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October 7, 2005
JAFP-05-0151

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
License No. DPR-59
Request for Approval of Relief Request No. RR-39, Implementation of BWRVIP Guidelines in lieu of ASME Section XI Code Requirements on Reactor Vessel Internals and Components Inspection

Reference: NRC Letter to Michael Kansler, "Safety Evaluation of Relief Request RI-01, Vermont Yankee Nuclear Power Station (TAC. NO. MC0960), dated September 19, 2005.

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(a)(3)(i), Entergy Nuclear Operations, Inc. (ENO) is submitting a relief request (Attachment 1) to implement various Boiling Water Reactor Vessel Internals Program (BWRVIP) Guidelines in lieu of the American Society of Mechanical Engineers (ASME) Section XI Code Inspection Requirements on reactor vessel internals and components.

The James A. FitzPatrick Nuclear Power Plant (JAFNPP) requests relief from the Inservice Inspection (ISI) Program requirements of the ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition, No Addenda. The request applies to reactor vessel internals and components, and includes the technical basis for relief on each applicable component, or group of components. Attachment 2 is a comparison of the ASME Examination Requirements and the BWRVIP Guideline requirements. Attachment 3 is the reactor internals inspection history, including up to the most recent refueling outage (RO16, dated October 2004). Attachment 4 is a list of the applicable components in the Reactor Vessel Internals Inspection Program and the number of welds for these components. Additionally, the ASME Code does not have specific inspection requirements on the steam dryers. Entergy will be using the guidelines in

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BWRVIP-139, "BWRVIP Steam Dryer Inspection and Flaw Evaluation Guidelines" and GE SIL 644, Revision 1 for the steam dryer inspections.

Entergy has concluded that this proposed alternative will ensure that the integrity of the reactor vessel internal components is maintained with an acceptable level of quality and safety.

A similar relief request was approved for Entergy's Vermont Yankee Nuclear Power Station (Reference).

Entergy requests approval of the relief request by August 2006 to support JAF Refueling Outage R17 scheduled for the Fall 2006.

Should you have any questions concerning this letter, please contact Mr. James Costedio, Regulatory Compliance Manager at (315) 349-6358.

There are no new commitments made in this letter.

Very truly yours,

T.A. SULLIVAN

Attachments

cc:

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JAMES A. FITZPATRICK NUCLEAR POWER PLANT
THIRD TEN-YEAR INTERVAL INSERVICE INSPECTION PROGRAM
RELIEF REQUEST RR-039

Proposed Alternative
In Accordance with 10CFR50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1.0 ASME Code Component(s) Affected

Code Class:	Class 1
Examination Categories:	B-N-1, Interior of Reactor Vessel, and B-N-2, Integrally Welded Core Support Structures and Interior Attachments to Reactor Vessels
Item Numbers:	B13.10, Vessel Interior B13.20, Interior Attachments within Beltline Region B13.30, Interior Attachments beyond Beltline Region B13.40, Core Support Structure

2.0 Applicable Code Edition and Addenda

The Code of Record for the third Inservice Inspection Interval is ASME Section XI Code, 1989 Edition, No Addenda.

3.0 Applicable Code Requirements

ASME 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 are identified with the following item numbers:

B13.10 Examine accessible areas of the reactor vessel interior each period by the VT-3 method.

B13.20 Examine interior attachment welds within the beltline region each interval by the VT-1 method.

B13.30 Examine interior attachment welds beyond the beltline region each interval by the VT-3 method.

B13.40 Examine surfaces of the core support structure each interval by the VT-3 method.

These examinations are performed to assess the structural integrity of components within the boiling water reactor pressure vessel.

4.0 Reason for Request

To conserve radiological person rem and reduce outage duration, while still maintaining an adequate level of quality and safety for the examination of the reactor vessel internals and welds.

5.0 Proposed Alternative

In lieu of the requirements of ASME Section XI, 1989 Edition, the proposed alternative described herein shall be used.

Entergy will examine components within the reactor vessel in accordance with BWRVIP Guideline requirements, unless otherwise noted. The particular guidelines that are applicable to those components are:

- BWRVIP-18-A, "BWRVIP Core Spray Internals Inspection and Flaw Evaluation Guidelines"
- BWRVIP-25, "BWRVIP Core Plate Inspection and Flaw Evaluation Guidelines"
- BWRVIP-26-A, "BWRVIP Top Guide Inspection and Flaw Evaluation Guidelines"
- BWRVIP-27-A, "BWRVIP BWR Standby Liquid Control System/Core Plate deltaP Inspection and Flaw Evaluation Guidelines"
- BWRVIP-38, "BWRVIP Shroud Support Inspection and Flaw Evaluation Guideline"
- BWRVIP-41, "BWRVIP Jet Pump Assembly Inspection and Flaw Evaluation Guidelines"
- BWRVIP-47-A, "BWR Lower Plenum Inspection and Flaw Evaluation Guidelines"
- BWRVIP-48-A, "Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines"
- BWRVIP-76, "BWR Core Shroud Inspection and Flaw Evaluation Guidelines"
- BWRVIP-104, "BWRVIP Evaluation and Recommendations to Address Shroud Support Cracking in BWRs"
- BWRVIP-138, "BWRVIP Updated Jet Pump Beam Inspection and Flaw Evaluation Guidelines"

Attachment 2 compares the required ASME Category B-N-1 and B-N-2 examination requirements with the above current BWRVIP Guideline requirements that are applicable to FitzPatrick. Attachment 3 is a summary of JAF's reactor internals inspection history, including results from the last inspections performed during the most recent refuel outage (RO16, October 2004). Attachment 4 identifies the applicable component in the reactor internal inspection program and the total number of welds in each component.

In addition, the requirements of BWRVIP-94, "Program Implementation Guideline", will be followed. BWRVIP-94 states that where guidance in existing BWRVIP documents has been supplemented or revised by subsequent correspondence approved by the BWRVIP Executive Committee, the most current approved guidance will be implemented. Therefore, the attached Table only represents a most current comparison.

6.0 Basis for Use

These BWRVIP Guidelines were developed and maintained to provide guidance in the examination of BWR internals and components. These Guidelines have been written to address the safety significant vessel internal components and to examine these components using appropriate methods and re-examination frequencies. The NRC has agreed with the BWRVIP approach in principle and has issued Safety Evaluations for these guidelines (see References). The technical basis for the proposed alternative inspection of each component, or group of components, is discussed in the following paragraphs, by Code Subsections. Each section includes several examples of a component or weld that belong in each Code Subsection.

6.1 B13.10, Reactor Vessel Interior Accessible Areas B-N-1

The ASME Section XI Code requires a VT-3 inspection of reactor vessel interior surfaces made accessible every three and a third (3 1/3) years during each 10 year interval. This is a non-specific inspection requiring inspection of surfaces made accessible during refueling. The various BWRVIP Inspection and Evaluation guidelines require, as a minimum, a VT-3 inspection of reactor vessel interior components. Additionally, the BWRVIP guidelines require that many component welds and weld heat affected zones in this category be inspected by a VT-1, EVT-1, or UT. The BWRVIP inspection method meets (VT-3) or exceeds (VT-1, EVT-1, or UT) the inspection method requirement specified by the Code.

The Core Spray piping and sparger is used as an example for comparison between the Code and the BWRVIP inspection requirements.

BWR Core Spray Internals Inspection and Flaw Evaluation Guideline (BWRVIP-18-A)

- The Section XI Code requires a VT-3 each period (3 1/3 years) of each 10 year interval of the Core Spray internal piping and sparger accessible surfaces.

- The BWRVIP requires either an EVT-1 of the core spray pipe creviced welds and weld heat affected zones each refuel outage (2 year) along with 25% of the non creviced weld locations on a rotated basis or UT. If UT is performed on the creviced weld locations, then the frequency is every other outage (4 years). 100% of the pipe brackets are inspected by EVT-1 every 4 outages (8 years). 100% of the major Core Spray sparger welds require an EVT-1 inspection every other outage (4 years). 50 % of the other Core Spray sparger welds require a VT-1 inspection every other outage (4 years). 100% of the sparger bracket welds are inspected by VT-1 every 2 outages.

The BWRVIP inspection methods are superior to the Code inspection methods. The BWRVIP specifies EVT-1 and UT inspections to detect small tight cracks before component functionality is challenged. The BWRVIP inspections are directed to component welds and weld heat affected zones, where experience has shown IGSCC cracks will initiate. The BWRVIP specified EVT-1 and UT examination have superior crack detection and characterization capability as compared to the Code VT-3. The inspection of high susceptibility creviced weld locations every outage (visual EVT-1) or every other outage (UT) is superior in crack detection and inspection frequency to the

VT-3 examination required every period. The sparger bracket inspection method (VT-1) is superior to the code inspection method (VT-3) and inspection intervals are similar. The 25% sampling of non creviced welds ensure all welds are inspected in a 10 year interval. The BWRVIP inspection requirements for reactor vessel interior accessible areas provide an acceptable level of quality and safety as compared to the Code requirements by providing an equivalent or in most cases superior inspection methods. Additional examples of components in this category are:

- Top Guide (BWRVIP-26-A)
- Jet Pumps (BWRVIP-41 and BWRVIP-138)
- Control Rod Guide Tube and Fuel Support Castings (BWRVIP-47-A)

6.2 B13.20, Interior Attachments Within the Beltline (B-N-2)

The ASME Code requires a VT-1 inspection of accessible reactor interior surface attachment welds each 10 year interval.

The BWRVIP requires an EVT-1 inspection on the majority of attachment welds in the beltline region in the first 12 years and then 25% during each subsequent 6 years.

The Jet Pump Riser Brace inspection requirements are used as an example for comparison between the Code and the BWRVIP inspection requirements.

Jet Pump Riser Braces (BWRVIP-41 and 48-A)

- The Code requires a 100% VT-1 inspection of the Jet Pump riser brace-to-reactor vessel wall pad welds each 10 year interval.

- The BWRVIP requires an EVT-1 inspection of the Jet Pump Beam riser brace-to-reactor vessel wall pad welds the first 12 years and then 25% during each subsequent 6 years.

The Code 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 enhanced VT-1 (EVT-1) is conducted to detect discontinuities and imperfections on the surface of components, including fatigue cracks and very tight cracks characteristic of inter-granular stress corrosion cracking (IGSCC). General wear, corrosion, or erosion, is generally not a concern for stainless steel due to its inherently tough, corrosion resistant material characteristics. However, the process of performing an EVT-1 inspection would detect such degradation mechanisms.

The Code VT-1 visual inspection method requires that a letter character with a height of 0.044 inches can be read at a maximum distance of 2 feet. The BWRVIP EVT-1 is a visual inspection method where the equipment and environmental conditions are such that they can achieve a ½ mil (0.0005 inch) resolution on the inspection surface.

The ASME Code and the BWRVIP have the same flaw evaluation criteria for detected indications. Both criteria measure the observed surface indication and compare them against acceptable flaw sizes determined by ASME Section XI Code.

The BWRVIP inspection method of interior attachments within the reactor vessel beltline has superior flaw detection capability (0.0005 inches versus 0.044 inches resolution) compared to the Code. The enhanced flaw detection capability of an EVT-1, with a less frequent inspection schedule and the same flaw evaluation criteria, results in the BWRVIP inspection requirement providing the same level of quality and safety to that provided by the ASME Code.

6.3 B13.30 Interior Attachments Beyond the Beltline Region (B-N-2)

The BWRVIP requires as a minimum the same VT-3 inspection method as the Code for interior attachment welds beyond the beltline region and in some cases specifies an enhanced visual inspection technique EVT-1.

As described in Attachment 2, the following components have the same VT-3 method of inspection, the same scope of inspection (accessible welds), the same inspection frequency (each 10 year interval) and ASME Section XI flaw evaluation criteria. Therefore, the level of quality and safety provided by the BWRVIP requirements are equivalent to that provide by the ASME Code. Examples of component attachment welds in this category are:

- Steam Dryer Holddown Brackets (BWRVIP-48-A)
- Guide Rod Brackets (BWRVIP-48-A)
- Surveillance Specimen Upper Holder Brackets (BWRVIP-48-A)

Additionally, there are interior attachment welds outside the beltline region that the BWRVIP requires an EVT-1 inspection instead of the Code required VT-3 inspection. The inspection frequency for EVT-1 is every four refueling outages (8 years) as compared to the Code inspection frequency of 10 years. The Code VT-3 examination is conducted to detect component structural integrity by ensuring components general condition is acceptable. An enhanced EVT-1 is conducted to detect discontinuities and imperfections on the inspection surfaces, including such conditions as tight cracks caused by IGSCC. Therefore, with the EVT-1 inspection method, the same inspection scope (accessible welds), an increased inspection frequency (8 years instead of 10 years) and 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.

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

Vessel ID Attachment Weld Inspection and Flaw Evaluation (BWRVIP-48)

- The Code inspection requirement is a VT-3 inspection of each weld every 10 years.

- The BWRVIP inspection requirement for the Core Spray piping brackets attachment weld is that each weld is inspected every four refueling outages (8 years) with an EVT-1.

The BWRVIP examination method EVT-1 has superior flaw detection and sizing capability, the inspection frequency is greater than the Code requirements and the same flaw evaluation criteria is used. Therefore the BWRVIP inspection criteria will provide a superior level of quality and safety as provided by the Code.

6.4 B13.40 Integrally Welded Core Support Structure-Shroud Support (B-N-2)

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

The BWRVIP requires as a minimum the same inspection method VT-3 as the Code for integrally welded Core Support Structures or either an enhanced visual inspection EVT-1 or volumetric examination UT.

As described in Attachment 1, the following component has the same VT-3 method of inspection, the same scope of inspection (accessible surfaces), the same inspection frequency (each 10 year interval) and the same flaw evaluation criteria, with the addition of an enhanced visual EVT-1 examination of the tie-rod locking devices. Therefore, the BWRVIP requirements provide a level of quality and safety equivalent to or superior to that provide by the ASME Code. An example of a component in this category is:

- Core Shroud Repair Tie-rods (BWRVIP-76)

The BWRVIP may also require either an EVT-1 or UT of core support structures. The core shroud is used as an example for comparison between the Code and BWRVIP inspection requirements.

BWR Core Shroud Inspection and Flaw Evaluation Guideline (BWRVIP-76)

- The Code requires a VT-3 of accessible surfaces every 10 years.
- The BWRVIP requires an EVT-1 or UT of each core shroud design reliant weld every 10 years (maximum).

This BWRVIP examination methods (EVT-1 or UT) are superior to the Code required VT-3 for flaw detection and characterization. The BWRVIP inspection frequency is equivalent to or greater than the inspection frequency required by the Code. The superior flaw detection and characterization capability, with an equivalent or greater inspection frequency and the same 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.

7.0 Conclusion

Pursuant to 10 CFR 50.55a(a)(3)(i), using these BWRVIP guidelines as an alternative to the ASME Section XI Code requirements provides an acceptable level of quality and safety. In many cases the BWRVIP examination requirements exceed the requirements of ASME XI by requiring more detailed examination criteria (for example, VT-1 and UT for shroud welds vs. VT-3). The BWRVIP Guidelines also provides detailed inspection areas and guidance for scope expansion if a defect is detected.

8.0 Duration of Proposed Alternative

Entergy proposes to use the alternative for the remaining term of the 3rd Inservice Inspection Interval for James A. FitzPatrick Nuclear Power Plant.

9.0 Precedents

A similar relief request was approved for Entergy's Vermont Yankee Nuclear Power Station (Reference NRC SER (TAC No. MC0960), dated September 19, 2005).

10.0 Attachments:

Attachment 2	Comparison of ASME Category B-N-1 and B-N-2 Examination Requirements with BWRVIP Guideline Requirements.
Attachment 3	Reactor Internals Inspection History for James A. FitzPatrick Nuclear Power Plant (Updated through Refuel Outage RO16), dated October 2004 (Reference 11.17).
Attachment 4	List of Components in the Reactor Internals Inspection Program and the Number of Welds/Components

11. References

11.1 NYPA Letter JPN-97-013, to NRC, dated March 24, 1997, "Core Spray Internals Inspection".
11.2 NRC Letter to BWRVIP, dated July 29, 1997, "BWR Utility Commitments to the BWRVIP".
11.3 BWRVIP Letters to NRC, dated May 30 and October 30, 1997, "BWR Utility Commitments to the BWRVIP".
11.4 NRC letter to BWRVIP, dated April 27, 1998, "Final Supplement to the Safety Evaluation of the BWRVIP, BWRVIP-07 Report".
11.5 NRC letter to BWRVIP, dated September 15, 1998, "Safety Evaluation of the BWRVIP, BWRVIP-06 Report".
11.6 NRC letter to BWRVIP, dated September 29, 1999, "Final Safety Evaluation of 'BWRVIP, BWR Top Guide Inspection and Flaw Evaluation Guidelines (BWRVIP-26),' EPRI Report TR-107285, December 1996".
11.7 NRC letter to BWRVIP, dated September 29, 1999, "Final Safety Evaluation of 'BWRVIP, BWR Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines (BWRVIP-48),' EPRI Report TR-108724".
11.8 NRC letter to BWRVIP, dated October 6, 1999, "Staff Reevaluation of Table 1 in the BWRVIP-07 Report".
11.9 NRC letter to BWRVIP, dated October 13, 1999, "Final Safety Evaluation of 'BWRVIP, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines (BWRVIP-47),' EPRI Report TR-108727".
11.10 NRC letter to BWRVIP, dated December 2, 1999, "Final Safety Evaluation of BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines (BWRVIP-18)".
11.11 NRC letter to BWRVIP, dated December 19, 1999, "Final Safety Evaluation of BWRVIP, 'BWR Core Plate Inspection and Flaw Evaluation Guidelines (BWRVIP-25)' EPRI Report TR-107284, December 1996".
11.12 NRC letter to BWRVIP, dated July 24, 2000, "Final Safety Evaluation of the 'BWRVIP, BWR Shroud Support Inspection and Flaw Evaluation Guidelines (BWRVIP-38),' EPRI Report TR-108823".
11.13 Entergy Letter JAFP-01-0021 to NRC, dated January 26, 2001, "In-Vessel Visual Inspection Summary Report 2000 Refuel Outage (Reload 14/Cycle 15)".
11.14 NRC letter to BWRVIP, dated February 4, 2001, "Final Safety Evaluation of the 'BWRVIP, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines (BWRVIP-41)".
11.15 NRC letter to BWRVIP, dated August 20, 2001, "Final Safety Evaluation of the 'BWRVIP, Shroud Vertical Weld Inspection and Evaluation Guidelines (BWRVIP-63)".
11.16 Entergy Letter JAFP-02-0251 to NRC, dated December 26, 2002, "In-Vessel Visual Inspections Summary Report 2002 Refuel Outage (Reload 15/Cycle 16)".
11.17 Reactor Internals Inspection History for James A. FitzPatrick Nuclear Power Plant (Updated after RO16), October 2004.
11.18 BWRVIP-27A, "BWRVIP BWR Standby Liquid Control System / Core Plate ΔP Inspection and Flaw Evaluation Guidelines", EPRI Report 1007279, August 2003.

Comparison of ASME Category B-N-1 and B-N-2 Examination Requirements with BWRVIP Guideline Requirements[2]

ASME Item No. Table IWB-2500-1	Component	ASME Exam Scope	ASME Exam	ASME Frequency	Applicable BWRVIP Document	BWRVIP Exam Scope	BWRVIP Exam	BWRVIP Frequency
B13.10	Reactor Vessel Interior (Note 1)	Accessible Areas (Non-specific)	VT-3	Each period	BWRVIP-18-A, 25, 26-A, 27-A, 38, 41, 47-A, 48-A, 76, 104, 138	In accordance with applicable BWRVIP Document.		
B13.20	Interior Attachments Within Beltline – Jet Pump Riser Brace	Accessible Welds	VT-1	Each 10-year Interval	BWRVIP-48-A Table 3-2	Riser Brace Attachment	EVT-1	100% in first 12 years (with 50% to be inspected in the first 6 years); 25% during each subsequent 6 years
	Lower Surveillance Specimen Holder Brackets				BWRVIP-48-A 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-A Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval
	Guide Rod Brackets				BWRVIP-48-A Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval
	Steam Dryer Support Brackets				BWRVIP-48-A Table 3-2	Bracket Attachment	EVT-1	Each 10-year Interval
	Feedwater Sparger Brackets				BWRVIP-48-A Table 3-2	Bracket Attachment	EVT-1	Each 10-year Interval
	Core Spray Piping Brackets				BWRVIP-48-A Table 3-2	Bracket Attachment	EVT-1	Every 4 Refueling Cycles
	Upper Surveillance Specimen Holder Brackets				BWRVIP-48-A Table 3-2	Bracket Attachment	VT-3	Each 10-year Interval
	Shroud Support (Weld H9)				BWRVIP-38 3.1.3.2, Figure 3-5 & BWRVIP-104	Weld H9	EVT-1 or UT	Maximum of 6 years for EVT-1, Maximum of 10 years for UT
B13.40	Integrally Welded Core Support Structure – Shroud Support	Accessible Surfaces	VT-3	Each 10-year Interval	BWRVIP-38 3.1.3.2, 3.2.1, Figures 3-5 and 3-6 & BWRVIP-104	Weld H9 and Gusset Attachments	EVT-1 or UT	Maximum 6 years for EVT-1, 10 years for UT
	Shroud				BWRVIP-76 3.3 and 3.4	Vertical and Top Guide Ring Seg. Welds	EVT-1 or UT	Per Shroud repair Designer Recommendations.
					BWRVIP-76 3.5 and 3.6	Tie-rod Repair	EVT-1 and VT-3	JAF has a shroud repair consisting of ten tie-rods. Inspection frequency is within 10 years

Notes:
1. Per NYPA letter to NRC (JPN-97-013), "Core Spray Internals Inspection", dated March 24, 1997, JAF informed the NRC of a new commitment to perform Core Spray System piping and spargers inspections inside the reactor vessel in accordance with the BWRVIP-18 guidelines (Reference 11.1).
2. This table provided only an overview of the requirements. For more details, refer to ASME Section XI, Table IWB-2500-1, and the appropriate BWRVIP document.

James A. FitzPatrick Nuclear Power Plant
Reactor Internals Inspection History
(Updated through RO16, October 2004)

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summary of Inspection Results, Repairs, Replacements, and Re-inspections
Core Shroud	1994 to present	UT, EVT-1 VT-3 For Shroud Tie Rods	94/95 Outage: Planar flaws on H2, 35" length intermittent (ID/OD) less than 0.75" depth by UT; two small planar flaws on H3, 1.42" length (ID/OD) by UT . A calculated 136" of vertical weld were inspected by EVT-1 or UT with no relevant indications. 96 Outage: Crack like indications on H2, 55" length intermittent (OD) by EVT-1. This cracking is being mitigated by the shroud repair from 94/95 outage with 10 tie-rods; vertical crack like indications on SV5A intermittent (OD) totaling 6-3/4" in length out of total 92", and two horizontal 1/2" each (one OD and one ID). Crack like indications were less than 10% of weld length and are within allowables per BWRVIP-07. Shroud inspections included 25% vertical welds with 50% at beltline areas , and 3 tie-rods. A calculated 286" of vertical welds were inspected. No relevant indications on other welds. Tie-rod assemblies were found acceptable.
	Fall 1998 (RO13)	EVT-1	Baseline completed per BWRVIP-07 Guidelines (by EVT-1) for all vertical welds. 100% of beltline shroud welds inspected in RO-13. Relevant indications found in 5 welds as follows: *SV5A OD-There are 6 indications with a combined length of 9.3 inches. *SV5B OD-There are 18 indications with a combined indication length of 45.8 inches. *SV6A OD-There is 1 indication that is measured to be 1" long. *SV6B ID-There is 1 indication in the weld which is measured to be 0.8 inches long. *SH4 Indication-Indication is 3 inches from SV5A ID and is 6 inches long and goes across the SH4 horizontal weld. No relevant indications noted on other vertical welds.

Core Shroud (cont.)	Fall 2000 (RO14)	EVT-1	Re-inspected per BWRVIP-76 Guidelines: Vertical Welds SV5A, SV5B, SV6A and SV6B. Relevant indications found in these welds are as follows: *SV5A OD-There are 7 indications total with a combined indication length of 11.7" vertical and 3.3" circ. *SV5B OD-There are 19 indications total with a combined indication length of 50.7" vertical. *SV6A OD-There is one vertical indication that is measured to be 1" long. *SV6B ID-There is one vertical indication in the weld measured to be 1.25" long. *SH4 ID-There are 2 vertical indications across SH4 with total combined length of 6.4". The closest indication is 3" from SV5B. This indication is branching out near the bottom portion.
	Fall 2002 (RO15)	EVT-1	Re-inspected by BWRVIP-76 Guidelines: Vertical Welds SV2B, SV5B, and SV8A; and Radial Ring Welds SV3A and SV3D. Relevant indications were only noted on the SV5B weld, as follows: • SV5B ID and OD. There appears to be no discernable changes this outage affecting the cracks length from RO14; though one additional indication is noted on the ID CCW side of the weld approximately ½" long. This indication may be associated with indications on the opposite side (OD) at the same location.
	Fall 2004 (RO16)	EVT-1	Inspected Vertical Welds SV2A, SV8C, SV9A, SV9B and SV9C. No relevant indications noted.
Shroud Support	1992 to present	UT or EVT-1	92 Outage: Inspected 0 and 180 deg access covers by UT. One planar indication detected at 180 deg, which is believed to be inherent to the fabrication process and is not ID connected. 94/95 Outage: Inspected 40" of H9 weld and accessible areas of 10 gusset plates used for tie-rod repair. 96 Outage: Inspected access hole cover at 0 deg, and inspected 36" of H9 weld and gusset plate welds at 3 tie-rod locations. No relevant indications noted.
	Fall 1998 (RO13)	EVT-1 VT-3	Baseline completed per BWRVIP-07 and BWRVIP-38 guidelines for all shroud repaired tie rods and load transfer gusset plate welds. *7 out of 10 tie rod assemblies inspected (by EVT-1/VT-3) in Fall 1998. No relevant indications noted. *All load transfer gusset plate welds and 12 inches of H9 weld each side of the gussets were examined by EVT-1. 7 out of 10 gussets inspected in RO13. No relevant indications noted. Examined by EVT-1 the access hole cover at 180 degrees. No relevant indications noted.
	Fall 2000/2002		No inspections during RO14 and RO15

Shroud Support (cont.)	Fall 2004 (RO16)	EVT-1	Inspected two shroud support gusset plate welds and 12 inches of H9 top weld each side of the gussets. No relevant indications noted.
Core Spray Piping	1987 to present	VT-3, MVT-1 or EVT-1	IEB 80-13 of piping and welds in annulus. One clamp repair in 1988 at cracked weld in "B" loop at 190 deg below upper elbow piping. Welds were brushed and inspected by EVT-1 per BWRVIP-18 in Fall, 1996. No relevant indications found.
	Fall 1998 (RO13)	EVT-1, MVT-1	Re-inspected 100% of loop "A" and "B" welds per BWRVIP-18 Guidelines (by EVT-1). No relevant indications noted, except for a rub-mark near CSA-10 weld. Support brackets were examined by MVT-1. No recordable indications noted.
	Fall 2000 (RO14)	EVT-1	Re-inspected all Loop "A" and "B" creviced and T-box-to-pipe welds, including repair clamp welds per BWRVIP-18 Guidelines (by EVT-1). A relevant indication was noted on weld CSB-12. No other relevant indications were noted.
	Fall 2002 (RO15)	EVT-1	Re-inspected all Loop "A" and "B" creviced and T-box-to-pipe welds; repair clamp at Loop "B" downcomer pipe; and rotating sample of pipe elbow upper/lower welds in Loop "A" at 10 degrees. No relevant indications noted. Re-inspected the indication noted in RO14 on weld CSB-12. Level IIIs assessment is that the indication is now believed to be a scratch.
	Fall 2004 (RO16)	EVT-1	Re-inspected all Loop "A" and "B" creviced and T-box-to-pipe welds; repair clamp welds at Loop "B" downcomer pipe; and rotating sample of pipe elbow upper/lower welds in Loop "A" at 170 degrees. No relevant indications noted.
Core Spray Sparger	1987 to present	VT-3, MVT-1 or EVT-1	IEB 80-13 of sparger and welds. MVT-1 and EVT-1 inspections per BWRVIP-18 in Fall, 1996. An indication characterized as weld profile deficiency was recorded on spray nozzle D-28. Historical IVVI data was reviewed and the indication was previously noted and dispositioned as acceptable.
	Fall 1998 (RO13)	EVT-1, MVT-1	Re-inspected 100% of sparger piping "A" and "B" welds per BWRVIP-18 Guidelines (EVT-1/MVT-1) including tee boxes, end caps, drain welds, and support brackets. No relevant indications noted.
	Fall 2000	N/A	No inspections during RO14

Core Spray Sparger (*cont.)	Fall 2002 (RO15)	EVT-1	Re-inspected all T-box and end caps to sparger pipe welds at Loops "A", "B", "C", and "D". No relevant indications noted.
		VT-1	Re-inspected Sparger "C" and "D" nozzle welds, and supporting brackets at "A" and "B". No relevant indications noted.
	Fall 2004 (RO16)	VT-1	Re-inspected all sparger bracket support welds at "C" and "D". No relevant indications noted.
Top Guide (Rim, etc.)	1988, 1992 and 1994/1995	VT-3, and EVT-1	2 cells inspected in 1988 and in 1992; 4 cells in 1994. Additional inspections included , alignment wedges , hold down bolts, and rim welds at several locations (EVT-1 at rim welds in 94/95). No relevant indications noted.
	Fall 1998	N/A	No inspections during RO13
	Fall 2000 (RO14)	VT-1, and VT-3	A total of 4 hold down assemblies were examined by VT-1 and 3 alignment pin assemblies by VT-3 per BWRVIP-26 Guidelines. No indications were noted.
	Fall 2002 and 2004	N/A	No inspections in RO15 and RO16.
Core Plate (Rim, etc.)	1992 and 1994	VT-3	Inspection at one core plate in 1992. Inspected approximately 25% of hold down bolting in 1994/95. No relevant indications noted.
	Fall 1998 (RO13)	VT-3	Inspected 100% of hold down bolting. No relevant indications noted.
	Fall 2000 (RO14)	VT-3	Inspected core plate plugs at 5 core locations. No relevant indications noted.
	Fall 2002	N/A-	No inspections during RO15
	Fall 2004 (RO16)	VT-3	Inspected a total of 6 core plate plugs (at two locations). No relevant indications noted.
SLC	Fall 2000 (RO14)	EVT-2	Performed Enhanced VT-2 on SLC nozzle-to-safe end weld during RPV System Leakage Test per BWRVIP-27 Guidelines. Test was "Accepted".
	Fall 2002/2004 (RO15/16)	EVT-2	Performed Enhanced VT-2 on SLC nozzle-to-safe end weld during RPV System Leakage Test per BWRVIP-27 Guidelines. Test was "Accepted".

Jet Pump Assembly	1987 to1994	VT-1,VT-3 and UT	Inspected all riser brace attachment welds by VT-1. No relevant indications but found debris at some weld locations. Have replaced all jet pump beams in 1992 because one exhibited indications of cracking by UT exam. Also inspected pump assembly, sensing lines, supports and diffuser to shelf welds, all by visual. No relevant indications but found debris at some weld locations. Cracking at a Japanese BWR of a Jet Pump riser weld prompted FitzPatrick to review IVVI tapes from previous refueling outages, including 1996 outage. Viewed accessible areas at two welds by VT-1, and at three welds by VT-3 examination. No cracking was found in the reviewed welds.
	Fall 1998 (RO13)	MVT-1, and VT-3	Inspected by MVT-1 50% of all Jet Pumps (#7 to #16) for component safety priority H (high) and M (medium), per BWRVIP-41 Guidelines. No relevant indications noted. Interferences in the annulus region restricted inspection of AD-1 and AD-3b welds. Inspected by VT-3 sensing lines/brackets at same jet pumps (#7 to #16). No relevant indications noted.
	Fall 2000	N/A	No inspections during RO14
	Fall 2002 (RO15)	EVT-1, VT-1, and VT-3	Completed inspection of Jet Pumps 5 and 6, and portions of Jet Pumps 19 and 20, with no relevant indications noted. Used inspections guidelines of BWRVIP-41 and 48. There are no MX-1 welds on the inlet-mixer, but there are IN-4 and MX-2 welds. Interferences in the annulus region (gussets) prevented inspection of the AD-3b welds.
		VT-1	Inspected Jet Pump Beams at #5, 6, 19 and 20, at locations recommended by BWRVIP-41, and by latest Operating Experience. No relevant indications noted.
	Fall 2004 (RO16)	EVT-1	Performed "High – priority" riser weld inspections at Jet Pumps #1, 2, 3, 4, 17 and 18. No relevant indications noted. Performed diffuser/adapter assembly weld inspections (Also "High"- priority) at Jet Pumps #17 and 18. No relevant indications noted.
		VT-1	Performed wedge bearing surface (WD-1) inspections at Jet Pumps #17 and 18. No relevant indications noted.
Jet Pump Diffuser	1992 and 94	VT-3	See above.
	Fall 1998 (RO13)	MVT-1	See Jet Pump Assembly (above).

	Fall 2000	N/A	No inspections during RO14
Jet Pump Diffuser (cont.)	Fall 2002/2004 (RO15/16)	EVT-1/VT-1	See Jet Pump Assembly (above).
CRD Guide Tube	1992	VT-3	Inspected stub tube to vessel and stub tube to housing welds for 9 tubes. No relevant indications.
	Fall 1998	N/A	No inspections during RO13.
	Fall 2000 (RO14)	EVT-1 and, VT-3	Inspected accessible surfaces at 3 Guide Tubes per BWRVIP-47 Guidelines. Inspected accessible surfaces at 8 Guide Tubes (VT-3). No relevant indications noted.
	Fall 2002 (RO15)	EVT-1 and VT-3	Inspected accessible surfaces at 4 Guide Tubes per BWRVIP-47 Guidelines. No relevant indications noted.
	Fall 2004	N/A	No inspections in RO16.
CRD Stub Tube	1992	VT-3	See above.
	Fall 1998	N/A	No inspections during RO-13.
	Fall 2000/2002/ 2004	N/A	No inspection requirements per BWRVIP-47 Guidelines.
In-Core Housing	1992	VT-1	No relevant indications.
	Fall 1998	N/A	No inspections during RO-13.
	Fall 2000 thru 2004	N/A	No inspection requirements per BWRVIP-47 Guidelines.
Dry Tube	1994	VT-1	No indications. Replaced all dry tubes in 1987/88.
	Fall 1998	N/A	No inspections during RO-13.
	Fall 2000 (RO14)	VT-1	Inspected 4 IRM/SRM In Core Dry Tubes per GE SIL-409 and GE RICSIL-073 Guidelines. No relevant indications noted.
	Fall 2002 (RO15)	VT-1	Re-inspected SRM Core Dry Tube 20-17 per GE SIL 409 and GE RICSIL-073 Guidelines. No relevant indications noted
	Fall 2004	N/A	No inspections in RO16.
Instrument Penetrations	1992	VT-1	Two inspected in 1992. No relevant indications noted.
	Fall 1998	N/A	No inspections in RO13.

Instrument Penetrations (cont.)	Fall 2000 (RO14)	VT-2	Performed VT-2 ISI System Leakage Exam Test at 6 instrument nozzles (during RPV System Test) per BWRVIP-49 Guidelines. Test was conducted to the extent possible with insulation installed and shield doors closed. Test was "Accepted".
	Fall 2002 and 2004 (RO15/16)	VT-2	Performed a VT-2 leakage test at 6 instrument nozzles (same as in RO14-Fall 2000). Test was "Accepted".
Vessel ID Brackets	1987 to present	VT-1, VT-3, EVT-1 for core spray	Section XI inspections of jet pump riser brace, dryer, feedwater sparger, core spray, and surveillance capsule holder brackets, performed once per interval. Last inspection was Fall, 96 VT-3, or VT-1 if in beltline region. EVT-1 for core spray. No relevant indications noted.
	Fall 1998 (RO13)	MVT-1	Inspected Core Spray Brackets and Jet Pump Riser Brace Attachments per BWRVIP-48 requirements. No relevant indications noted.
	Fall 2000	N/A	No inspections in RO14
	Fall 2002 (RO15)	EVT-1	Inspected Jet Pump Riser Brace (at JP #5/6 and #19/20); and Feedwater Sparger Bracket Attachments (at all 8-locations), per BWRVIP-48 requirements. No relevant indications noted.
	Fall 2004 (RO16)	EVT-1	Inspected shroud support gusset plate welds to RPV wall at two locations, with no relevant indications.
		EVT-1, VT-3	Inspected all four steam dryer support brackets and attachment welds to RPV wall, with no relevant indications.
		VT-3	Inspected all four steam dryer hold-down brackets and attachment welds to RPV top head, with no relevant indications noted.
			Inspected guide rod and bracket to RPV weld at 180°, with no relevant indications noted.
LPCI Coupling	N/A	N/A	Not applicable to this plant.

Fuel Support Castings	Fall 1998 (RO13)	VT-3	Inspected accessible areas at fuel support castings during in-process control rod blade change-out. No relevant indications noted.
	Fall 2000 (RO14)	VT-3	Inspected accessible areas at fuel support castings during in-process control rod blade change-out. No relevant indications noted.
	Fall 2002 (RO15)	VT-3	Inspected accessible areas at four fuel support castings during in-process control rod blade change-out. No relevant indications noted.
	Fall 2004	N/A	No inspections in RO16
CRD Nozzle NIR	Fall 1998 (RO13)	VT-1	The Control Rod Drive Nozzle Inner Radius was examined. No relevant indications noted.
	Fall 2000 (RO14)	EVT-1	Examined the CRD Nozzle Inner Radius, including adjacent vessel wall area. No relevant indications noted.
	Fall 2002 and 2004	N/A	No inspections in RO 15 and RO16.
Steam Dryer Moisture Separator	Fall 1998 (RO13)	VT-3	Inspected 25% of shroud head bolts at storage pit. No relevant indications noted.
	Fall 2000 (RO14)	VT-3 and EVT-1	Re-inspected by VT-3 all areas of the steam dryer support ring and by EVT-1 previously found cracks (1992/1994). A total of 10 indications were noted in 2000 (RO14), with no discernable changes from previous inspection.
	Fall 2004 (RO16)	VT-1 and VT-3	Inspected steam dryer integrity per SIL 644 Supplement 1 (steam dryer integrity) and INPO OE 18796 (steam dryer hood crack and tie bar recordable visual indications) guidelines. Two relevant indications areas were noted. These indications resulted in expanded scope with additional brushing and evaluations. These indications are in the HAZ of vibration block welds and at a drain channel. All indications were satisfactorily dispositions by calculations. Plans are to re-inspect the indications in RO17.
		VT-3	Inspected steam dryer hold-downs and support brackets and attachment welds with no relevant indications noted.
			Inspected steam separator lifting rod eye assemblies, and 25% of shroud head bolts with no relevant indications noted.

Surveillance Capsule Specimen Holder	Fall 2000 (RO14)	VT-1 and VT-3	Inspected at one location, the upper and lower mounting bracket (VT-1) and the condition of the specimen holder (VT-3) No relevant indications noted.
Lower Plenum	Fall 2000 (RO14)	VT-3 VT-1	Inspected by VT-3 accessible areas of lower plenum per BWRVIP-47 Guidelines. No relevant indications noted. Inspected by VT-1 accessible areas of bottom head drain. After removal of debris the area was re-examined and found acceptable.
Feedwater Sparger	Fall 2002 (RO15)	VT-3 VT-1 UT	Inspected Sparger pipe assembly at 45, 135, 225 and 315 degrees azimuth, sparger welds and end brackets. No relevant indications noted. Inspected Junction T-box welds and Nozzle Inner Radius (NIR) at 45, 135, 225 and 315 degrees azimuth. No relevant indications noted. Inspected the NIR at all 4-locations. No relevant indications noted.

List of Components in the Reactor Internals Inspection Program and the Number of Welds/Components

Reactor Internal Component	BWRVIP Reference Document	Number of Welds/Components
Control Rod Drive Guide Tube Body Welds	BWRVIP-47-A, Table 3.3	2 per Component
Control Rod Drive Guide Tube Lug and Pin	BWRVIP-47-A, Table 3.3	2 per Component
Core Plate Rim Hold-Down Bolts	BWRVIP-25, Table 3-2	72 Bolts
Core Shroud Horizontal Welds (H1, H2, H3)	BWRVIP-76, Figure 3.1	3
Core Shroud Horizontal Welds (H4-H7)	BWRVIP-76, Figure 3.1	5
Core Shroud Vertical Welds	BWRVIP-76, Figure 3-3	11
Core Shroud TG Ring Segment Welds	BWRVIP-76, Section 3.4	6
Core Shroud CP Ring Segment Welds	BWRVIP-76, Section 3.4	6
Core Shroud Flange Ring Segment Welds	BWRVIP-76, Section 3.4	6
Core Shroud Tie-Rod Repair	BWRVIP-76, Section 3.5	10 Tie Rods
Core Shroud Support Welds (H8)	BWRVIP-76, Figures 3-1	1
Core Shroud Support Welds (H9)	BWRVIP-38, Figure 3-5 and BWRVIP-104, Section 9.2	1
Core Shroud Support Gussets	BWRVIP-38, Section 3.2.1 and Figure 3-6	22
Core Spray Thermal Sleeve Welds (Hidden)	BWRVIP-18-A, Section 3.2.4	1 (loop A) 2 (loop B)
Core Spray Piping Welds (except P9)	BWRVIP-18-A, Table 3-5	22 per loop (2 loops) & 1 weld repaired with a welded clam shell
Core Spray P9 Welds	BWRVIP-18-A, Section 3.2.4	2 per loop (2 loops)
Core Spray Sparger Large Circ Welds	BWRVIP-18-A, Table 3-5	5 per loop (4 loops)
Core Spray Sparger Nozzle Welds	BWRVIP-18-A, Table 3-5	52 nozzles per loop (4 loops) see Note 1 on next page
Core Spray Piping Brackets	BWRVIP-18-A, Table 3-5	2 per loop (2 loops)
Core Spray Sparger Brackets	BWRVIP-18-A, Table 3-5	6 per loop (2 loops)
Feedwater Sparger Tee Welds	NUREG 0619	3 per loop (4 loops)

Feedwater Sparger End Bracket Attachment	BWRVIP-48-A, Table 3-2	2 per loop (4 loops)
Feedwater Sparger Piping and Brackets	NUREG 0619	2 brackets per loop (4 piping loops)
Jet Pump Beams	BWRVIP-41, Table 3.3-1 and BWRVIP-13, Sections 4 and 6	20
Jet Pump Thermal Sleeve Welds (Hidden)	BWRVIP-41, Table 3.3-1	3 per Jet Pump (10 Jet Pumps)
Jet Pump Riser Welds (RS-1, RS-2, RS-3)	BWRVIP-41, Table 3.3-1	3 per Jet Pump (10 Jet Pumps)
Jet Pump Riser Welds (RS-6, RS-7, RS-8, RS-9)	BWRVIP-41, Table 3.3-1	4 per Jet Pump (10 Jet Pumps)
Jet Pump Riser Brace Welds	BWRVIP-41, Table 3.3-1	8 per Jet Pump (10 Jet Pumps)
Jet Pump Inlet Bolted Connection	BWRVIP-41, Table 3.3-1	2 per Jet pump (10 Jet Pumps)
Jet Pump Restrainer Wedges	BWRVIP-41, Table 3.3-1	2 per Jet Pump (10 Jet Pumps)
Jet Pump Mixer Weld MX-1	BWRVIP-41, Table 3.3-1	2 per Jet Pump (10 Jet Pumps)
Jet Pump Adapter/Diffuser Welds	BWRVIP-41, Table 3.3-1	14 per Jet Pump (10 Jet Pumps)
Lower Plenum (CRD)	BWRVIP-47-A	137 CRDs
Miscellaneous Vessel Internal Attachments	BWRVIP-48-A, Table 3-3	12
Orificed Fuel Support Castings	BWRVIP-47-A, Table 3.2-1	137
SLC Nozzle-to-Safe End Weld	BWRVIP-27-A, Section 3.3.1	1
Steam Dryer Support and Holdown Bracket	BWRVIP-48-A, Table 3-2	8
Top Guide Hold-down Assemblies	BWRVIP-26-A, Table 3-2	4
Top Guide Grid Beams	BWRVIP-26-A, Section 3.2	28

Note 1: There are between 2 and 4 welds per nozzle depending on nozzle configuration. There are two drain nozzles on 2 lower spargers.