, dated August 29, 2005, NRC Approval Letter of (BWRVIP-26-A), "BWR Vessel and Internals Project Boiling Water Reactor Top Guide Inspection and Flaw Evaluation Guidelines," (ADAMS Accession No. ML052490550)

9. Letter USNRC to BWRVIP, dated June 9, 2004, Non-Proprietary Version of NRC Staff Review of (BWRVIP-27-A), "BWR Standby Liquid Control System/Core Plate DP Inspection and Flaw Evaluation Guidelines," (ADAMS Accession No. ML041700446)

10. Letter USNRC to BWRVIP, dated July 24, 2000, Final Safety Evaluation of the "BWR Vessel and Internals Project, BWR Shroud Support Inspection and Flaw Evaluation Guidelines (BWRVIP-38), EPRI Report TR-108823 (TAC NO. M99638) and (ADAMS Accession No. ML003735498)

11. Letter USNRC to BWRVIP, dated June 26, 2018, Final Safety Evaluation for Electric Power Research Institute Topical Report BWRVIP-41, Revision 4, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," (CAC NO. MF4887; EPID L-2014-TOP-0008), (ADAMS Accession No. ML18130A023)

12. Letter USNRC to BWRVIP, dated September 1, 2005, NRC Approval Letter of (BWRVIP-47-A), "BWR Vessel and Internals Project Boiling Water Reactor Lower Plenum Inspection and Flaw Evaluation Guidelines," (ADAMS Accession No. ML052490537)

13. Letter USNRC to BWRVIP, dated July 25, 2005, NRC Approval Letter of (BWRVIP-48-A), "BWR Vessel and Internals Project Vessel ID Attachment Weld Inspection and Flaw Evaluation Guideline," (ADAMS Accession No. ML052130284)

14. Letter BWRVIP to USNRC, dated May 24, 2002, Notes the (-A) version of (BWRVIP-49-A), "BWR Vessel and Internals Project, Instrument Penetrations Inspection and Flaw Evaluation Guidelines," EPRI Technical Report 1006602 was submitted with this letter and contains the SER for this Guideline, (ADAMS Accession No. ML021510018)

15. Letter BWRVIP to USNRC, dated June 18, 2003, Notes the (-A) version of (BWRVIP-74-A), "BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines for License Renewal," EPRI Technical Report 1008872 was submitted with this letter and contains the SER for this Guideline, (ADAMS Accession No. ML031710343)

16. Letter USNRC to BWRVIP, dated December 28, 2015, Notes the (-A) version of (BWRVIP-76, Revision 1A), "BWR Vessel and Internals Project, BWR Core Shroud Inspection and Flaw Evaluation Guidelines," are approved in future licensing actions as specified in the final safety evaluation, (CAC No. ME8317), (ADAMS Accession No. ML15307A468)

17. Letter BWRVIP to USNRC, dated September 22, 2011, (BWRVIP-94NP, Revision 2), "BWR Vessel and Internals Project, Program Implementation Guide," EPRI Technical Report 1024452. Provided to USNRC for INFORMATION ONLY as this report is updated periodically, (ADAMS Accession No. ML11271A058)

18. Letter USNRC to BWRVIP, dated November 1, 2007, "NRC Approval Letter with Comment for BWRVIP-100-A, BWR Vessel and Internals Project, Updated Assessment

of the Fracture Toughness of Irradiated Stainless Steel for BWR Core Shrouds," (ADAMS Accession No. ML073050135)

19. BWRVIP-48, Revision 1, "BWR Vessel and Internals Project BWR Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines"

20. Letter Entergy to USNRC, dated November 9, 2020, "Response to Request for Additional Information Regarding Relief Requests GG-ISI-020 and RBS-ISI-019," CNRO-2020-00021, (ADAMS Accession Nos. ML20314A124 and ML20314A125)

21. Letter DTE to USNRC, dated February 28, 2019, "Submittal of the Inservice Inspection / Nondestructive Examination Program Relief Requests for the Fourth Ten-year Interval," NRC-19-0016, (ADAMS Accession No. ML19059A327)

22. Letter DTE to USNRC, dated June 11, 2019, "Response to Requests for Additional Information Regarding Relief Requests for the Inservice Inspection Program Fourth Ten-year Interval," NRC-19-0042, (ADAMS Accession No. ML19162A314)

23. Letter USNRC to DTE, dated July 20, 2019, "FERMI 2 - PROPOSED ALTERNATIVE FROM THE REQUIREMENTS OF THE ASME BPV CODE REGARDING THE INSERVICE EXAMINATION OF CLASS 1 COMPONENTS (EPID L-2019-LLR-0022)," (ADAMS Accession No. ML19204A253)

Revised Relief Request RR-A39
Alternative in Accordance with 10 CFR 50.55a(z)(1) –
Alternative Provides Acceptable Level of Quality and Safety

TABLE 1 – Comparison of ASME Code Section XI Table IWB-2500-1 Examination Category B-N-1 and B-N-2 Requirements to BWRVIP Guidance Requirements (1)

ASME Item No. Table IWB-2500-1	Component	ASME Exam Scope	ASME Exam Type	ASME Frequency	Applicable BWRVIP Document	BWRVIP Exam Scope	BWRVIP Exam Type	BWRVIP Frequency
B13.10	Reactor Vessel Interior	Areas of the RPV above and below the core made accessible during a normal refuel.	VT-3	Each Period	None	While there is not a specific BWRVIP Guideline that addresses the scope of B-N-1, the examinations performed by BWRVIP-18, 25, 26, 27, 41, 47, 138 provide a general overview of the reactor interior which may be considered representative of the B-N-1 scope.		
B13.20	Interior Attachments within Beltline - Riser Braces	Accessible Welds	VT-1	Each 10-year Interval	BWRVIP-48-R1, Table 3-2	Riser Brace Attachment	EVT-1	25% during each subsequent 6 years
	Lower Surveillance Specimen Holder Brackets				BWRVIP-48-R1, Table 3-2	Bracket Attachment	VT-1	Each 10-Year Interval
B13.30	Interior Attachments beyond Beltline - Steam Dryer Hold-down Brackets	Accessible Welds	VT-3	Each 10-year interval	BWRVIP-48-R1, Table 3-2	Bracket Attachment	VT-3	Each 10-Year Interval
	Guide Rod Brackets				BWRVIP-48-R1, Table 3-2	Bracket Attachment	VT-3	Each 10-Year Interval
	Steam Dryer Support Brackets				BWRVIP-48-R1, Table 3-2	Bracket Attachment	EVT-1	Each 10-Year Interval
	Feedwater Sparger Brackets				BWRVIP-48-R1, Table 3-2	Bracket Attachment	EVT-1	Each 10-Year Interval
	Core Spray Piping Brackets				BWRVIP-48-R1, Table 3-2 BWRVIP-18-A-R2, Table 3-1	Bracket Attachment	EVT-1	Each 10-Year Interval

Revised Relief Request RR-A39
Alternative in Accordance with 10 CFR 50.55a(z)(1) –
Alternative Provides Acceptable Level of Quality and Safety

ASME Item No. Table IWB-2500-1	Component	ASME Exam Scope	ASME Exam Type	ASME Frequency	Applicable BWRVIP Document	BWRVIP Exam Scope	BWRVIP Exam Type	BWRVIP Frequency
	Upper Surveillance Specimen Holder Brackets				BWRVIP-48-R1, Table 3-2	Bracket Attachment	VT-3	Each 10-Year Interval
	Shroud Support (Weld H9)				BWRVIP-38, 3.1.3.2, Figures 3-2 and 3-5	Weld H-9	EVT-1 or UT	Maximum of 6 years for EVT-1, Maximum of 10 years for UT
B13.40	Integrally Welded Core Support Structure	Accessible Surfaces	VT-3	Each 10-year interval	BWRVIP-38, 3.1.3.2, Figures 3-2 and 3-5	Shroud support welds H8 and H9 (2) including gussets	EVT-1 or UT	Based on as-found conditions, to a maximum 6 years for one side EVT-1, 10 years for UT where accessible
	Core Shroud Horizontal Welds				BWRVIP-76-R1-A, 2.2	Welds H1-H7 as applicable	UT or EVT-1	Based on as-found conditions, to a maximum of 10 years for UT when inspected from both sides of the welds
	Core Shroud Vertical Welds				BWRVIP-76-R1-A, 2.3	Vertical Welds as applicable	EVT-1 or UT	Maximum 10 years for UT based on inspection of horizontal welds
	Core Shroud Repairs (2)				BWRVIP-76-R1-A, 3.5	Tie-Rod Repair	VT-3	In accordance with designer recommendations per BWRVIP-76 R1

Notes:

(1) This table provides only an overview of the requirements. For more details, refer to ASME Code Section XI, Table IWB-2500-1 and the appropriate BWRVIP Document.

(2) No repairs have been performed on the core shroud.

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TABLE 2 – Vessel Attachment Welds – Fabricated Either from E-308/E-309 (Furnace Sensitized) Austenitic Stainless Steel or Inconel 182 Material

Vessel Attachment Welds (Weld No.'s)	Description	Weld Filler Material	Inspection Performed to date Code B-N-2 / BWRVIP-48-R1 and -38 (1)	Results (2)
5-327	Shroud Support to RPV	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI
6-327	Shroud Support Gussets to RPV	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI
2-323-A&B	Guide Rod Brackets to Inlays	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI
103-305-A thru D	Steam Dryer Support Lugs to Inlays	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI
104-305-A thru H	Core Spray Brackets to Inlays	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI
101-305-A thru C, 102-305-A thru C	Surveillance Specimen Brackets to Inlays	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI
105-305-A thru M	Feedwater Sparger Brackets to Inlays	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI
16-308-A thru V	Buildup for Jet Pump Riser Pads	Inconel 182	B-N-2 until RF14/BWRVIP since RF06	NRI

Notes:

(1) Since RF06 and until RF14, Fermi 2 implemented the requirements of ASME Section XI and the guidance of the BWRVIP. Since RF14, Fermi has implemented the BWRVIP as previously approved by the NRC via Relief Request RR-A39 for the Third Interval.

(2) "NRI" indicates No Relevant Indications were identified during examination.

ATTACHMENT 1

Comparison of Code Examination Requirements to BWRVIP Examination Requirements

The following discussion provides a comparison of the examination requirements provided in ASME Code Item Numbers B13.10, B13.20, B13.30, and B13.40 in Table IWB-2500-1, to the examination requirements in the BWRVIP Guidelines. Specific BWRVIP Guidelines are provided as examples for comparisons. This comparison also includes a discussion of the examination methods.

1. Code Requirement - B13.10 - Reactor Vessel Interior Accessible Areas (B-N-1)

   The ASME Code Section XI requires a VT-3 examination of reactor vessel accessible areas, which are defined as the spaces above and below the core made accessible during normal refueling outages. The frequency of these examinations is specified as the first refueling outage, at intervals of approximately 3 years during the first inspection interval, and each ASME inspection period during each successive 10-year Inspection Interval. Typically, these examinations are performed every other refueling outage of the Inspection Interval. This examination requirement is a non-specific requirement that is a departure from the traditional Section XI examinations of welds and surfaces. The purpose of the examination is to identify relevant conditions such as distortion or displacement of parts; loose, missing, or fractured fasteners; foreign material, corrosion, erosion, or accumulation of corrosion products; wear; and structural degradation.

   Portions of the various examinations required by the applicable BWRVIP Guidelines listed in this request require entry to accessible areas of the reactor vessel during each refueling outage. Examination of Core Spray Piping and Spargers (BWRVIP-18-A-R2), Top Guide (BWRVIP-26-A), Jet Pump Welds and Components (BWRVIP-41-R4-A), Interior Attachments (BWRVIP-48-R1), Core Shroud Welds (BWRVIP-76-R1-A), Shroud Support (BWRVIP-38) and Lower Plenum Components (BWRVIP-47-A) provides such access. Locating and examining specific welds and components within the reactor vessel areas above, below (if accessible), and surrounding the core (annulus area) entails access by remote camera systems that essentially performs equivalent VT-3 examination of these areas or spaces as the specific weld or component examinations are performed. This provides an equivalent method of visual examination on a more frequent basis than that required by the ASME Code Section XI. Evidence of wear, structural degradation, loose, missing, or displaced parts, foreign materials, and corrosion product buildup can be, and has been observed during the course of implementing these BWRVIP examination requirements. Therefore, the specified BWRVIP Guideline requirements meet or exceed the subject Code requirements for examination method and frequency of the interior of the reactor vessel. Accordingly, these BWRVIP examination requirements provide an acceptable level of quality and safety as compared to the subject Code requirements.

ATTACHMENT 1

2. Code Requirement - B 13.20 - Interior Attachments Within the Beltline (B-N-2)

The ASME Code Section XI requires a VT-1 examination of accessible reactor interior surface attachment welds within the beltline each 10-year interval. In the boiling water reactor, this includes the jet pump riser brace welds-to-vessel wall and the lower surveillance specimen support bracket welds-to-vessel wall. In comparison, the BWRVIP requires the same examination method and frequency for the lower surveillance specimen support bracket welds, and requires an Enhanced VT-1 (EVT-1) examination on the remaining attachment welds in the beltline region in the first 12 years, and then 25% during each subsequent 6 years.

The jet pump riser brace examination requirements are provided below to show a comparison between the Code and the BWRVIP examination requirements.

Comparison to BWRVIP Requirements - Jet Pump Riser Braces (BWRVIP-41-R4-A) and BWRVIP-48-R1)

- The ASME Code requires a 100% VT-1 examination of the jet pump riser brace-to reactor-vessel wall pad welds each 10-year interval

- The BWRVIP requires an EVT-1 examination of the jet pump riser brace-to-reactor vessel wall pad welds the first 12 years and then 25% during each subsequent 6 years (note that BWRVIP-41-R4-A has a relaxed requirement of 25% during each subsequent 12 years, but this frequency will not be implemented until it is also reflected in a subsequent revision of BWRVIP-48-R1).

- BWRVIP-48-R1 specifically defines the susceptible regions of the attachment that are to be examined

The ASME Code Section XI, VT-1 examination is conducted to detect discontinuities and imperfections on the surfaces of components, including such conditions as cracks, wear, corrosion, or erosion. The BWRVIP EVT-1 is conducted to detect discontinuities and imperfections on the surface of components and is additionally specified to detect potentially very tight cracks characteristic of fatigue and Inter-Granular Stress Corrosion Cracking (IGSCC), the relevant degradation mechanisms for these components. General wear, corrosion, or erosion although generally not a concern for inherently tough, corrosion resistant stainless steel material, would also be detected during the process of performing a BWRVIP EVT-1 examination.

The ASME Code Section XI, 2013 Edition, VT-1 visual examination method requires that a letter character with a height of 0.044 inches can be read. The BWRVIP EVT-1 visual

examination method requires the same 0.044-inch resolution on the examination surface and additionally the performance of a cleaning assessment and cleaning as necessary. While the jet pump riser brace configuration varies depending on the vessel manufacturer, BWRVIP-48-R1 includes diagrams for each configuration and prescribes examination for each configuration including Fermi 2 (Combustion Engineering).

The calibration standards used for BWRVIP EVT-1 exams utilize the same Code characters, thus assuring at least equivalent resolution compared to the Code. Although the BWRVIP examination may be less frequent, it is a more comprehensive method. Therefore, the enhanced flaw detection capability of an EVT-1, with a less frequent examination schedule provides an acceptable level of quality and safety to that provided by the ASME Code.

3. Code Requirement - B13.30 - Interior Attachment Beyond the Beltline Region (B-N-2)

The ASME Code Section XI requires a VT-3 examination of accessible reactor interior surface attachment welds beyond the beltline each 10-year interval. In the boiling water reactor, this includes the core spray piping primary and supplemental support bracket welds-to-vessel wall, the upper surveillance specimen support bracket welds-to-vessel wall, the feedwater sparger support bracket welds-to-reactor vessel wall, the steam dryer support and hold down bracket welds-to-reactor vessel wall, the guide rod support bracket weld-to-reactor vessel wall, the shroud support plate-to-vessel wall, and shroud support gussets. BWRVIP-48-R1 requires as a minimum the same VT-3 examination method as the Code for some of the interior attachment welds beyond the beltline region, and in some cases specifies an enhanced visual examination technique EVT-1 for these welds. For those interior attachment welds that have the same VT-3 method of examination, the same scope of examination (accessible welds), the same examination frequency (each 10-year interval) and ASME Code Section XI flaw evaluation criteria, the level of quality and safety provided by the BWRVIP requirements are equivalent to that provide by the ASME Code.

For the Core Spray support bracket attachment welds, the steam dryer support bracket attachment welds, the feedwater sparger support bracket attachment welds, and the shroud support plate-to-vessel welds, as applicable, the BWRVIP Guidelines require an EVT-1 examination at the same frequency as the Code, or at a more frequent rate. Therefore, the BWRVIP requirements provide the same level of quality and safety to that provided by the ASME Code.

The Core Spray piping bracket-to-vessel attachment weld is used as an example for comparison between the Code and BWRVIP examination requirements as discussed below.

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Comparison to BWRVIP Requirements - Core Spray Piping Bracket Welds (BWRVIP-48-R1 and BWRVIP-18-A-R2)

- The ASME Code examination requirement is a VT-3 examination of each weld every 10 years

- The BWRVIP examination requirement is an EVT-1 inspection of 100% of the primary and supplemental core spray piping bracket to vessel ID attachment welds and heat-affected zones on both the vessel and bracket sides of the welds every 10 years. The BWRVIP examination method EVT-1 has superior flaw detection and sizing capability, the examination frequency is greater than the Code requirements, and the same flaw evaluation criteria are used

- The ASME Code VT-3 examination is conducted to detect component structural integrity by ensuring the components general condition is acceptable. An enhanced EVT-1 is conducted to detect discontinuities and imperfections on the examination surfaces, including such conditions as tight cracks caused by IGSCC or fatigue, the relevant degradation mechanisms for BWR internal attachments

Therefore, with the EVT-1 examination method, the same examination scope (accessible welds), the same flaw evaluation criteria (Section XI), the level of quality and safety provided by the BWRVIP criteria is superior than that provided by the Code.

4. Code Requirement - B13.40 - Integrally Welded Core Support Structures (B-N-2)

The ASME Code Section XI requires a VT-3 examination of accessible surfaces of the welded core support structure each 10-year interval. In the boiling water reactor, the welded core support structure has primarily been considered the shroud support structure, including the shroud support plate (annulus floor) the shroud support ring, the shroud support welds, the shroud support gussets. In later designs, the shroud itself is considered part of the welded core support structure. Historically, this requirement has been interpreted and satisfied differently across the industry. The proposed alternate examination replaces this ASME requirement with specific BWRVIP Guidelines that examine susceptible locations for known relevant degradation mechanisms.

- The Code requires a VT-3 of accessible surfaces each 10-year interval

- The BWRVIP requires as a minimum the same examination method (VT-3) as the Code for integrally welded Core Support Structures, and for specific areas, requires either an enhanced visual examination technique (EVT-1) or volumetric examination (UT)

ATTACHMENT 1

BWRVIP recommended examinations of integrally welded core support structures are focused on the known susceptible areas of this structure, including the welds and associated weld heat affected zones. As a minimum, the same or superior visual examination technique is required for examination at the same frequency as the code examination requirements. In many locations, the BWRVIP Guidelines require a volumetric examination of the susceptible welds at a frequency identical to the Code requirement.

For other integrally welded core support structure components, the BWRVIP requires an EVT-1 or UT of core support structures. The core shroud is used as an example for comparison between the Code and BWRVIP examination requirements as shown below.

Comparison to BWRVIP Requirements - BWR Core Shroud Examination and Flaw Evaluation Guideline (BWRVIP-76)

- The ASME Code requires a VT-3 examination of accessible surfaces every 10 years

- The BWRVIP requires an EVT-1 examination from the inside and outside surface where accessible or ultrasonic examination of each core shroud circumferential weld that has not been structurally replaced with a shroud repair at a calculated "end of interval" (EOI) that will vary depending upon the amount of flaws present, but not to exceed ten years

The BWRVIP recommended examinations specify locations that are known to be vulnerable to BWR relevant degradation mechanisms rather than "all surfaces." The BWRVIP examination methods (EVT-1 or UT) are superior to the Code required VT-3 for flaw detection and characterization. The BWRVIP examination frequency is equivalent to or more frequent than the examination frequency required by the Code. The superior flaw detection and characterization capability, with an equivalent or more frequent examination frequency and the comparable flaw evaluation criteria, results in the BWRVIP criteria providing a level of quality and safety equivalent to or superior to that provided by the Code requirements.

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ATTACHMENT 2
Fermi 2 - Reactor Internals Inspection History through RF19

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
Core Shroud (BWRVIP-07/76)	RF04	VT-1 (1mil wire)	Inspected 100% ID welds H2, H3, and, H4; 100% OD welds H1-H7; accessible areas H8 & H9.
		VT-1/VT-3	The only indications identified were two <1" vertical in orientation above the H2 weld at azimuth 125 degrees. These were evaluated against established flaw screening criteria and found acceptable.
	RF05	EVT-1 (1/2mil wire)	Inspected approximately 60-70 degrees arc on the core shroud in area of previous indications. H2-H4 inspected on shroud ID, H1-H7 inspected on shroud OD. No new indications, no change observed in previous indications above H2 weld.
	RF06	UT	Performed focused phased array UT examination of the H3, H4, H5, and H7 welds utilizing GE's universal carousel. No indication of cracking was identified.
		EVT-1	A cursory exam was performed on H-3 weld to confirm UT results for information only. No new indications and no change was observed in the previous indication above H2 weld.
	RF07	EVT-1	Re-inspected the indication above the H2 weld on the inside of the shroud. No change in appearance. The control rod blade was withdrawn to perform the examination.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF08	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.
	RF09	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.
	RF10	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.
	RF11	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.
	RF12	UT	Performed phased array UT examination of the H3, H4, H5, and H7 welds from both sides utilizing AREVA's demonstrated technique. No indication of cracking was identified. Inspection coverage exceeded 60% for all welds with coverage spaced around the entire circumference.
	RF13	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.
	RF14 (10/10)	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.
	RF15 (04/12)	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF16 (2014)	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support.
	RF17 (2015)	N/A	No inspections performed.
	RF18 (2017)	UT	Performed phased array UT examination of the H3, H4, HS, H6 and H7 welds from both sides utilizing GEH's demonstrated technique. No indication of cracking was identified. Inspection coverage exceeded 85% for all welds with coverage spaced around the entire circumference. Off-axis UT examinations performed on a high fluence zone (-l.36E21 n·cm2, 57.67° to 80.35°) and low fluence zone (-2.33E20 n·cm2, 74.18° to 98.87°) near H4 with 5.2% (of207" diameter) coverages. The GEH technique had been demonstrated but not published in a BWRVIP document at the time of the exam. No relevant indications.
	RF19	N/A	No inspections performed
Shroud Support (BWRVIP-38/*104) Access Hole Cover (BWRVIP-180)	RF03	VT-3	Inspected shroud support gusset welds and H8/H9 in conjunction with jet pump inspections. No indications.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF04	VT-1/VT-3	Inspected areas in conjunction with jet pumps, included were gusset welds H8 and H9. H8 and H9 welds inspected at 0 and 180 degrees with 1 mil wire. No indications.
	RF05	EVT-1 (1/2mil wire)	Inspected sample area 60-70 degree arc plus 180 degrees location on H8, H9, and gussets. No indications.
	RF06	VT-3	Inspection performed in conjunction with jet pump inspections. Approximately 50% of the gussets and H8 and H9 welds were inspected. This was a best effort exam which ranged from MVT-1 to VT-3 depending on camera angle and lighting. No cleaning was performed. No indications identified.
	RF07	EVT-1	Inspection performed in conjunction with jet pump inspections. Remaining 50% of the gusset welds were inspected. This was a best effort exam which ranged from EVT-1 to VT-3 depending on camera angle and lighting. (Credited as an EVT-1 exam) No cleaning was performed or needed. No indications identified. The H8 and H9 welds were inspected in detail at 0 and 180 Deg. Azimuth to EVT-1 standards where there were no obstructions.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF08	EVT-1	The H8 and H9 welds were re-inspected to achieve required coverage. 22% of both welds were inspected and included the areas at 0 and 180 degrees as well as adjacent to Jet Pumps 2 and 3. Accessible areas on Gussets 1, 3, 11, 12, and 22 were inspected. No indications of cracking identified.
	RF09	EVT-1/ VT-1	The H8 and H9 welds were inspected adjacent to Jet Pumps 3 and 4 (Coverage obtained 1% and 8.3%). Accessible areas on Gussets 2 and 15 inspected (90% coverage on each obtained). Both access hole covers were inspected (VT-1). No indications identified.
	RF10	EVT-1/ VT-1	The H8 and H9 welds were inspected adjacent to Jet Pump 5(Coverage obtained 1% and 8.3%). Accessible areas on Gussets 7 and 8 inspected (70/90% coverage obtained @ VT-1 quality, EVT-1 not credited). No indications identified.
	RF11	EVT-1	The H8 and H9 welds were inspected at 0 and 180 degrees as well as several other locations. Coverage obtained was 24% for H8 and 30% for H9. Accessible areas on Gussets 5, 6, 7, 8, 9, 10, 18, and 21 were inspected with 50% to 80% coverage obtained @ EVT-1. No indications identified.
		UT	A portion of the H9 weld was examined from the vessel outside diameter using a manual technique as required by BWRVIP-104. Approximately 19.6% of weld was examined with no indications.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF12	EVT-1	Accessible areas on Gussets 4 and 13 were inspected with 55% to 80% coverage obtained using EVT-1. No indications identified. Both Access Hole covers were inspected per draft BWRVIP -180 requirements. Cracking identified on 0 degree cover. Reference OE 25794.
	RF13	EVT-1	Accessible areas on Gussets 5 and 6 were inspected with 75% coverage obtained using EVT-1. No indications identified. The 0 Degree Access Hole cover was re-inspected and no additional cracking was identified. No repair installed.
	RF14 (10/10)	EVT-1	Accessible areas on Gussets 1, 21, and 22 were inspected with 50% - 60% coverage obtained using EVT-1. No indications identified. All 3 welds on the 0 Degree Access Hole Cover were re-inspected and no additional cracking was identified. No repair installed.
	RF15 (04/12)	EVT-1	Accessible areas on Gussets 4, 5, 6, 13, 16, and 17 were inspected with 50% to 70% EVT-1 coverage obtained. No indications identified. The H8 and H9 welds were EVT-1 visually inspected from the annulus side with combined coverage at several locations of 15 .9% for the H8 weld and 20.5% for the H9 weld. No indications identified.

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Components in BWRVIP Scope	**Date or Frequency of Inspection**	**Inspection Method Used**	**Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections**
	RF16 (2014)	EVT-1	Accessible areas on Gussets 11 and 12, as well as the 180° Access Hole Cover were inspected with 90% coverage and no indications were identified. All 3 welds on the 0° Access Hole Cover were re-inspected. No additional cracking was identified and the component was evaluated to be acceptable without repair.
	RF17 (2015)	EVT-1	Accessible areas on Gussets 14, 15, and 18, were inspected with 35% to 65% coverage and no indications were identified.
	RF18 (2017)	EVT-1	Accessible areas on Gussets 7, 8, 9, and 10 were inspected with 3 0% to 60% coverage and no indications were identified. The 0° Access Hole Cover was inspected with 80% coverage with no changes in relevant indication status.
	RF19	EVT-1	Accessible areas on Gussets 2, 3, 19, and 20 were inspected with 30% to 60% coverage. NRI.
Core Spray Piping (BWRVIP-18/ 18-A)	Each outage RF01 thru RF04	VT-1 (1mil wire)	During RF01 two small arc strikes were identified on loop piping. These have been re-inspected each outage. No change in condition. Inspections performed per IEB 80-013 and SIL 289. No indication of cracking.
	RF05	EVT-1 (1/2mil wire)	All welds brushed prior to inspection using 1/2 mil wire. Remainder of loop piping inspected without brushing. No indication of cracking.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF06	EVT-1	Inspected all welds on both loops of core spray to EVT-1 standards as opposed to BWRVIP-18 requirements of MVT-1. Cleaning assessment was performed; cleaning was not necessary. No indication of cracking.
	RF07	EVT-1	Inspected all welds on both loops of core spray to EVT-1 standards. Cleaning assessment was performed; cleaning was not necessary. No indication of cracking.
	RF08	EVT-1	Inspected all welds on both loops of core spray to EVT-1 standards. Cleaning assessment was performed, cleaning was not necessary. No indication of cracking.
	RF09	EVT-1	Inspected all target welds on both loops of core spray and sample welds on Div 2 to EVT-1 standards. Cleaning assessment was performed, cleaning was not necessary. No indications of cracking.
	RF10	EVT-1	Inspected all target welds on both loops of core spray and rotating sample welds on Div 2 to EVT-1. Cleaning assessment was performed, cleaning was necessary for selected locations and welds were brushed. No indications of cracking. Inspection coverage reported separately but generally >80%.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF11	EVT-1	Inspected all target welds on both loops of core spray and rotating sample welds on Div 1 to EVT-1. Cleaning assessment was performed, cleaning was necessary for selected locations and welds were brushed. No indications of cracking. Inspection coverage reported separately but generally >80%.
	RF12	EVT-1	Inspected all target welds on both loops of core spray and rotating sample welds on Div 1 to EVT-1. Cleaning assessment was performed, cleaning was necessary for selected locations and welds were brushed. No indications of cracking. Inspection coverage reported separately but generally >55%.
	RF13	EVT-1	Inspected all target welds on both loops of core spray and rotating sample welds on Div 2 to EVT-1. Cleaning assessment was performed, cleaning was necessary for selected locations and welds were brushed. No indications of cracking. Inspection coverage reported separately but generally >55%.
	RF14 (10/10)	EVT-1	Inspected all target welds on both loops of core spray and rotating sample welds on Div 2 to EVT-1. Cleaning was performed for all locations and welds were hydrolazed or brushed. No indications of cracking. Inspection coverage reported separately but generally >60%.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF15 (4/12)	EVT-1	Inspected all target welds on both loops of core spray and rotating sample welds on Div 1 to EVT-1. Cleaning was performed for all locations and welds were brushed. No indications of cracking. Inspection coverage reported separately but generally >60%.
	RF16 (2014)	EVT-1	Inspected all target welds on both loops of core spray and a rotating sample welds on Div 1 with no indications of cracking observed. Brushing was performed on all locations. Inspection coverage is reported separately in Att. 2, but averaged 58%.
	RF17 (2015)	EVT-1	Inspected all target welds on both loops of core spray and a rotating sample welds on Div 2 with no indications of cracking observed. Brushing was performed on all locations. Inspection coverage is reported separately in Att. 2, but averaged 60%.
	RF18 (2017)	EVT-1	Inspected a sample of welds on both loops with no indications of cracking observed. Brushing was performed on all locations. Inspection coverage averaged 70%.
	RF19	EVT-1	Inspected a sample of welds on both loops with no indications of cracking observed. Brushing was performed on all locations. Inspection coverage averaged 50%.

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Components in BWRVIP Scope	**Date or Frequency of Inspection**	**Inspection Method Used**	**Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections**
Core Spray Sparger (BWRVIP-18/18-A)	Each outage RF01 to RF04	VT-1 (1mil wire)	During RF01 one arc strike identified on upper CS sparger. Re-inspections have not identified any changes. No indication of cracking.
	RF05	VT-1/ EVT-1 (1/2mil)	1/2 mil wire used for junction box remainder utilized l mil wire. No indication of cracking.
	RF06	EVT-1, MVT-1	Inspected per BWRVIP-18 using EVT-1 for sparger T-box and end caps and MVT-1 for remaining locations. No indications of cracking.
	RF07	EVT-1/ VT-1	Inspected per BWRVIP-18 using EVT-1 for sparger T-box welds, end cap welds, drain plug welds, and support brackets and welds, and VT-1 for flow nozzles and tack welds. No indications of cracking identified.
	RF08	EVT-1/ VT-1	Inspected per BWRVIP-18 using EVT-1 for SI, S2 and S4 welds. Selected S3a, S3b welds inspected using VT-I. Selected S3c welds as well as selected SB bracket welds were inspected using EVT-1 technique. A best effort exam was performed on all accessible areas. No indications of cracking identified.
	RF09	EVT-1/ VT-1	Inspected per BWRVIP-18 using EVT-1 for 50% of the Sl, S2 and S4 welds and VT-1 for 50% of the S3a, S3b and S3c welds on the same spargers. 9 SB bracket welds were inspected using EVT-1 technique. Coverage for specific welds will be reported separately. No indications of cracking were identified.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF10	EVT-1/ VT-1	Inspected per BWRVIP-18 using EVT-1 for 50% of the Sl, S2 and S4 welds and VT-1 for 50% of the S3a, S3b and S3c welds on the same spargers. 6 SB bracket welds were inspected using EVT-1 technique. Coverage for specific welds will be reported separately but was > 60% for welds and >85% for brackets. No indications of cracking were identified.
	RF11	EVT-1/ VT-1	Inspected per BWRVIP-18-A using EVT-1 for 50% of the Sl, S2 and S4 welds on the same spargers. 6 SB bracket welds were inspected using VT-1 technique. Coverage for specific welds will be reported separately but was> 50% for welds and >75% for brackets. No indications of cracking were identified.
	RF12	EVT-1/ VT-1	Inspected per BWRVIP-18-A using EVT-1 for 50% of the Sl, S2 and S4 welds on the same spargers. 6 SB bracket welds were inspected using EVT-1 technique. Coverage for specific welds will be reported separately but was > 40% for welds and >75% for brackets. No indications of cracking were identified.
	RF13	EVT-1/ VT-1	Inspected per BWRVIP-18-A using EVT-1 for 50% of the Sl, S2 and S4 welds on the same spargers. 6 SB bracket welds were inspected using EVT-1 technique. Coverage for specific welds will be reported separately but was> 50% for welds and >70% for brackets. No indications of cracking were identified.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF14 (10/10)	EVT-1/ VT-1	Inspected per BWRVIP-18-A using EVT-1 for 50% of the Sl, S2 and S4 welds on the C and D spargers. 6 SB bracket welds and S3 nozzle welds were inspected using VT-1 technique. Coverage for specific welds will be reported separately but was > 40% for welds and >60% for brackets. No indications of cracking were identified.
	RF15 (4/12)	EVT-1/ VT-1	Inspected per BWRVIP-18-A using EVT-1 for 50% of the Sl, S2 and S4 welds on the A and B spargers. 6 SB bracket welds inspected using VT-1 technique. Coverage for specific welds will be reported separately but was > 40% for welds and >60% for brackets. No indications of cracking were identified.
	RF16 (2014)	EVT-1/ VT-1	Inspected per BWRVIP-18-A using EVT-1 for 50% of the Sl, S2 and S4 welds on the A and B spargers. 6 SB bracket welds were inspected using VT-1. Coverage for specific welds is reported separately in Attachment 2 but was > 40% for most welds and> 60% for most brackets. No indication of cracking was identified.
	RF17 (2015)	EVT-1/ VT-1	Inspected 50% of the Sl, S2 and S4 welds on the A and B spargers using EVT-1 and 6 sparger bracket welds using VT-1. Coverage for specific welds is reported separately in Attachment 2 but averaged 46% for the welds and 50% for the brackets. No indication of cracking was identified.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF18 (2017)	VT-1	Inspected 3 sparger bracket welds using VT-1 with 50% coverage each. No indication of cracking was identified.
	RF19	EVT-1/VT-3	Inspected 50% of the S1, S2, S3, and S4 welds on the lower spargers only. EVT-1 coverage averaged 50%. NRI.
Top Guide (Rim, etc.) Beams (BWRVIP-26) (BWRVIP-183)	RF01 & RF02	VT-3	Inspected rim each outage. No indications.
	RF03	VT-1/VT-3	Inspected 6 locations (RICSIL 059) and rim area 0° - 180°. No indications.
	RF04	VT-1/VT-3	Inspected 6 locations (SIL 554) and rim area 0° - 360°. No indications.
	RF05	VT-1	Inspected 15 locations (SIL 554). No indications.
	RF06	VT-1	Inspected bottom edge of beams at 11 core locations per SIL 554. No indication of cracking.
	RF07	VT-1	Inspected bottom edge of beams at 8 core locations per SIL 554. No indication of cracking.
	RF08	VT-1	Inspected bottom edge of beams at 5 core locations per SIL 554. No indication of cracking.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF09	VT-1	Inspected bottom edge of beams at 6 core locations per SIL 554. No indication of cracking.
	RF10	VT-1/VT-3	Inspected bottom edge of beams at 2 core locations per (SIL 554) and rim area 0° - 90°. No indication of cracking.
	RF11	VT-1/VT-3	Inspected bottom edge of beams at 2 core locations per SIL 554. No indication of cracking. Inspected 90 degree segment of top guide rim (90° - 180°) and no indications were identified.
	RF12	VT-1/VT-3	Inspected intersection and bottom edge of beams at 5 core locations per SIL 554. No indication of cracking.
	RF13	EVT-1	Inspected intersection and bottom edge of beams at 5 core locations per BWRVIP-183 utilizing a new visual inspection tool and rim area 0° - 90°. No indication of cracking.
	RF14 (10/10)	VT-3	Inspected rim area 0° - 180° with no indications identified.
	RF15 (4/12)	EVT-1	Inspected intersection and bottom edge of beams at 5 core locations per BWRVIP-183 utilizing a new visual inspection tool. No indication of cracking. Fabrication related conditions identified on the bottom surface of the plate material at 3 cell locations. Inspected the rim area 180° - 360° with no indications.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF16 (2014)	N/A	No inspections performed in RF16.
	RF17 (2015)	EVT-1	Inspected intersection and bottom edge of beams at 9 core cell locations per BWRVIP-183 with no indication of cracking.
	RF18 (2017)	N/A	No inspections performed in RF18.
	RF19	EVT-1	No inspections performed in RF19.
Core Plate Rim Bolts, etc. (BWRVIP-25)	RF05	VT-1 (1mil wire)	Inspected 6 core plate bolts located between 100 and 160 degrees and adjacent area. No indications.
	RF06	VT-3	Inspected tops of approximately 20 bolts per SIL 588. No indications identified.
	RF07	VT-3	Inspected tops of approximately 20 bolts per SIL 588. No indications identified.
	RF08	VT-3	Inspected tops of approximately 20 core plate bolts (VT-3) per SIL 588. Did not meet BWRVIP requirements. No indications identified.
	RF09	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2003-117 and TJ-2003-01).

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF10	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference B WR VIP 2003-117 and TJ-2003-01).
	RF11	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2006-041 and DD-2006-01).
	RF12	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2006-041).
	RF13	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2006-041).
	RF14 (10/10)	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2006-041) BWRVIP 2010- 243 now requires preparation of a Deviation Disposition by 3/31/2011.
	RF15 (4/12)	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. Deviation Disposition DD-2011-01 was submitted to BWRVIP 3/30/2011.
	RF16 (2014)	N/A	No inspections performed in RF16, as justified by Deviation Disposition DD-2011-01.

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Components in BWRVIP Scope	**Date or Frequency of Inspection**	**Inspection Method Used**	**Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections**
	RF17 (2015)	N/A	No inspections performed in RF 17, as justified by Deviation Disposition DD-2011-01 Revision 1.
	RF18 (2017)	N/A	No inspections performed in RF18, as justified by Deviation Disposition DD-2011-01 Revision 1.
	RF19	N/A	No inspections performed in RF19, as justified by Deviation Disposition DD-2011-01 Revision 1.
SLC (BWRVIP-27)	RF04	VT-3	Performed a visual inspection from Reactor penetration to shroud support when access was provided during jet pump beam replacement. No indications.
	RF05 – RF07	N/A	No inspections performed as access was not provided.
	RF08	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, but did not remove mirror insulation box from safe-end. No leakage observed.
	RF09	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.
	RF10	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF11	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.
	RF12	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.
	RF13	VT-2*/UT	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed. Performed a manual POI qualified ultrasonic inspection of the nozzle to safe end weld as well as additional base material of bored material. No indications identified.
	RF14 (10/10)	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.
	RF15 (4/12)	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.
	RF16 (2014)	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF17 (2015)	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.
	RF18 (2017)	VT-2*	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed.
	RF19	VT-2*/UT/PT	Performed enhanced inspection on nozzle area from inside skirt area, and removed cover on the mirror insulation box for the safe-end for direct inspection. No leakage observed. Performed augmented surface PT and manual PDI qualified ultrasonic inspection of the nozzle to safe end weld as well as additional base material of bored material. NRI.
Jet Pump Assembly (BWRVIP-41)	Each outage examine at least 50% thru RF05	VT-1, VT-3	Jet pump assemblies are inspected each outage from top to bottom. During RF-04 all (20) hold down beams were replaced as a preventative measure and to avoid performing UT's on the old style/original beams. Inspections are performed to the recommendations of SIL 551,574,465 S-1, and RICSIL 078. During RF05 one of the 80 restrainer screw tack welds was found to be cracked. This was evaluated and was not repaired during RF05.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF06	MVT-1, VT-3	Performed inspections to the intent of BWRVIP-41 as well as augmented VT-3 of selected areas on jet pumps 1-10. Inspections included all High, Medium and Low Priority locations. Inspected RS-1 and RS-2 welds on jet pumps 11-20. One indication identified on RS-1 weld, 1.75" long. JCO performed prior to startup. No other new indications identified.
	RF07	EVT-1	Performed inspections to the intent of BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected areas on jet pumps 11-20. Inspections included all High, Medium and Low Priority locations. Re-inspected previously identified indication on RS-1 weld, 1.75" long that was identified in RF06. No change in indication length or appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. No other indications or changes in previous indications identified.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF08	EVT-1	Performed re-inspections to the intent of BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected areas on jet pumps l & 2. Inspections included all High, Medium and Low Priority locations. Re-inspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF06. No change in indication length or appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Inspected all 20 jet pumps per recommendations of SIL 629 and verified no wedge damage (WD-1) as well as full contact with restrainer screws. No damage identified on any location. Re-inspected all restrainer screw tack welds with no changes observed.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF09	EVT-1	Performed re-inspections to BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected areas on Jet Pumps 3&4. Inspections included all High, Medium and Low Priority locations. Re-inspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF06. No change in indication length or appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Inspected all 20 Jet Pump Hold Down Beams by UT for BBl, BB2, and the transition area BB3 using the latest available technique from General Electric. No indications identified on the beams. Re-inspected all restrainer screw tack welds, contact area, and wedges after both tack welds on Jet Pump 15 were found cracked. No other damage or indications identified on any location. Jet Pump 15 permanently repaired by the installation of an auxiliary spring wedge. (Reference CARD 03-16929).
	RF10	EVT-1	Performed re-inspections to BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected welds on Jet Pumps 4, 5, 6, 7, & 8. Re-inspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF06. No change in indication length / appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Re-inspected auxiliary spring wedge on Jet Pump 15. No other damage or indications identified on any location.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF11	EVT-1	Performed re-inspections to BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected welds on Jet Pumps 7, 8, 9, & 10. Re-inspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF06. No change in indication length / appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Inspected all Jet Pump wedges after wear was identified on JP2 restrainer bracket. Performed inspection of other welds on Jet Pump 2 as required by BWRVIP-41. Auxiliary spring wedges installed on Jet Pumps 1 and 2 and a slip joint clamp was installed on Jet Pump 2 to restore integrity. No other damage or indications identified.
	RF12	EVT-1	Performed re-inspections to BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected welds on Jet Pumps 7, 8, 9, 10, 11, & 12. Re-inspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF06. No change in indication length / appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Inspected all 20 Jet Pump Hold Down Beams. Inspected 12 Jet Pump wedges including the wedges and hardware (auxiliary spring wedges and slip joint clamp) installed in RF11. No other damage or indications identified.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF13	EVT-1	Performed re-inspections to BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected welds on Jet Pumps 7, 8, 9, 10, 13, 14, 15, and 16. Re-inspected previously identified indication on RS-1 weld for Jet Pumps 7 & 8 identified in RF06. No change in indication length or appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Inspected 9 Jet Pump wedges. No other damage or indications identified.
	RF14 (10/10)	EVT-1	Performed re-inspections to BWRVIP-41 including EVT-1's as well as augmented VT-1 and VT-3's of selected welds on most Jet Pumps including RS-8/9 welds on all pumps. Re-inspected previously identified indication on RS-1 weld for Jet Pumps 7 & 8. No change in indication length or appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Inspected all 20 Jet Pump wedges. Minor movement noted but no other damage or indications identified.
	RF15 (4/12)	EVT-1	Performed re-inspections to BWRVIP-41 including EVT-1's as well as augmented VT-1's of selected welds on several Jet Pumps. Re-inspected previously identified indication on RS-1 weld for Jet Pumps 7 & 8. No change in indication length or appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Inspected all 20 Jet Pump wedges. No movement noted and no damage or indications identified.

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	RF16 (2014)	EVT-1/ VT-1	Performed EVT-1 exams of selected welds in accordance with BWRVIP-41 Rev. 3 with no indications identified. VT-1 exams performed on all 20 main wedge assemblies. Wedge wear identified on Jet Pump 06; scope expansion performed with no further relevant indications observed and wedge was evaluated to be acceptable without repair. Growth identified during re-inspection of indication on RS-1 weld for Jet Pumps 7 & 8. Indication was evaluated to be acceptable for two cycles without repair. Ultrasonic examination of all 20 Jet Pump Hold Down Beams (BBl, BB2 and BB3). No indications identified on the beams.
	RF17 (2015)	EVT-1/ VT-1	Performed EVT-1 exams of selected welds with no indications identified. VT-1 exams performed on all 20 main wedge assemblies. Minor wedge rod wear identified on Jet Pump 1; evaluated to be acceptable without repair. Minor wear identified on Jet Pump 2 Auxiliary Wedge, scope expansion performed with no further relevant indications observed and evaluated to be acceptable without repair. Mitigating clamp installed on the RS-1 weld for Jet Pumps 7 & 8.

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	RF18 (2017)	EVT-1	Performed EVT-1 exams of selected welds with no indications identified. VT-1 exams performed on all 20 main wedge assemblies. Jet Pump 1 Wedge Rod wear obscured by wedge position shift; scope expansion performed with no further relevant indications observed and evaluated to be acceptable without repair.
	RF19	EVT-1	Performed EVT-1 exams of selected welds with no indications identified. VT-1 exams performed on all 20 main wedge assemblies. Minor wear identified on Jet Pump 11 Wedge Rod; evaluated to be acceptable without repair.
Jet Pump Diffuser (BWRVIP-41)	Each outage	VT-3	Diffusers will be sample inspected during refueling outages.
	RF06	MVT-1	BWRVIP-41 on Jet Pumps 1-10 except inaccessible areas. No cracking.
	RF07	EVT-1	BWRVIP-41 on Jet Pumps 11-20 except inaccessible areas. No cracking identified. Welds DF-3, AD-1, and AD-2 are inaccessible for inspection.
	RF08	EVT-1	BWRVIP-41 reinspection on Jet Pumps 1 and 2 except inaccessible areas. No cracking identified. Welds DF-3, AD-1, and AD-2 are inaccessible for inspection.

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	RF09	EVT-1	BWRVIP-41 reinspection on Jet Pumps 3 and 4 except inaccessible areas. No cracking identified. Welds DF-3, AD-1, and AD-2 are inaccessible for EVT-1 visual inspection, VT-3 performed. (TJ-2003-02 prepared as justification).
	RF10	EVT-1	BWRVIP-41 reinspection of selected DF-1 and DF-2 welds on Jet Pumps 5, 6, 7, & 8. Performed access study for future performance of UT examinations of welds DF-3, AD-1, and AD-2. These welds are inaccessible for visual inspection. VT-3 performed. No indications identified (Reference TJ-2003-02).
	RF11	EVT-1	BWRVIP-41 reinspection of selected DF-2 welds on Jet Pumps 9 & 10.
		UT	Performed of UT examinations on a portion of a total of 17 DF-3, AD-1, and AD-2 welds using specialized tooling. These welds are inaccessible for visual inspection. No indications identified (Reference DD-2006-02).
	RF12	EVT-1	BWRVIP-41 reinspection of selected DF-1 and 2 welds on Jet Pumps 6, 11, & 12.
		UT	No UT examinations performed during RF12 due to tooling failures. These welds are inaccessible for visual inspection. (Reference DD-2006-02).

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	RF13	EVT-1	BWRVIP-41 reinspection of selected DF-1 and 2 welds on Jet Pumps 7, 13, & 14.
		UT	No UT examinations performed during RF13 due to tooling failures. These welds are inaccessible for visual inspection. (Reference DD-2006-02).
	RF14 (10/10)	EVT-1	BWRVIP-41 reinspection of selected DF-1 and 2 welds on Jet Pumps 7, 8, 9, and 13-18. No indications identified.
		UT	Completed baseline UT examinations on all 20 Jet Pumps Diffuser/Adapter DF-3, AD-1 and AD-2 welds, (60 welds) since these welds are inaccessible for visual inspection. Deviation Disposition is no longer needed.
	RF15 (4/12)	EVT-1	BWRVIP-41 reinspection of selected DF-1 and 2 welds on Jet Pumps 10, 19, and 20. No indications identified.
	RF16 (2014)	EVT-1	BWRVIP-41 re-inspection of selected DF-1 and 2 welds on Jet Pumps 01, 02, and 11. No indications identified. ·
	RF17 (2015)	EVT-1	BWRVIP-41 re-inspection of selected DF-1 and 2 welds on Jet Pumps 03, 04, and 12. No indications identified.
	RF18 (2017)	EVT-1	BWRVIP-41 re-inspection of selected DF-1 and 2 welds on Jet Pumps 05, 06, 07, 08, 13, and 14. No indications identified.

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		UT	UT performed on DF-3, AD-1, and AD-2 on Jet Pumps 01, 02, 03, 04, 07, 08, 17, 18, 19, 20 with no relevant indications observed.
	RF19	EVT-1	BWRVIP-41 re-inspection of selected DF-1 and 2 welds on Jet Pumps 09, 10, & 15. No indications identified.
CRD Guide Tube (BWRVIP-47)	RF04	VT-3	Inspected lower portion of peripheral guide tubes and stub tubes when access was provided during jet pump hold down beam replacement. No indications identified.
	RF07	EVT-1 and VT-3	Performed best effort exam on CRGT-3 as weld was not visible on inside of tube. CRGT-2 not accessible due to flow and ARPIN was not felt to be accessible. No indications identified.
	RF08	EVT-1 and VT-3	Performed best effort exam on CRGT-3 as weld was not visible on inside of tube. CRGT-2 not accessible due to flow and PS/GT-ARPIN was not felt to be accessible. No indications identified.
	RF09	EVT-1 and VT-3	Performed exams on CRGT-1, CRGT-2, CRGT-3, and PS/GT-ARPIN at 10 Control Rod Guide Tubes/locations. No indications identified.
	RF10	N/A	No inspection performed in RF10.
	RF11	N/A	No inspection performed in RF11.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF12	VT-3	Performed exams on CRGT-1 and PS/GT-ARPIN at 5 Control Rod Guide Tubes/locations. CRGT-2 and CRGT-3 not performed or credited due to high flow conditions. No indications identified.
	RF13	N/A	No inspections performed in RF13.
	RF14 (10/10)	EVT-1 and VT-3	Completed all remaining baseline inspections on the Control Rod Guide Tubes. Inspections performed on (4) CRGT-1, and PS/GT-ARPIN locations and on (9) CRGT-2 and CRGT-3 locations. One manufacturing flaw identified that did not impact the functionality of the component.
	RF15 (4/12)	N/A	No BWRVIP required inspections performed in RF15.
	RF16 (2014)	N/A	No BWRVIP required inspections performed in RF16.
	RF17 (2015)	N/A	No BWRVIP required inspections performed in RF17.
	RF18 (2017)	N/A	No BWRVIP required inspections performed in RF18.
	RF19	EVT-1	Performed opportunistic inspections of CRGTs 30-27 and 30-31. NRI.

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Components in BWRVIP Scope	**Date or Frequency of Inspection**	**Inspection Method Used**	**Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections**
CRD Stub Tube * (BWRVIP-47)	RF04	VT-3	Inspected lower portion of peripheral guide tubes and stub tubes when access was provided during jet pump hold down beam replacement. No indications identified.
	RF19	VT-3	Performed opportunistic inspections of Stub Tubes at cell locations 30-27 and 30-31. NRI.
In-Core Housing * (BWRVIP-47)	RF04	VT-3	Small portion visible during jet pump beam replacement. No indication of degradation.
	RF19	VT-3	Performed opportunistic inspections of ICMH 32-29. NRI.
Dry Tube (BWRVIP-47)	Each outage	VT-1	9 of 12 tubes found not completely seated. Performed all inspections per SIL 409 and RICSIL 073. No indications of cracking.
	RF06	VT-1	Re-inspected 12 dry tubes. No change from previous condition. No cracking.
	RF07	VT-1	Inspected all 12 original design Dry Tubes. No change from previous conditions identified. No cracking identified.
	RF08	VT-1	Inspected all 12 original design Dry Tubes from two sides. No change from previous conditions identified. No cracking identified.
	RF09	N/A	No inspections performed in RF09.

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	RF10	VT-1	Inspected all 12 original design Dry Tubes from two sides. Linear indications identified on 7 tubes in the collar region above the pressure boundary weld. Evaluated as acceptable for one cycle of operation. Plan to replace in RF 11. (Reference CARD 04-25703).
	RF11	VT-1	Replaced all 12 Dry Tubes in RF11. Performed baseline VT-1 and verified proper engagement in Top Guide.
	RF12	N/A	No inspections performed in RF12.
	RF13	N/A	No inspections performed in RF13.
	RF14 (10/10)	N/A	No inspections performed in RF14.
	RF15 (4/12)	N/A	No inspections performed in RF15.
	RF16 (2014)	N/A	No inspections performed in RF16.
	RF17 (2015)	N/A	No inspections performed in RF17.
	RF18 (2017)	N/A	No inspections performed in RF18.

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	RF19	N/A	No inspections performed in RF19.
Instrument Penet. * (BWRVIP-49 & 41)	Each outage	VT-3	Inspected jet pump sensing lines and brackets each outage.
	RF04	VT-3	SLC and peripheral bottom head penetrations inspected. No indications.
	RF06	VT-3	Inspected JP sensing lines for pumps 1-10. No indications.
	RF07	VT-3	Inspected JP sensing lines for pumps 11 thru 20 only. No indications.
	RF08	VT-3	Inspected JP sensing lines for Pumps 1 & 2 only. No indications.
	RF09	VT-3	Inspected JP sensing lines for Pumps 3 & 4 only. No indications.
	RF10	VT-1	Inspected JP sensing lines for Pumps 5, 6, 7, 16, & 17. No indications.
	RF11	VT-1	Inspected JP sensing lines for Pumps 6, 7, 16, & 17. No indications.
	RF12	VT-1	Inspected JP sensing lines for Pumps 6, 7, 11, 12, 16, & 17. No indications.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF13	VT-1	Inspected JP sensing lines for Pumps 6, 7, 13, 14, 16, & 17. No indications.
	RF14 (10/10)	VT-1	Inspected JP sensing lines for Pumps 6, 7, 15, 16, 17, & 18. No indications.
	RF15 (4/12)	VT-1	Inspected JP sensing lines for Pumps 6, 7, 16, 17, 19, & 20. No indications.
	RF16 (2014)	VT-1	Inspected JP sensing lines for Pumps 1, 2, 6, 7, 16, & 17. No indications.
	RF17 (2015)	VT-1	Inspected JP sensing lines for Pumps 3, 4, 6, 7, 16, & 17. No indications.
	RF18 (2017)	VT-1	Inspected JP sensing lines for Jet Pumps 05, 06, 07, 08, 16, & 17 with no relevant indications noted.
	RF19	VT-1	Inspected JP sensing lines for Jet Pumps 06, 07, 09, 10, 16, & 17. NRI.
Vessel ID Brackets (BWRVIP-48)	Each outage	VT-1/3	Inspect sample population each outage. We have inspected most brackets each outage (core spray, feedwater). Jet pump riser brace, steam dryer support lugs, guide rod brackets and specimen holder; brackets are sample inspected. No indications of cracking identified.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF06	MVT-1	6 Feedwater brackets. All Core Spray piping brackets. 4 Steam Dryer brackets. 1 Guide Rod bracket. 1 Specimen bracket. No indication of cracking.
	RF07	EVT-1	6 Feedwater brackets. All Core Spray piping brackets. 4 Steam Dryer brackets. 1 Guide Rod bracket. No indication of cracking.
	RF08	EVT-1	6 Feedwater brackets. All Core Spray piping brackets. 4 Steam Dryer brackets. 1 Guide Rod bracket. Surveillance Holder and Brackets @ 30 az. No indication of cracking.
	RF09	EVT-1	6 Feedwater brackets. 4 Core Spray piping brackets. 1 Jet Pump riser brace (Jet Pump 3 and 4) No indication of cracking.

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	RF10	EVT-1	6 Feedwater brackets. 3 Core Spray piping brackets. 1 Surveillance Holder bracket. 4 Steam Dryer Support brackets. 4 Steam Dryer Hold Down 1 Guide Rod Bracket. 1 Jet Pump riser brace (Jet Pump 5 and 6) No indication of cracking.
	RF11	EVT-1/ VT-1	No inspections performed in RF-11.
	RF12	EVT-1/ VT-1	6 Feedwater Sparger bracket sets. 1 Surveillance Holder bracket 4 Steam Dryer Support brackets 1 Guide Rod Bracket 2 Jet Pump riser braces (Jet Pumps 7, 8, 9, & 10) No indication of cracking identified.
	RF13	EVT-1/ VT-1	No inspections performed in RF-13.

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Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs Replacements, Re-inspections
	RF14 (10/10)	EVT-1/ VT-1	3 Feedwater Sparger bracket sets. 2 Core Spray Piping Brackets 1 Surveillance Holder bracket 4 Steam Dryer Support brackets I Guide Rod Bracket 2 Jet Pump riser braces (Jet Pumps 1/ 2, and 11/12) No indication of cracking identified.
	RF15 (4/12)	EVT-1/ VT-1	Inspections performed on 3 Feedwater Sparger bracket sets and 1 Guide Rod Bracket. No indications identified.
	RF16 (2014)	EVT-1/ VT-1	Inspection performed on 1 Surveillance Sample Holder Bracket. No indications identified.
	RF17 (2015)	EVT-1/ VT-1	2 Feedwater Sparger bracket sets (four individual brackets) 4 Core Spray Piping Brackets 4 Steam Dryer Support Brackets 4 Steam Dryer Holddown Brackets 1 Guide Rod Bracket 1 Jet Pump Riser Brace. No indication of cracking identified.
	RF18 (2017)	EVT-1/ VT-1	3 Feedwater Sparger bracket sets (six individual brackets) 1 Surveillance Holder Bracket 1 Guide Rod Bracket 1 Jet Pump Riser Brace. No indication of cracking identified.

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	RF19	EVT-1/VT-1	4 Steam Dryer Support Brackets 1 Feedwater Sparger Bracket (two individual brackets) 3 Surveillance Sample Holder Brackets (2018-043) No relevant indications.
LPCI Coupling	N/A	N/A	Fermi does not have a LPCI Coupling
Shroud Head Bolts/Shroud Head	RF04	UT/VT	16 had indications, 17 replaced during RF04.
	RF05	N/A	Remaining bolts replaced (31) duringRF05 as a preventative measure. All 48 are now new style.
	RF06	VT-3	Bolts 1-24 (of 48). No indication of cracking.
	RF07	VT-3	Bolts 25-48 (of 48). No indication of cracking or damage. Springs were left compressed on 20 of the 24 inspected.
	RF08	VT-3	Bolts 1-24 (of 48). No indication of cracking or damage.
	RF09	VT-3	Bolts 23 and 25-48 (of 48). No indication of cracking or damage. All retainer springs verified to be functioning properly.
	RF10	VT-3	Bolts 1-24 (of 48). Inspected North 1/3rd of Shroud Head/Separator and 2 lifting lugs. No indication of cracking or damage.

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	RF11	VT-3	Inspected Bolts 25-48 (of 48) and inspected Center 1/3rd of Shroud Head/Separators. No indication of cracking or damage.
	RF12	VT-3	Bolts 1-24 (of 48). Inspected South 1/3rd of Shroud Head/Separator and 2 lifting lugs. All mid support ring gussets were inspected and small short cracks were identified on 3 of the 24 gussets. No repairs were required. Ref. OE 25795.
	RF13	VT-3	Bolts 25-48 (of 48). Inspected North 1/3rd of Shroud Head/Separator and 2 lifting lugs. No changes identified in previous indications identified in RF12. No other indications identified.
	RF14 (10/10)	VT-3	Bolts 1-24, 27, 30, & 33 (of 48). Inspected Center 1/3rd of Shroud Head/Separator. No changes identified in previous indications and no new indications identified.
	RF15 (4/12)	VT-3	Inspected Bolts 25-48 and 2 (of 48). Inspected South 1/3rd of Shroud Head/Separator. No changes identified in previous gusset indications and no new indications identified.
	RF16 (2014)	VT-3	Inspected Bolts 1-12 (of 48) and the North 1/3rd of Shroud Head/Separator. No new indications were identified.

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	RF17 (2015)	VT-3	Inspected bolts 13-24 (of 48). Minor pin & window wear identified on bolts 21 & 23, evaluated to be acceptable without repair. Replaced bolts 2 & 33 due to their inability to latch. Inspected the Center I/3rd of the Separator and identified one tie bar with a severed attachment weld on one end. The tie bar was removed to preclude generation of a loose part (technical justification from OEM obtained to support acceptance of one missing tie bar).
	RF18 (2017)	VT-3	Re-inspected bolts 21 & 23 with no change in condition recorded. Normal inspections included bolts 25-36. Minor pin wear on bolts 31 & 35; evaluated acceptable without repair. Pin and window wear observed on bolts 34 & 36; evaluated acceptable without repair. No other indications.
	RF19	VT-3	Reinspected bolt 36; no change in condition. Normal inspections included bolts 37-48; NRI. Examined North 1/3rd of Separator; NRI.
Steam Dryer (RF01–RF08 not previously reported)	RF09	VT-3	Inspected approximately 1/3 of dryer including hood welds and cover plate welds. (Ref. SIL 644). No indications of additional cracking identified.

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	RF10	VT-1/VT-3	Inspected approximately 50% of dryer including all inner hood vertical welds as recommended in SIL 644, Supplement 1, and Revision 1. Several new indications were identified near welds due to new locations being inspected and the change in technique. Indications were noted at base of inner hood vertical welds. Reference CARD 04-25416 and also OE #17600. No changes were identified on previously recorded indications.
	RF11	VT-1/VT-3	Inspected approximately 50% of dryer including all inner hood vertical welds as recommended in SIL 644, Revision 1 and BWRVIP-139. Several new indications were identified near welds due to new locations being inspected and the change in technique. Indications previously noted on hood welds in RF10 were re-inspected and no changes were noticed.
	RF12	VT-1/VT-3	Inspected approximately 50% of dryer including inner hood vertical welds as recommended in BWRVIP-139. Several new small indications were identified near welds due to new locations being inspected and the change in technique and camera angles used. Indications previously noted on hood welds were re-inspected and no changes were noticed.
	RF13	VT-1/VT-3	Inspected approximately 20% of dryer including “F” Bank welds and a sampling of other locations following re-inspection guidelines contained in NRC SE to BWRVIP-139. One new indication identified in support ring.

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	RF14 (10/10)	VT-1/VT-3	Inspected approximately 20% of dryer including "E" Bank welds and a sampling of other locations following re-inspection guidelines contained in BWRVIP-139-A. No new indications identified.
	RF15 (4/12)	VT-1/VT-3	Inspected approximately 20% of dryer including "D" Bank welds and a sampling of other locations following re-inspection guidelines contained in BWRVIP-139-A. No new indications identified.
	RF16 (2014)	VT-1/VT-3	Inspected approximately 20% of dryer including "C" Bank welds and a sampling of other locations following re-inspection guidelines contained in BWRVIP-139-A. Indication newly identified on interior vane bank weld HE-C-2-1; evaluated to be acceptable without repair.
	RF17 (2015)	VT-1/VT-3	Inspected approximately 20% of dryer including "B" Bank welds and a sampling of other locations following re-inspection guidelines contained in BWRVIP-139-A. Indication on interior vane bank weld HEC-2-1 identified in RF16 re-inspected with no changes observed. 24 capture plate assemblies installed to cover all tie rod nut washer locations. Vertical drain channel welds preemptively increased from 1/8" to 1/4".

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	RF18 (2017)	VT-1/VT-3	Inspected approximately 20% of dryer including "A" Bank welds and a sampling of other locations following re-inspection guidelines contained in BWRVIP-139-A. Indication on interior vane bank weld HEC-2-1 identified in RF16 re-inspected with no changes observed. 24 capture plate assemblies re-inspected with no new indications. New wear at 94° Seismic Support Block at interface with RPV Support Block; evaluated as acceptable without repair.
	RF19	VT-1/VT-3	Performed VT-1inspections of approximately 20% of dryer including "F" Bank welds and a sampling of other locations following reinspection guidelines contained in BWRVIP-139-A. Upper support ring indication newly identified near DC-C-3 weld; evaluated as acceptable without repair along with revisited flaws. Additional VT-3 exams performed on inner vane bank end panels and all of vane bank A (including cover plate) as part of Moisture Carryover investigation - NRI.
*VT-2 leakage inspections have been and are performed on all RPV Instrumentation Nozzles and Piping Nozzles each refuel outage. An enhanced leakage inspection is performed on all locations to ensure no pressure boundary leakage. Inspections are performed in the annulus area adjacent to the vessel skirt, and are performed under vessel to ensure that any leakage identified is not from welded connections. Flange leakage from CRDM's is recorded, evaluated, and repaired if necessary. Mirror insulation is opened for SLC safe end inspection and for bottom head inspections but is not removed from other locations unless the leakage source can't be determined.			

ATTACHMENT 3
PAST REFUEL OUTAGE DATES

Refueling Outage	Duration and Dates
RF01	102 DAYS SEPTEMBER 5, 1989 - DECEMBER 16, 1989
RF02	72 DAYS MARCH 30, 1991 - JUNE 10, 1991
RF03	56 DAYS SEPTEMBER 12, 1992 - NOVEMBER 7, 1992
RF04	389 DAYS DECEMBER 25, 1993 - JANUARY 18, 1995
RF05	98 DAYS SEPTEMBER 27, 1996 - JANUARY 3, 1997
RF06	54 DAYS SEPTEMBER 4, 1998 - OCTOBER 29, 1998
RF07	52 DAYS APRIL 1, 2000 - MAY 23, 2000
RF08	33 DAYS OCTOBER 27, 2001 - NOVEMBER 30, 2001
RF09	42 DAYS MARCH 28, 2003 – MAY 10, 2003
RF10	27 DAYS NOVEMBER 6, 2004 – DECEMBER 3, 2004
RF11	41 DAYS MARCH 25, 2006 – MAY 5, 2006
RF12	50 DAYS SEPTEMBER 29, 2007 – NOVEMBER 18, 2007
RF13	34 DAYS MARCH 28, 2009 – MAY 1, 2009
RF14	41 DAYS OCTOBER 24, 2010 – DECEMBER 5, 2010
RF15	40 DAYS MARCH 26, 2012 – MAY 5, 2012
RF16	53 DAYS FEBRUARY 10, 2014 – APRIL 5, 2014
RF17	61 DAYS SEPTEMBER 27, 2015 – NOVEMBER 28, 2015
RF18	33 DAYS MARCH 18, 2017 – APRIL 20, 2017
RF19	35 DAYS SEPTEMBER 22, 2018 – OCTOBER 27, 2018
RF20	137 DAYS MARCH 21, 2020 – AUGUST 5, 2020