

2010-052 _____ BWR Vessel & Internals Project (BWRVIP)

February 16, 2010

Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Attention: Michael McCoppin

Subject: Project No. 704 – BWR Vessel and Internals Inspection Summaries for Spring 2009 Outages

Enclosed are five (5) copies of the document entitled “BWR Vessel and Internals Project, Vessel Internals Inspection Summaries for Spring 2009 Outages, February 2010.”

The information provided in the enclosed document identifies the BWR internal components inspected and generally includes the date or frequency of inspection, the inspection method used and a summary of results including repair or replacement activities. Please note that the inspection summaries now include the results of the BWRVIP-75-A Dissimilar Metal Weld examinations. This information is being used by the BWRVIP to track the material performance of the associated vessel internal components. The enclosed document is being provided to the NRC for information only.

The information contained in the enclosed document was developed by the individual utilities and has been compiled into the enclosed document by the BWRVIP. The BWRVIP plans to continue to gather such information and to provide periodic updates such as in the enclosed document.

Representatives of the BWRVIP would be pleased to meet with the NRC staff to discuss any comments or questions related to the enclosed document. If you have any questions on the enclosed document or the general subject of inspection results, please call Chuck Wirtz, BWRVIP Integration Committee Technical Chairman, FirstEnergy, at 440.280.7665.

Sincerely,



Rick Libra
Exelon
Chairman, BWR Vessel and Internals Project

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*Good
well*

BWR Vessel and Internals Project

**Vessel Internals Inspection Summaries
for Spring 2009 Outages**

February 2010

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Reactor Internals Inspection History

Plant: **Browns Ferry Nuclear Plant: Unit 2**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	1994	UT	Baseline (1994) per GE SIL No. 572 for circumferential seam welds - indications found in several welds (H2, H3, H5).
	1996	UT	Reinspection (1996) per GE SIL No. 572 - indications found in H1, H6, and H7 welds along with previous indications. Full structural margins on flawed welds for at least one additional operating cycle. Vertical welds not inspected.
	1997	UT	Reinspection (1997): UT examination of H1, H2, H3, H4, H5, H6, & H7 performed per BWRVIP I&E guideline. Six new indications recorded. All other indications recorded in earlier outages exhibited no significant flaw growth. Satisfactory structural margins on the flawed welds for at least one additional operating cycle. Vertical welds not inspected. All seven horizontal welds will be reinspected in 2007, along with any required vertical welds.
	2007	UT	Reinspection (2007): UT examination of H1 (single-sided) and H2, H3, H4, H5, H6, H7, V7, and V8 (two-sided) performed per BWRVIP-76. The length of the weld inspected was at least 50 percent of the weld circumference in all cases. Flaws observed in six (H1, H2, H3, H4, H5, & H7) horizontal welds were less than 20 percent of examined length. Barring license renewal impacts, all seven horizontal welds (along with any required vertical welds) will not be reinspected until 2017.

Shroud Support	1996	EVT-1, UT	(1996): Access Hole Cover Welds at 0° and 180° UT examined in both the radial and circumferential directions per the requirements of GE SIL No. 462. No reportable indications on either cover.
	1999	EVT-1	Baseline (1999): EVT-1 inspection per BWRVIP-38 for Shroud Support Welds H-8 and H-9 at 0 and 180 degree locations. No reportable indications. Reinspection (1999): UT inspection of access hole cover locations at 0 and 180 degrees. No reportable indications.
	2005	EVT-1, UT	Reinspection (2005) of access hole cover locations at 0 and 180 degrees per GE SIL No. 462 R1 (EVT-1). No reportable indications were found. Reinspection (2005) of Shroud Support Welds H-8 (EVT-1) and H-9 (manual UT) per BWRVIP-38, -104. No reportable indications were found.
	2009	EVT-1, UT	(2009): Baseline UT inspection using phased array per BWRVIP-180 of access hole cover locations at 0 and 180 degrees. Supplemental EVT-1 examinations performed of those areas that were not accessible for UT. No relevant indications.
Core Spray Piping	1996 1997 1999	EVT-1, UT, VT-1	(1996): Inspection per IEB 80-13/GE SIL No. 289 RIS2 of piping and welds in annulus. No reportable indications. Baseline inspection (1997) per BWRVIP-18: Inspected all accessible welds (T-Box, welds on Downcomers "A", "B", "C", & "D") with UT and inaccessible welds (Piping Bracket (PB) welds) with VT. No reportable indications. (1999) Inspected Piping Bracket (PB)

	2001	EVT-1, UT, VT-1	<p>welds; P4d, P8a, P8b welds on "A", "B", "C", "D" downcomers) per BWRVIP-18 (EVT-1). No reportable indications.</p> <p>Reinspection (2001) per BWRVIP-18: EVT-1 visual examination of T-Box welds. No reportable indications. UT examination of Downcomer "A" elbow welds and Downcomer "A", "B", "C", & "D" sleeve welds. No reportable indications.</p>
	2003	EVT-1, UT, VT-1	<p>Reinspection (2003) per BWRVIP-18: EVT-1 visual examination of T- Box welds. No reportable indications.</p>
	2005	EVT-1, UT, VT-1	<p>Reinspection (2005) per BWRVIP-18: EVT-1 visual inspections (T-Box welds @ 120 degrees and 240 degrees). No reportable indications. UT examination of Downcomer "B" elbow welds and Downcomer "A", "B", "C", & "D" sleeve welds. No reportable indications.</p>
	2007	EVT-1, UT, VT-1	<p>Reinspection (2007) per BWRVIP-18: EVT-1 visual examinations (T-Box welds @ 120 and 240 degrees, Piping Bracket (PB) welds @ 15, 110, 130, 165, 195, 230, 250, and 345 degrees). No reportable indications.</p>
	2009	EVT-1, UT, VT-1	<p>Reinspection (2009) per BWRVIP-18, Rev. 1: EVT-1 visual inspections (T-Box welds @ 120 and 240 degrees). No reportable indications. UT examination of Downcomer "C" elbow welds and Downcomer "A", "B", "C", & "D" sleeve welds (supplemental EVT-1 on Welds 8a and 8b). No relevant indications.</p>
Core Spray Sparger	1996	EVT-1, VT-1, VT-3	<p>(1996): Inspection per IEB 80-13 of welds on sparger. One small indication in lower tack weld of the nozzle to "B" sparger in Nozzle 3B. No other indications were recorded.</p>

	1997	EVT-1, VT-1, VT-3	Reinspection (1997): No reportable indications found. Small linear indication on tack weld for Nozzle 3B observed during 1996 exam was not found upon reexamination.
	1999	EVT-1, VT-1, VT-3	Reinspection (1999) per BWRVIP-18: EVT-1 and VT-3 of sparger welds. No reportable indications found.
	2003	EVT-1, VT-1, VT-3	Reinspection (2003) per BWRVIP-18: EVT-1 (S1, S2, S4) and VT-1 (S3a, S3b, S3c, SB) inspections of sparger welds. No reportable indications.
	2007	EVT-1, VT-1, VT-3	Reinspection (2007) per BWRVIP-18: EVT-1 (S1, S2, S4) and VT-1 (S3a, S3b, S3c, SB) inspections of sparger welds. Upper Sparger bracket at 273 degrees is displaced from the lower brackets. Otherwise, no reportable indications.
Top Guide (Rim, etc.)	1996	EVT-1, VT-1, VT-3	(1996): Lower side of beams (in cells where fuel and blade guides are removed) VT-3 inspected in accordance with GE SIL No. 554. No indications were recorded.
	1997	EVT-1, VT-1, VT-3	Reinspected (1997): Top Guide Alignment Pins & Bolts visually inspected per SIL 588. No indications found.
	1999	EVT-1, VT-1, VT-3	Baseline inspection (1999) per BWRVIP-26: Inspected Rim Welds (Location 11) (EVT-1) and Aligner Pins (Locations 2/3) (VT-1) at 2 locations. No reportable indications found.
	2001	EVT-1, VT-1, VT-3	Expanded baseline inspection (2001) per BWRVIP-26: Locations 1, 4, 6, 10, 12, 13, 15, and 16 EVT-1 inspected; no reportable indications
	2003	EVT-1,	Reinspection (2003) per BWRVIP-26:

		VT-1, VT-3	Locations 2 and 3 (VT-1) and Location 11 (EVT-1) examined on two adjacent aligner assemblies with no reportable indications.
	2007	EVT-1, VT-1, VT-3	Reinspection (2007) per BWRVIP-26: Locations 2 and 3 (VT-1) and Location 11 (EVT-1) examined on two adjacent aligner assemblies with no reportable indications.
Core Plate (Rim, etc.)	1996	VT-3	(1996): The core plate bolts were visually inspected in accordance with GE SIL No. 588. No indications were recorded.
	1997	VT-3	Reinspected (1997) per BWRVIP-25 with one plug not seated; otherwise no indications found.
	1999	VT-3	(1999): Inspected core plate bolts (VT-3) at accessible locations per BWRVIP-25 with no reportable indications.
	2001	VT-3	Reinspection (2001) per BWRVIP-25: Holddown Bolts (Location 10) VT-3 inspected with no reportable indications. Plugs (Location 13) VT-3 inspected with no reportable indications. Aligner Pin Socket to Rim Welds (Location 8) were inaccessible.
	2003	VT-3	Reinspection (2003) per BWRVIP-25: All thirty-four (34) holddown bolts (Location 10) were VT-3 inspected with no reportable indications. Fifteen (15) plugs (Location 13) were VT-3 inspected with no reportable indications.
	2005	VT-3	Reinspection (2005) per BWRVIP-25: All thirty-four (34) holddown bolts (Location 10) were VT-3 inspected with no reportable indications. Thirty-three (33) plugs (Location 13) were VT-3 inspected with no reportable indications.

	2007	VT-3	Reinspection (2007) per BWRVIP-25: All thirty-four (34) holddown bolts (Location 10) were VT-3 inspected with no reportable indications. Sixteen (16) plugs (Location 13) were VT-3 inspected with no reportable indications.
	2009	VT-3	Reinspection (2009) per BWRVIP-25: All thirty-four (34) holddown bolts (Location 10) were VT-3 inspected with no relevant indications. Core plate plugs (Location 13) adjacent to three (3) control rod guide tubes inspected with no relevant indications.
SLC	Prior to 2005	VT-2	(Prior to 2005): Nozzle is leak checked every outage and volumetric exams are conducted per ASME Section XI code requirements. No indications noted.
	2005	EVT-2	(2005): Bare metal examination (EVT-2) performed per BWRVIP-03, -27. No reportable indications found.
	2007	EVT-2	(2007): Bare metal examination (EVT-2) performed per BWRVIP-03, -27. No reportable indications found.
	2009	EVT-2	(2009): Bare metal examination (EVT-2) performed per BWRVIP-03, -27. No relevant indications found.
Jet Pump Assembly	1996	EVT-1, MVT-1, VT-1, VT-3	(1996): VT-3 inspection of sensing lines per GE SIL No. 420 - no indications recorded. Jet pump throats inspected per GE SIL No. 465 for Jet Pumps 11 & 12 - build-up found in inlet mixer that may require internal cleaning during next refueling outage. Riser braces for Jet Pumps 11-20 VT-1 inspected per GE SIL No. 551 - no indications were recorded. Jet pump adjusting screws VT-1 inspected per GE SIL No. 574 - minor indications on set screw tack welds for Jet Pumps 1, 11, & 12 that were evaluated and determined to be irrelevant due to their small size. NOTE: Group I

			jet pump beams were replaced with Group II beams (that are high temp. annealed and have a reduced preload) during the Cycle 4 Outage (1983).
	1997	EVT-1, MVT-1, VT-1, VT-3	Reinspected (1997): Jet Pumps 1 thru 20 - Adjusting Screws (VT-3), Riser Elbow Welds (MVT-1), & Sensing Lines. Jet Pumps 1 thru 10 - Riser Braces. GE SIL Nos. 574, 551, 60, 420, & RICSIL 078 used as guidance. Previous indication on set screw tack weld for Jet Pump 1 not found. Previous indication on set screw tack welds for Jet Pumps 11 & 12 unchanged. Slight gap observed on shroud-side set screw for Jet Pump Nos. 7 & 16, vessel-side set screw for Jet Pump No. 14. No other reportable indications.
	1999	EVT-1, VT-1, VT-3	Baseline (1999) per BWRVIP-41: VT-3 of holddown beam locations BB-1 and BB-2 to verify proper function of beam (all 20 jet pumps) - no indications. EVT-1 of High Priority Locations RS-1, RS-2, RS-3, DF-2, AD-1, AD-2, AD-3a, AD-3b (all 20 jet pumps); no reportable indications.
	2001	EVT-1, VT-1	Baseline (2001) per BWRVIP-41: EVT-1 of Medium Priority Locations RB-1a-d, RB-2a-d; no reportable indications.
	2003	EVT-1, VT-1	Baseline (2003) per BWRVIP-41: EVT-1 of holddown beam locations BB-1 and BB-2 (Jet Pumps 11 thru 20) - no reportable indications. EVT-1 of Medium Priority Locations RS-6, RS-7, RS-8, RS-9, IN-4, MX-2, DF-1 (Jet Pumps 11 thru 20); no reportable indications. VT-1 of Medium Priority Location WD-1; wear noted on inlet-mixer wedge and restrainer bracket pad for Jet Pump Nos. 13, 14, 17 (the most severe), and 20. Scope expanded to

	2005	UT, VT-1	<p>perform VT-1 of WD-1 for Jet Pumps 1 thru 10; wear noted on inlet-mixer wedge/restrainer bracket pad for Jet Pump No. 4. Reinspection (EVT-1) of Riser Brace Welds RB-1a-d and Riser Pipe Weld RS-1 (Jet Pumps 3/4, 13/14, 17/18, 19/20), along with additional baseline inspection (EVT-1) of Riser Pipe Welds RS-8 and RS-9 (Jet Pumps 3/4) performed per Justification for Continued Operation (JCO) issued for continued operation of Jet Pumps 4, 13, 14, 17, and 20 through U2C13 Fuel Cycle; no reportable indications. VT-1 of Set Screw Locations AS-1 and AS-2 performed for Jet Pumps 4 (additional scope) and 11 thru 20; previous indications on vessel-side set screw (Jet Pump 11) and shroud-side set screw (Jet Pump 12) observed with no changes, previous set screw gap on vessel-side set screw for Jet Pump 14 not observed, previous set screw gap on shroud-side set screw for Jet Pump 16 observed - gap is approximately 1/5 of a thread width.</p> <p>Baseline (2005) per BWRVIP-41, -138: UT (newly-qualified technique) of holddown beam locations BB-1, BB-2, and BB-3 (Jet Pumps 1 thru 20) - no reportable indications.</p> <p>Reinspection (2005) per BWRVIP-41: VT-1 of Medium Priority Location WD-1 (Jet Pumps 1 thru 20); wear noted on inlet-mixer wedge and restrainer bracket pad for Jet Pump Nos. 4, 7, 13, 14, 17 (the most severe), and 20. No additional wear noted since 2003 inspection. Wedge rod wear noted for Jet Pump Nos. 4, 8, 17, and 20. Dimensional problems with slip joint clamps prevented their scheduled installation on five (5) jet pumps. Qualitative Assessment justified continued operation of jet pumps through U2C14 Fuel Cycle. VT-1 of Set Screw</p>
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	2007	EVT-1, VT-1	<p>Locations AS-1 and AS-2 performed for Jet Pumps 1 thru 20. Backlighting identified ten (10) set screw gaps ranging from 8 to 44 mils in width. One reportable linear indication identified on outboard shroud-side set screw tack weld for Jet Pump No. 12. Nine (9) auxiliary wedges installed on Jet Pumps 1, 2, 4, 5, 10, 12, 14, 16, and 20.</p> <p>Baseline (2007) per BWRVIP-41: EVT-1 of Medium Priority Locations RS-6 & RS-7 (Jet Pumps 1 thru 10), RS-8 & RS-9 (Jet Pumps 1, 2, 5 thru 10), IN-4, MX-2, & DF-1 (Jet Pumps 1 thru 10); no reportable indications.</p> <p>Reinspection (2007) per BWRVIP-41:</p> <p>EVT-1 of Medium Priority Locations RB-1a-d, RB-2a-d (Jet Pumps 1 thru 6), RS-8 & RS-9 (Jet Pumps 3 & 4); no reportable indications.</p> <p>EVT-1 of High Priority Locations RS-1, RS-2, RS-3, DF-2, AD-1, AD-2, AD-3a, & AD-3b (Jet Pumps 1 thru 10); no reportable indications.</p> <p>VT-1 of Medium Priority Location WD-1 (Jet Pumps 1 thru 20); vibration-induced wear noted on inlet-mixer wedge and restrainer bracket pad for Jet Pump Nos. 3 (new) along with 4, 13, 14, 17, and 20 (existing but unchanged since 2003 inspection). Slip joint clamps installed on these six (6) jet pumps. Service-induced wear noted on inlet-mixer wedge for Jet Pump Nos. 4 (existing but unchanged since 2005 inspection) along with 5, 12, 16, and 19 (new). Minor rod wear observed for Jet Pump Nos. 3, 5, 13, & 15 (new) along with 4, 8, 17, & 20 (existing, but unchanged since 2005).</p>
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	2009	EVT-1, VT-1	<p>VT-1 of Set Screw Locations AS-1 and AS-2 performed for Jet Pumps 1 thru 20. Backlighting identified four (4) set screw gaps ranging from 7 to 12 mils in width. Vessel-side gap on Jet Pump 9 grew from 9 to 19 mils following attempts to reseal inlet-mixer. One reportable linear indication identified on inboard vessel - side set screw tack weld for Jet Pump No. 15. Nine (9) auxiliary wedges installed in 2005 inspected to verify contact; no reportable indications.</p> <p>Reinspection (2009) per BWRVIP-41, Rev. 1:</p> <p>VT-1 of Medium Priority Location WD-1 (Jet Pumps 1 thru 20); vibration-induced wear noted on inlet-mixer wedge and restrainer bracket pad for Jet Pump Nos. 7 and 18 (new) along with 3, 4, 13, 14, 17, and 20 (existing but unchanged from previous inspections). Slip joint clamps installed on Jet Pumps 7 and 18. Service-induced wear noted on inlet-mixer wedge for Jet Pump Nos. 5, 6, 8, 9, 10, 12, and 16.</p> <p>VT-1 of Set Screw Locations AS-1 and AS-2 performed for Jet Pumps 1 thru 20. Backlighting identified three (3) set screw gaps that exceeded the 15-mil criteria for installation of an auxiliary spring wedge. Auxiliary spring wedges installed on shroud-side set screw for Jet Pump No. 7 and the vessel-side set screw for Jet Pump Nos. 9 and 13. Three relevant weld indications were noted on the inboard vessel-side set screw tack welds for Jet Pump Nos. 11 (first identified during U2C7 Refueling Outage (RFO) in 1994), 13, and 15 (first identified during U2C13 RFO in 2005).</p> <p>Six (6) slip joint clamps installed in 2007 inspected to verify hardware remains as</p>
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			<p>installed; no relevant indications.</p> <p>VT-3 visual examination of sensing line clamps installed during U2C14 RFO (2007) on Jet Pumps 1-5 and 11-15 performed to confirm that all of the repair hardware is in place and that the hardware has not shifted or changed from the as-installed condition. No relevant indications were observed.</p>
Jet Pump Diffuser	N/A	N/A	N/A
CRD Guide Tube	<p>2005</p> <p>2007</p> <p>2009</p>	<p>EVT-1, VT-3</p> <p>EVT-1, VT-3</p> <p>EVT-1, VT-3</p>	<p>Baseline (2005) per BWRVIP-47: 10 control rod guide tubes examined. VT-3 visual examination of Locations CRGT-1 and FS/GT-ARPIN-1, EVT-1 visual examination of Locations CRGT-2 and CRGT-3; no reportable indications.</p> <p>Baseline (2007) per BWRVIP-47: 3 control rod guide tubes examined. VT-3 visual examination of Locations CRGT-1 and FS/GT-ARPIN-1, EVT-1 visual examination of Locations CRGT-2 and CRGT-3; no reportable indications.</p> <p>Baseline (2009) per BWRVIP-47: 3 control rod guide tubes examined. VT-3 visual examination of Locations CRGT-1 and FS/GT-ARPIN-1, EVT-1 visual examination of Locations CRGT-2 and CRGT-3; no relevant indications.</p>
CRD Stub Tube	N/A	N/A	<p>A general area inspection was performed in 1991 while a jet pump was removed. The periphery stub tubes and housing were visible. No indications or abnormalities were noted.</p>
In-Core Housing	N/A	N/A	N/A
Dry Tube	1994	VT	<p>Dry tubes inspected during U2C7 Refueling Outage per the requirements of GE SIL No. 409. Cracking was observed; tubes replaced with modified design which is resistant to cracking during U2C7 Refueling Outage.</p>

			Inspections will be scheduled after dry tubes have reached the expected 20-year life (2013).
Instrument Penetrations	2009	VT-2	Visual leak check is performed during each refueling outage. No reportable indications reported to date.
	2009	UT	UT performed on RPV Instrument Nozzles N11A/B, N12A/B, and N16A/B in response to indication found on N11B safe end-to-pipe weld during U1C7 Refueling Outage. Flaw was found in N12A austenitic stainless steel safe end material approximately 0.5" from safe end-to-pipe weld. Full structural weld overlay was applied to maintain pressure boundary integrity.
Vessel ID Brackets	1996	EVT-1, VT-1, VT-3	(1996): The dryer support brackets, guide rod brackets, feedwater sparger brackets, core spray piping brackets, jet pump riser support bracket, and shroud support were visually inspected in accordance with BFN Surveillance Instruction 2-SI-4.6.G. No indications recorded to date.
	1997		Reinspection (1997): No reportable indications.
	2001		Reinspection (2001): No reportable indications.
	2003		Reinspection (2003): No reportable indications.
	2007		Reinspection (2007): Core Spray Piping (VT-3) and Jet Pump Riser Brace (EVT-1) visually examined; no reportable indications. EVT-1/VT-3 examination performed of all twelve (12) Feedwater Sparger End Brackets. Minor wear observed under the retaining pin for the end bracket at eight (8) locations. Qualitative assessment performed to accept-as-is for one cycle. Additional

	2009	EVT-1, VT-1, VT-3	<p>inspections during the U2C15 RFO in 2009 will be scheduled to determine the extent of any additional wear.</p> <p>Reinspection (2009): VT-3 visual examination performed of all twelve (12) Feedwater Sparger End Brackets. Minor wear observed under the retaining pin for the end bracket at eight (8) locations during previous inspection in 2007 was unchanged. Qualitative assessment performed to accept-as-is for one cycle. Additional inspections during the U2C16 Refueling Outage in 2011 will be scheduled to determine the extent of any additional wear. In addition, a contingency modification will be developed in the event that the inspection results dictate that repair of the end bracket is required for continued operation.</p>
LPCI Coupling	N/A	N/A	Not applicable to this plant
Steam Dryer	1989	VT-3	(1989): During Unit 2 Restart, cracking was found in 3 of 8 Unit 2 Steam Dryer Drain Channel to Skirt Attachment Welds. Repair of the cracked welds and reinforcement of all 8 welds for future mitigation performed.
	1994	VT-3	(1994): Welds associated with Drain Channel #4 (Azimuth 310°) visually inspected (VT-3) in accordance with vendor requirements. No reportable indications were noted.
	1997	VT-1, VT-3	(1997): Welds associated with Drain Channel #1 (Azimuth 50°) were visually inspected (VT-3) in accordance with vendor requirements. No reportable indications were noted.
	2001	VT-1, VT-3	(2001): Welds associated with Drain Channel #2 (Azimuth 130°) were visually inspected (VT-3) in accordance with vendor requirements. No reportable

	2005	VT-1, VT-3	<p>indications were noted.</p> <p>(2005): The following locations were visually inspected (VT-1) in accordance with BWRVIP-139 and GE SIL 644 R1:</p> <ul style="list-style-type: none"> • Horizontal and vertical welds which outline the steam dryer outer bank • Cover plate between the outer hood vertical plate and the support ring • Weld seams associated with the outer side of the inner banks • Dryer manway @ 90° <p>No reportable indications were noted.</p> <ul style="list-style-type: none"> • Stabilizer/Tie Bars - Deformation noted on center tie bars between Banks 3 & 4: All 3 locations (0°, center, 180°). Evaluation performed to accept-as-is for next fuel cycle (U2C14 Fuel Cycle), which is the final fuel cycle prior to Extended Power Uprate (EPU) implementation. <p>The following locations were inspected in accordance with INPO OE:</p> <ul style="list-style-type: none"> • Leveling screw tack welds @ 5° & 185° - No reportable indications were noted. • Dryer surfaces - Light to heavy Noble Metal coating observed in many areas, some with flaking (NRI). Also, a metal abrasion was noted above the lower guide bracket (NRI). <p>Welds associated with Drain Channel #3 (Azimuth 230°) visually inspected (VT-3) i.a.w. vendor requirements. No reportable indications were noted.</p>
	2007	VT-1	<p>Stabilizer/Tie Bars - No apparent change to deformation noted on center tie bars between Banks 3 & 4: All 3 locations (0°, center, 180°). Small deformation noted for Tie Bar 4/5-1. In addition, the Dryer Center Bank Divider was observed to be bent. Evaluation performed to accept-as-is until Extended Power Uprate (EPU) implementation.</p>

	2009	VT-1, VT-3	<p>Pre-EPU inspection of Steam Separator Standpipe Welds performed to look for fatigue cracking; no reportable indications.</p> <p>Pre-EPU inspection of all 48 Shroud Head Bolts performed to look for wear in locking pin window and on mid-span and top support ring gussets; no reportable indications.</p> <p>(2009): The “green” weld locations (locations associated with field cracking throughout the BWR fleet) were visually inspected (VT-1) in accordance with BWRVIP-139. 9 anomalies were identified:</p> <ul style="list-style-type: none"> • 3 tie bars severed at one end (TBs-3/4-01, -02, & -03) • TB-4/5-02 contained an indication on the SE end of the bar in the weld • 4 tie bars were slightly bowed (TBs-1/2-01, -02, 5/6-01, -02) • Center Divider (Baffle) Plate between Banks 3 and 4 was deformed <p>Weld was repaired for TB-4/5-02 and seven (7) broken/damaged tie bars replaced with EPU-qualified replacements.</p> <p>Scope was expanded to visually inspect (VT-1) all “red” weld locations (locations important to dryer integrity) in accordance with BWRVIP-139. In addition, high stress weld locations as identified in the steam dryer analysis for EPU were VT-1 inspected as well as locations subject to load increase once the center tie bars failed (due to vane bank displacement). During the course of these additional scope exams, three vertical welds (2V01, 2V10, and 5V10) on the ends of the 3/8-inch plate attached to the vane bank dryer units were found to have no weld metal present for approximately six inches at the top of the</p>
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			<p>welds. These three welds were repaired and restored to their original design condition.</p> <p>All repairs will be inspected during the U2C16 RFO in 2011 to ensure that structural integrity of the dryer is maintained. Additionally, any original tie bars that have not yet been replaced will be replaced during the U2C16 RFO in preparation for initiation of EPU operation during the U2C17 Fuel Cycle.</p> <p>Dryer Drain Channel Welds associated with Drain Channels 1-4 and Dryer Manway Cover were VT-1 inspected in accordance with BWRVIP-139. No relevant indications were observed.</p> <p>Seismic Lugs at 90 and 270 degrees were VT-3 inspected for general overall condition. No relevant indications were observed.</p> <p>The following locations were inspected in accordance with INPO OE:</p> <ul style="list-style-type: none"> • Leveling screw tack welds at 5 and 185 degrees were VT-1 inspected - No relevant indications noted. • Dryer hood exterior surfaces above the support ring were VT-3 inspected - light to heavy scale deposits were found.
DM Welds - BWRVIP-75-A Cat. C	2009	N/A	No Cat. C DM Welds were inspected during the U2C15 Refueling Outage.
DM Welds - BWRVIP-75-A Cat. D	2009	N/A	No Cat. D DM Welds were inspected during the U2C15 Refueling Outage.

Reactor Internals Inspection History

Plant: **Brunswick Unit 2**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Re-inspections
Core Shroud	1993	EVT-1 and UT	EVT-1 baseline, except UT on H4. Installed pre-emptive clamp repair on H2/H3. Indications in several circumferential welds. Full structural margins on non-repaired welds.
	1995	UT	UT re-inspected H4 with no growth in indications. UT baseline H1, H6A, H6B and H7. Several indications noted with full structural margins maintained. VT-1 and VT-3 inspected 3 repair brackets with no indications noted.
	1997	UT	UT re-inspected H4 and H6B (lower) with no growth in indications noted. Full structural margins maintained. UT baseline H5 with no indications noted. VT-1 and VT-3 inspected 3 repair brackets with no indications noted.
	1999	UT/EVT-1	UT re-inspected H1, H4 and H6B with no growth in indications noted. Full structural margins maintained. EVT vertical welds V3, V4, V5, and V6 with no indications. VT-1 and VT-3 inspected 3 repair brackets with no indications noted.
	2001	UT/EVT-1	UT re-inspected 100% of H6b and two selected areas of H4. Problems were encountered with lift-off of the UT package. The inspection data is still under investigation. EVT-1 of OD of vertical welds V9, V10, and V11 with no indications noted. VT-1/VT-3 inspected 3 repair clamps with no indications noted.

	2003	EVT-1	EVT-1 of vertical welds V1 and V2. No indications noted.
		VT-1/VT-3	VT-1/VT-3 of shroud repair clamps SRB225, SRB255, SRB285, and SRB315. No indications noted.
	2005	VT-1/VT-3	Four of 12 Shroud repair brackets SRB105, SRB135, SRB165, and SRB195. No indications noted.
		UT	H1 Upper - Deferred
		"	H1 Lower 61.2% examined
		"	H4 Upper 94.2% examined
		"	H4 Lower 89.7% examined
		"	H6a Upper 75% examined
		"	H6a Lower 67.1% examined
		"	H7 Upper & Lower Deferred
			No significant growth of existing cracks or new cracking noted.
	2007	UT	H1 upper – 95% examined – 2% flawed H5 – 100% examined – 0% flawed H6b – 99% examined – 59% flawed – average flaw depth is 0.12” H7 – 83% examined – 3% flawed No growth noted.
		VT-1/VT-3	4 of the 12 Core Shroud repair clamps for H2&H3. No indications.
		EVT-1	V9, V10, V11 – one side only. ID is inaccessible. No indications.
	2009	VT-1/VT-3	4 of the 12 Core Shroud repair clamps for H2&H3. NRI
		EVT-1	(V1,V2)-OD,(V3,V4, & V6)-OD & ID 1 RI on V2, 5 RI's on V6 all < 10%
Shroud Support	1994	EVT-1	VT-1 of access cover welds inspected - no indications noted.
	1996	UT	H9 inspected with no indication noted.
	1991 and 1994	UT	Access hole covers UT's for radial and circumferential indications with no

			indications noted.
	1999	N/A	No inspections performed.
	2001	N/A	No inspections performed.
	2003	EVT-1	EVT-1 of both access hole covers. No indications noted.
	2005	UT	H9 ~ 60% examined, One relevant indication noted.
	2007	EVT-1	H8 & H9 at 0 & 180 deg Access Hole Covers at 0 and 180 deg No indications noted.
	2009	N/A	No inspections performed this outage.
Core Spray Piping	1980's to Present	MVT-1 and EVT-1	IEB 80-13 of piping and welds in annulus. One indication on annulus header piping at the header to T-Box weld. Welded brackets installed 1991 with full structural margins maintained. First inspected per BWRVIP-18 in Fall 1996 with no new indications found. Re-inspected per BWRVIP-18 in Fall 1997 with no new indications found.
	1999	EVT-1	Performed inspections of selected core spray annulus piping welds in accordance with BWRVIP-18 with no new indications noted.
	2001	EVT-1	Performed inspections of selected core spray annulus piping welds in accordance with BWRVIP-18 with no new indications noted.
	2003	EVT-1	EVT-1 inspection of all P1, P2, P3, P5, P6, P7, P8a and P8b welds, 25% of P4 welds, 25% of piping bracket welds, and 100% of existing repairs. No indications noted.
	2005	EVT-1	Inspection of all P1, P2, P5, P6, P7, P11,

	2007	EVT-1	P12, P8a and P8b welds and P3 @ 270 degrees, 25% of P4 welds, 25% of piping bracket welds, and 100% of existing repairs. No indications noted.
	2009	EVT-1	Inspection of all P1, P2, P5, P6, P7, P11, P12, P8a and P8b welds and P3 @ 270 degrees, 25% of P4 welds, 25% of piping bracket welds, and 100% of existing repairs. No indications noted.
			Inspection of all P1, P2, P5, P6, P7, P11, P12, P8a, P8b, P3's @ 270. 25% of P4 welds, 25% of piping bracket welds. Repair bracket welds on 90 deg T Box found flaws near the end of the T-Box. May come from creviced weld P2. UT not possible.
Core Spray Sparger	1980's to Present	MVT-1, EVT-1, and VT-3	IEB 80-13 of welds on sparger. One indication in sparger to tee weld. Bolted clamp installed in 1982 and full structural margin maintained. One small indication noted in and near the heat affected zone of Core Spray sparger support bracket to shroud plate weld. Structural integrity of the support maintained. First inspected per BWRVIP-18 in Fall 1996 with no new indications found. Re-inspected per BWRVIP-18 in Fall 1997 with no new indications found.
	1999	Per BWRVIP-18	Inspected spargers per BWRVIP-18 with no new indications noted and no change in previously identified indications.
	2001	Per BWRVIP-18	Inspected spargers per BWRVIP-18 with no new indications noted.
	2003	EVT-1/ VT-1	Inspected 7 Core Spray Sparger brackets and 25% of the sparger welds. No indications noted.
	2005	EVT-1/	Inspected 25% of the Sparger welds and

		VT-1	5 sparger brackets. Tee Repair bracket also inspected. No indications noted.
	2007	EVT-1/ VT-1	Inspected 25% of the Sparger welds and 5 sparger brackets. Tee Repair bracket also inspected. No indications noted.
	2009	EVT-1/ VT-1	Inspected all S1, 25% of S2, S4, S3, and SD welds and 5 sparger brackets. No indications noted.
Top Guide (Rim, etc.)	1991-96	MVT-1, VT-3	Examined 2 cells in 1992 with no indications noted. 15 cells examined in 1995 with no indications noted. Did VT-3 of top guide hold downs examined in 1996 with no indications noted.
	1999	N/A	No inspections performed.
	2001	N/A	Inspected 50% of the top guide hold down latches with no discrepancies noted.
	2003	VT-1	Inspected 50% of the top guide hold down latches. No indications noted.
	2005	VT-1	No Top Guide components were inspected this outage.
	2007	VT-1 EVT-1	Two hold-down latches Two Grid Beam Intersections in conjunction with Dry Tubes (SIL-409) No indications noted
	2009	EVT-1/ VT-1	2 hold-down latches 3 cells - grid beams lower 2" & intersection. No Indications noted.
Core Plate (Rim, etc.)	1993	VT-1	Hold down bolts from topside and partial surface areas. No indications noted.
	1999	UT	UT from shroud outside surface to detect bolting presence. Detected presence of 56 bolts out of a minimum needed of 54 with no discrepancies noted.

	2001	UT	UT from shroud outside surface to detect bolting presence. Detected presence of all 72 bolts with no discrepancies noted.
	2003	N/A	No inspections performed on Core Plate.
	2005	N/A	No inspection performed on Core Plate bolts this outage.
	2007	UT	UT from shroud outside surface to detect bolting presence. Detected presence of all 72 bolts with no discrepancies noted.
	2009	N/A	No inspections performed this outage.
SLC	1988	LP	No exams performed on internal piping. Section XI LP performed on nozzle to safe end welds in 1988 with no indications noted.
	2001	N/A	No inspections performed.
	2003	VT-2	Enhanced leakage examination performed on nozzle-to-safe end weld. No leakage noted.
	2005	VT-2	Enhanced leakage examination performed on nozzle-to-safe end weld. No leakage noted.
	2007	VT-2	Enhanced leakage examination performed on nozzle-to-safe end weld. No leakage noted.
	2009	VT-2	Enhanced leakage examination performed on nozzle-to-safe end weld. No leakage noted.
Jet Pump Assembly	to present	VT-1 and VT-3	Riser brace brackets done once per period. Wedges, set screws, tack welds, sensing lines and sensing line supports VT per various SILs. Latest inspected in 1996 with no indications noted. Jet pump beams replaced in 1993. No indications noted, as well as in old jet pump beams.

	1997	VT-1 and VT-3	MVT-1 of Riser welds and tailpipe welds on 5 Jet Pump Pairs with no indications noted.
	1999	EVT-1/ MVT-1/ VT-1/VT-3	Performed inspections on 30 Riser welds, and 50% of the miscellaneous riser brace, inlet mixer, etc. welds. No indications noted.
	2001	EVT1/ VT-1	Performed inspections on representative samples of riser pipe to restrainer bracket circ. welds (RS-6, RS-7), riser pipe to primary riser brace circ. welds (RS-8, RS-9), barrel to adapter welds (MX-2), wedge bearing surfaces (WD-1), connections between inlet and mixer sections (IN-4), primary riser brace leaf to vessel pad welds (RB-1), and primary brace leaf to yoke welds (RB-2). No recordable indications noted.
	2003	EVT-1	EVT-1 of accessible areas of all 20 jet pump beams. No indications noted.
	2005	UT	Examined 100% of BB-1, BB2, & BB-3 Type 2 Beams (20). No indications noted.
		VT-1	Examined 10 WD-1 locations. No indications noted.
		EVT-1	Examined 4 IN-4 welds, 4 MX-2 welds, 1 Riser Brace, 2 RS-1, 2 RS-1a, 2 RS-2, 2 RS-3, and 1 RS-6, 1 RS-7, 1 RS-8, 1 RS-9: No indications noted.
	2007	UT	Examined 100% of BB-1, BB2, & BB-3 Type 2 Beams (20). No indications noted.
		VT-1	Examined 20 WD-1 locations. No indications noted.
		EVT-1	Examined 4 IN-4 welds, 4 MX-2 welds, 1 Riser Brace, 4 RS-1, 4 RS-1a, 2 RS-2, 2 RS-3, and 1 RS-6, 1 RS-7, 1 RS-8, 1

	2009	EVT-1	RS-9: No indications noted. 2 IN-4, 2 MX-2, 2 WD-1, <u>All</u> RS-1,1a, RS-8 & RS-9 welds. JPC Riser Brace & JPK RB-1a-d welds. 3 Flaws found in HAZ of JPC RS-1 weld, elbow side. Analysis good for two cycles. No other indications noted.
Jet Pump Diffuser	to present	VT-3	Adapter and diffuser welds inspected once per period with no indications noted.
	1999	EVT-1	Inspected 50% of welds with no indications noted.
	2001	N/A	No inspections performed.
	2003	EVT-1	EVT-1 of AD-1, AD-2, and AD-4 welds on 10 jet pumps. No indications noted.
	2005	EVT-1	6 DF welds, 8 AD welds, no indications noted.
	2007	EVT-1 VT-1	4 AD-1, 4 AD-2, 2 DF-1, 4 DF-2 No relevant indications noted. Jet Pump sensing lines. No Relevant Indications noted.
	2009	EVT-1	2 DF-2, 1 DF-1, 2 AD-1, 2 AD-2, No relevant indications noted.
CRD Guide Tube		VT-3	Access has not become available.
	2001	EVT-1/ VT-3	Performed inspections on 5% of CRD guide tube sleeve-to-alignment lug welds (CRGT-1), CRD guide tube body-to-sleeve welds (CRGT-2) and guide tube and fuel support alignment pin-to-core plate weld and pin (FS/GT-ARPIN-1). No recordable indications noted.
	2003	EVT-1	EVT-1 of CRGT-3 welds on 7 guide tubes. No indications noted.
	2005	N/A	No inspections this outage.

	2007	VT-3 EVT-1	1 alignment guide pin 2 CRGT-1, 2 CRGT-2, 1 CRGT-3 NRI
	2009	EVT-1/ VT-1	7 (Pins, CRGT-1, CRGT-2 & CRGT-3) NRI. Two of these performed from OD.
CRD Stub Tube	N/A	N/A	N/A
	2007	VT-3	7 Stub Tube-to-vessel welds (30%) 7 Stub Tube-to-CRD housing welds NRI
	2009	VT-3	8 stub tube to vessel welds 8 stub tube to CRD housing welds 2 CRD housing welds NRI
In-Core Housing	N/A	N/A	N/A
	2007	VT-3	2 ICH/RPV welds (30%) NRI
	2009	VT-3	4 inst. Tubes to vessel welds. NRI
Dry Tube		N/A	Replaced in 1987. Scheduled for inspection in 2001.
	2001	N/A	BWRVIP does not require inspection of dry tubes.
	2003	N/A	No inspections performed on dry tubes.
	2005	N/A	No inspections performed this outage.
	2007	VT-1	2 Dry Tubes – upper two feet, NRI per GE SIL. No indications noted.
	2009	VT-1	3 dry tubes – upper two feet from 2 adjacent cells. No indications noted.
Instrument Penetrations	N/A	N/A	Examinations of instrument penetrations are performed in accordance with ASME Section XI requirements.
Vessel ID Brackets	to present	VT-1 in beltline area and VT-3 in	Section XI inspections of dryer, feedwater sparger, core spray, and surveillance capsule holder brackets performed once per interval. Last

		other areas	inspections in 1997 with no indications noted.
	1999	VT-1/VT-3	Inspected Feedwater and Core Spray attachment welds to RPV with no indications noted.
	2001	EVT1/ VT-1/ VT-3	Inspected various jet pump riser brace arm pad to RPV welds, feedwater sparger end bracket to RPV welds, core spray bracket to RPV welds. No recordable indications noted
		EVT-1/VT-3	EVT-1/VT-3 of 2 core spray header piping brackets and 4 dryer support brackets. VT-3 of 2 guide rod brackets and 4 steam dryer hold-down brackets. No indications noted.
	2005	EVT-1/ VT-1	2 Core Spray Brackets, 8 Feedwater Brackets, 4 JP Riser Brace welds. No indications noted.
	2007	EVT-1/ VT-1	1 Core Spray Bracket, 8 Feedwater Brackets, 4 JP Riser Brace welds. 8 Steam Dryer hold-down & support Brackets, 6 Surveillance specimen brackets. No indications noted
	2009	EVT-1/ VT-1	1 Core Spray Piping Bracket, 2 jet pump riser braces. No relevant indications.
LPCI Coupling		N/A	Not applicable to Brunswick.
Feedwater Spargers	2003	EVT-1/VT-1/VT-3	EVT-1 of sparger tee welds, VT-1/VT-3 of sparger end bracket assemblies, VT-3 of sparger flow holes. EVT-1 of selected flow hole on each sparger. No changes in previously identified indications.
	2005	EVT-1/VT-1/VT-3	EVT-1 of sparger tee welds, VT-1/VT-3 of sparger end bracket assemblies, VT-3 of sparger flow holes. EVT-1 of selected flow hole on each sparger. No changes in previously identified

			indications.
	2007	EVT-1/ VT-1	Same as above.
	2009	EVT-1/ VT-1	Same as above. No significant growth noted.
Steam Dryer	2003	VT-1/VT-3	VT-1 of circular plate welds (this is the plate that failed at Quad Cities), VT-1 of drain channel welds and manhole cover, VT-3 of entire dryer assembly. No indications noted.
	2005	VT-1	Baseline of all steam dryer external welds. Two indications noted. Both IGSCC type cracking and both repaired.
	2007	VT-1	95 welds inspected, (red & green areas as denoted in BWRVIP-139) No indications noted.
	2009	VT-1	20% of assorted steam dryer welds inspected. Flaws identified on 1 of 2 tack welds of two lifting eyes to threaded rod connections.
Dissimilar Metal Welds in Accordance with BWRVIP-75-A	2009	Manual	3 Cat A – No Flaws (2B11N2B-RPV-FWABA, 2B11N2C-RPV-FWABA, 2B11N2D-RPV-FWABA)

Reactor Internals Inspection History

Plant: **Columbia Generating Station**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	1994	UT	35% weld H3, 10% of weld H4. No indication of cracking. Proactive examination as a category A plant.
	1998	UT	Baseline examination of all accessible areas of welds H3, H4, H5 and H7. per BWRVIP-01. No cracking found.
	2007	UT	Examination of accessible portions of H3, H4(upper), H6A and H7 per BWRVIP-76. H3 2.7% flaws H4 6.2% flaws H6A 0% flaws H7 0% flaws
Shroud Support	1994	VT-1	ASME Section XI includes access hole covers. No indications
	2003	VT-1, VT-3	No indications
	2005	UT EVT-1	H9 NRI (BWRVIP-38) H8 NRI (BWRVIP-38)
	2007	EVT-1	Access hole covers NRI (BWRVIP-180)
Core Spray Piping	1985 to 1997	VT-1 IEB 80-13	No indications of cracking. One mil wire resolution
	1998	MVT-1 IEB 80-13	No indications of cracking
	1999	VT-1 IEB-80-13	No indications of cracking. One mil wire resolution
	2001	EVT-1	No indications of cracking
	2003	EVT-1	No indications of cracking (BWRVIP-

	2005	EVT-1	18) NRI
	2007	EVT-1	NRI
	2009	EVT-1	NRI
Core Spray Sparger	1985 to 1997	VT-1 IEB 80-13	No indications of cracking. One mil wire resolution
	1998	MVT-1 IEB 80-13	No indications of cracking
	1999	VT-1 IEB 80-13	No indications of cracking. One mil wire resolution
	2001	VT-1	No indications of cracking
	2003	EVT-1 VT-1	No indications of cracking (BWRVIP-18)
	2005	EVT-1 VT-1	No indications of cracking
	2007	EVT-1 VT-1	No indications of cracking
	2009	EVT-1 VT-1	No indications of cracking
Top Guide (Rim, etc.)	1994	VT-1, VT-3	ASME Section XI. No indications Inspected 48 cells NRI
	2005	VT-3	Top Guide C-Clamp NRI
	2009	EVT-1	Top Guide Beams NRI (BWRVIP-183)
Core Plate (Rim, etc.)	NA	NA	NA
SLC	NA	NA	SLC routed through HPCS system
	2007	VT-2	Not required by BWRVIP-27. VT-2 exam during hydro test. No recordable indications.
	2009	VT-2	NRI

Jet Pump Assembly	1985-1997	VT-1, VT-3, UT	JP Beams replaced 1994. No indications found on old beams. Adjusting screws, wedges, sensing lines and clamps done to various GE SILS. Found one sensing line cracked at support. Acceptable for service. Found several adjusting screws with gaps between screw and inlet mixer. Reduced gaps by resetting JP and installing wedges. Found one adjusting screw tack weld cracked on two JP. Acceptable for continued service.
	1998	VT-1	Found one adjusting screw with gaps between screw and inlet mixer. Acceptable for continued service.
	1999	VT-1	Found three adjusting screws with small gaps between screw and inlet mixer. Acceptable for continued service.
	2001	EVT-1	BWRVIP-41 inspections. Found five pumps with small gaps between screw and inlet mixer. 2 wedges had wear. No indications on welds. RB-1, RB-2, RS-8, RS-9, RS-3 (JP 1-10)
	2003	EVT-1	Found 12 pumps with small gaps between screw and inlet mixer. No change noticed on wedge wear. No indications on welds.
	2005	EVT-1	Found 7 pumps with gaps between set screw and inlet mixer. Significant change in wear on one wedge. No change noticed on 3 wedges wear. Slight wear on 4 wedge rods. Installed slip joint clamps on all jet pumps.
	2007	EVT-1	Found 2 pumps with gaps between set screw and inlet mixer. Notable change in wear on one wedge. No change noted on 4 wedges. Minor wear noted on 9 wedge rods. No change noted on 4 wedge rods.
	2009	EVT-1, UT	Inspected 100% wedges - evidence of

			wedge “dropping” minor wear. Some set screw gaps all within allowable. UT on beams NRI, 50% Slip joint clamps NRI, JPSL exit line A loop NRI. Misc mixer, diffuser and adapter welds all NRI.
CRD Guide Tube	2003	VT-3, EVT-1	VT-3 of pin and lug EVT-1 of CRGT-2, 3. 10 tubes examined No indications
CRD Stub Tube	NA	NA	NA
In-Core Housing	1985-1997	VT-2	ASME Section XI. No indications
	1998	VT-2	ASME Section XI. No indications
Dry Tube	1987-1997	VT-1	Various degrees of erosion. Evaluated acceptable
	1998	VT-1	No unacceptable indications noted
	2001	VT-1	No unacceptable indications noted
	2005	VT-1	No unacceptable indications noted
	2009	VT-1	NRI Two not fully seated
Instrument Penetrations	1994	VT-2	ASME Section XI. No indications
	2005	VT-2	ASME Section XI. No indications
Vessel ID Brackets	1994	VT-1	ASME Section XI. No indications
	2001	EVT-1	FW brackets. NRI (BWRVIP-48)
	2003	EVT-1	Jet Pump & Core Spray NRI
	2005	EVT-1, VT-1, VT-3	Jet Pump, FW, Core Spray, Sample Holder and Steam Dryer Support Lugs. Existing wear from moving dryer showed no change from earlier outages. Surv. sample holder NRI
LPCI Coupling	1994	VT-1	ASME Section XI. No indications
	2003	EVT-1	Inspected NRI (BWRVIP-42)
	2009	EVT-1, VT-1	NRI
Steam Dryer	2005	EVT-1, VT-1	One tie bar to hood weld found 2 fatigue cracks. Stop drilled.

	2007	EVT-1, VT-1	IGSCC cracks found in base material near welds of 3 vertical hood welds. Damage associated with installing dryer found on 0 degree lower guide bracket. Tie bars inspected NRI. No additional crack propagation from prior stop drill repair. Additional IGSCC cracks found in base material near vertical hood weld. Similar to 2005 findings. Visible in '05 video review but not recorded.
	2009	VT-1	No change in previous indications,
Steam Separator	2009	VT-1, VT-3	100% Exhaust pipes and top tie bars two minor dents, 25% gusset and rings NRI. 36 Shroud Head Bolts some pin wear.
DM Safe End Welds	2009	UT	BWRVIP-75-A automated UT, six Category C DM welds inspected. All contain Alloy 82/182. One required surface conditioning. No recordable indications.

Reactor Internals Inspection History

Plant: **Duane Arnold Energy Center**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	95 (every 10 years), Next exam 2001	UT	Performed ultrasonic examination of the accessible areas. Baseline per BWRVIP-01, no indication were detected.
	01 (Next exam 2010)	UT	Performed ultrasonic examination of the H1-H7 welds , no indications found
Shroud Support	88/93	UT	Performed ultrasonic examination of the Access Hole Covers, no indications were reported.
	98	VT-3	VT-3 of shroud support
	99	VT-3	Shroud Support including H-8/H-9 (360 degrees)
	01	UT	Performed ultrasonic examination of the Access Hole Covers, no indications were reported.
	03	VT-3	Shroud Support including H-8/H-9 (180 to 360 degrees)
	05	VT-3	Shroud Support including H-8/H-9 (0 to 180 degrees)
	07	EVT-1/VT-3	Performed EVT-1 of 10% of the H-8 and H-9 weld. Completed VT-3 of 180° of the shroud plate including both access hole covers – no indications
	09	VT-3	Shroud Support including the H-8/H-9 (0 to 180 degrees) – no indications
Core Spray Piping	96 (portion every RFO)	VT	Performed Visual Examination (EVT, CSVT, VT-3), baseline per BWRVIP-18, no indications were detected.

	98	EVT-1	Reinspection per BWRVIP-18 – no indications.
	99	EVT-1	Reinspection per BWRVIP-18 – no indications
	01	EVT-1	Reinspection per BWRVIP-18 – no indications
	03	EVT-1	Reinspection per BWRVIP-18 – no indications
	05	EVT-1	Reinspection per BWRVIP-18 – no indications
	07	EVT-1	Reinspection per BWRVIP-18 – no indications
	09	EVT-1	Reinspection per BWRVIP-18 – no indications
Core Spray Sparger	96 (portion every RFO)	VT	Performed Visual Examination (CSVT, VT-3), baseline per BWRVIP-18, no indications were detected. One sparger nozzle is inspected every other RFO due to a missing tack weld.
	99	EVT-1	Examined S-1, S-2, and S-4 welds, VT-3 on S-3A/B welds. No indications noted
	01	EVT-1	Examined S-1, S-2, and S-4 welds, VT-3 on S-3A/B welds. No indications noted
	05	EVT-1	Examined S-1, S-2, and S-4 welds, VT-3 on S-3A/B welds. No indications noted
	09	EVT-1/ VT-1	Examined S-1, S-2, and S-4 welds with EVT-1. Examined S-3A/B with VT-1 – no indications
Top Guide (Rim, etc.)	95	VT-1 (1/2 mil wire)	Inspection of the 1/4" fillet weld on the contour wedge and verified that alignment blocks in place. 100% inspection of the grid locations has been completed over the past three RFOs.
	98	VT-3	VT-3 0° location

	99	VT-3	Examined nine cells (top general and bottom of grid areas)
	01	VT-1	Inspection of the 1/4" fillet weld on the contour wedge and verified that alignment blocks in place. Also inspect the two hold down assemblies
	03	VT-3	Examined five cells (top general and bottom of grid areas)
	05	VT-1	Inspection of the 1/4" fillet weld on the contour wedge and verified that alignment blocks in place. Also inspect two hold down assemblies.
	05	VT-3	Examined four cells (top general and bottom of grid areas).
	07	VT-1	Performed VT-1 examination of the bottom side of eight grid locations – no indications
	09	VT-1/VT-3	Performed VT-1 of the Latches at 46° and 226° location. VT-1 of the fillet welds on the contour wedges at 90° and 270°. Was not able to obtain 100% coverage of the fillet welds on the contour wedges due to the fuel being in the way. Will re-schedule in 2010. Performed VT-3 of the top guide. – no indications
Core Plate (Rim, etc.)	95	VT-3	Verified 25% core plate bolts were in place
	98	VT-3	Verified 20% core plate bolts
	99	VT-3	Examined Fuel support castings in nine cells, no indications
	01	VT-3	Verified rim hold down bolts 1-54 Examined Fuel support castings in ten cells, no indications
	03	VT-3	Examined Fuel support castings in five

	05	VT-3	cells, no indications Examined Fuel support castings in twenty cells, no indications
	07	VT-3	Performed a general VT-3 of Fuel Support Casting in eight locations – no indications
	09	VT-3	Performed a VT-3 examination of Fuel Support Castings in 12 locations – no indications
SLC	93	PT	Liquid Penetrant examination of the nozzle-safeend weld.
	01	EVT-2	Enhanced visual using Remote Visual Equipment on nozzle-safeend weld., no indication.
	03	EVT-2	Enhanced visual using Remote Visual Equipment on nozzle-safeend weld, no indication.
	05	EVT-2	Enhanced visual using Remote Visual Equipment on nozzle-safeend weld.
	07	UT	Performed Appendix VIII UT of the Nozzle-Safeend Weld – no indications
Jet Pump Assembly	96 (sample every RFO)	VT-3	Inspection of the riser spt pads(SIL551), holddown beams(SIL330), sensing lines(SIL420), three point contact(RICSIL078). Will inspect Riser Elbow in 1998. Repair to the set screws have been completed.
	98	MVT-1	50% of total number of jet pumps, 100% of each inspected – no indications All hold down beams – no indications
	99	UT EVT-1	DF-1 on JPs 1,2,3,4,13,14,15,16 IN-4, MX-2 and WD-1 on JPs 3,4,13 and 14 RB-1 and RB-2 on JPs 3,4,13 and 14. This completes all exams on 8 of 16 JPs

	01	EVT-1	RB-1, RB-2, RS-1, RS-2, RS-3, RS-6, RS-7, RS-8, RS-9, IN-4, MX-2, WD-1, on JPs 7 and 8. No indications.
	03	EVT-1	RB-1, RB-2, RS-6, RS-7, RS-8, RS-9, IN-4, MX-2, WD-1, DF-2, AD-1, and AD-2 on JPs 5,6,9, and 10. RS-1, RS-2, RS-3, DF-2, AD-1, and AD-2 on JPs 5,6,9,10, 11,12. DF-1 on JPs 5,6,7,8,9, and 10. No indications All hold down beams - no indications.
	07	UT EVT-1	Performed UT of all 16 Jet Pump Holddown beams using GE technique – no indications AD-1 on JPs 15,16 AD-2 on JPs 15, 16 DF-1 on JPs 11, 12, 15, 16 DF-2 on JPs 15, 16 IN-4 on JPs 11, 12, 15, 16 MX-2 on JPs 11, 12, 15, 16 RB-1 on JPs 1, 2, 11, 12, 15, 16 RB-2 on JPs 1, 2, 11, 12, 15, 16 Riser Brace Pad on JPs 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16 RS-1, RS-2, RS-3 @ 324° location RS-6 on JPs 11, 15 RS-7 on JPs 12, 16 RS-8, RS-9 @ 252°, 324° locations WD-1 on all 16 JPs No indications noted from any of the visual examinations
	09	EVT-1 VT-3	DF-2 on JPs 1, 2, 3, 4, 13, 14 AD-1 on JPs 1, 2, 3, 4, 13, 14 AD-2 on JPs 1, 2, 3, 4, 13, 14 RS-1, RS-2, RS-3, TS-1A @ 36°, 72°, 288° Sensing Line Clamp on JPs 1, 2, 3, 14, Sensing Line Support on JPs 4, 5, 12, 13 Sensing Line Exits at 90° and 270° No indications noted from any of the visual examinations
Jet Pump Diffuser	96 (sample	General	Part of doing a 100% general visual

	every RFO)	Visual	examination
CRD Guide Tube	95 (every 10 years)	VT-3	Inspected accessible portions of three guide tubes, no indication were detected.
	03	VT-3	Inspect CRGT-1, CRGT-2, CRGT-3, and alignment pin on five guide tubes, no indications detected.
	05	VT-3	Inspect CRGT-1, CRGT-2, CRGT-3, and alignment pin on five guide tubes, no indications detected.
	07	VT-3	Performed general VT-3 examination of eight locations – no indications
CRD Stub Tube	95 (every 10 years)	VT-3	Inspected accessible portions of three stub tubes, no indication were detected.
In-Core Housing			
Dry Tube	88 (6 cycles(98) and then every three cycles)	VT-1 (1 mil wire)	Inspected in 1988 with indications reported, replaced with the new design
	99	VT-3	Inspected accessible portions of 11 dry tubes, no indications noted
	07	VT-1	Performed VT-1 of upper 24” of five dry tubes. Note the exam was performed on the accessible areas – no indications
	09	VT-1/VT-3	Performed examination on four dry tubes. Note the exam was performed on the accessible areas – no indications
Instrument Penetrations			
Vessel ID Brackets	Every 10 years	VT-1(active fuel) VT-3 all others	Per ASME Section XI
LPCI Coupling	N/A	N/A	Not applicable to DAEC
Top Head	98	VT-3	<u>No indications</u>

	99	VT-3	No indications
	03	VT-3	No indications
	05	VT-3	No indications
	07	VT-3	Performed VT-3 of interior portion of the RPV Head – no indications
Guide Rods	98	VT-3	<u>No indications</u>
	99		Both examined (found cracked tack weld on 0 degree rod which was evaluated as acceptable)
	01	VT-3	Inspected 0 degree guide rod, no additional indications
	03	VT-3	Inspected 180 degree guide rod, no indications
	07	VT-3	Inspected 180 degree guide rod, bracket, and bracket welds – no indications
	09	VT-3	Inspected the 0° guide rod bracket and bracket welds – noted the previously identified cracked tack weld, no other indications noted.
Sample Holder Integral Attachment	98	VT-1/3	No indications
	99	<u>VT-1/3</u>	108 and 288 degree examined with no indications
	01	<u>VT-1/3</u>	108 degree examined with no indications
	03	<u>VT-1/3</u>	36 and 108 degree examined with no indications
	05	VT-1/3	288 degree examined with no indications
	07	VT-3	108° location – no indications
	09	VT-3	288° location – no indications
Core Spray Bracket	98	VT-3	No indications
	01	VT-3	No indications

	05 09	VT-3 EVT-1/ VT-1	No indications Performed EVT-1 on the Piping Brackets at 30°, 150°, 210°, and 330° - no indications Performed VT-1 on the Sparger Brackets at 11°, 50°, 89°, 91°, 129°, 169°, 191°, 230°, 269°, 271°, 309°, and 349° locations – no locations
Jet Pump Riser Support Pads	98 03 05	VT-1 VT-1 VT-1	No indications 216 degree pad – no indications 144 and 252 degree pads – no indications
Feedwater Spargers	98 01 05 07	VT-1/3 VT-1/3 VT-1/3 VT-1	Indications around flow holes No additional indications No additional indications Detailed inspection of all four spargers at the following locations due to broken keeper Vessel Attachment Keeper to pin Handle interface Keeper to Sparger Bracket weld Pin to sparger bracket Pin to wall bracket Sparger Bracket & Bolts Sparger Bracket to Vessel Measurement Sparger to End Plate Jacking Bolts (two spargers only) T-Box to Sparger Welds Wear was noted in several locations

	09	VT-1	(details can be provided if requested). Performed VT-1 of the Inner Radii at 45°, 135°, 225°, and 315° - no indications
		EVT-1/ VT-3	Performed EVT-1/VT-3 of Bracket Welds at 6°, 84°, 96°, 174°, 186°, 264°, 276°, and 354° - no indications Implemented a FW Sparger Modification to repair the indications noted in 2007. This modification was to re-install the preload on the spargers @ 225° and 315°.
		VT-1	Performed VT-1 on FW Brackets @ 6°, 84°, 96°, 174°, 186°, 264°, 276°, and 354° - wear was identified on the 264
		VT-1	276°, and 354°.
		VT-1/89	Performed VT-1 on the T-Box to Sparger welds @ 45°, 135°, 225°, and 315° - no indications
			Performed visual examination of the flow holes on the T-Box and Spargers
Steam Dryer	03	VT-1/3	Inspect per GE SIL644. Indications in Upper Support Ring, Drain Channels, and Access Openings- all indications evaluated "use as is".
	05	VT-1/3	Inspect per GE SIL644 Rev 1. Indications in Drain Channels and Upper Support Ring – all indications evaluated "use-as-is". No change in previous indications
	07	VT-1	Inspected per BWRVIP-139 (all exterior locations) Indications in Drain Channels, Access Openings and Upper Support Ring. All indications evaluated "use-as-is" for one cycle. Some of the previous indications could not be located and some new indication were identified. Details can be provided if requested.

	09	VT-1/89	Performed examinations per BWRVIP-139 (all exterior locations). All previously identified indications were noted as "No change". Three new indications were identified. 1) Upper Guide Bracket was observed to have a rolled piece of metal extending out and below the face/corner of the guide channel. 2) Middle weld on Tie Bar #4 was found cracked, and 3) Lower guide bracket, 180° side was found bent. All indications were determined to be acceptable.
Dissimilar Metal weld (per BWRVIP-75-A)	09	UT	ASME Section XI, Appendix VIII, Supplement 10 manual exams performed on four (4) Category C, seven (7) Category D and two (2) Category E dissimilar metal welds.

Reactor Internals Inspection History

Plant: **Fermi 2**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud (BWRVIP-07/76)	RF-04 (7/94)	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.
	RF-05 (9/96)	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.
	RF-06 (9/98)	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 indications above H2 weld.
	RF-07 (4/00)	EVT-1	Reinspected 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.
	RF-08 (10/01)	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support
	RF-09 (3/03)	N/A	No inspections performed on the Core

	RF-10 (11/04)	N/A	Shroud. Inspections were performed on the Shroud Support No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support
	RF-11 (04/06)	N/A	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support
	RF-12 (10/07)	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	UT	No inspections performed on the Core Shroud. Inspections were performed on the Shroud Support
Shroud Support (BWRVIP-38/*104) Access Hole Cover (BWRVIP-180)	RF-03	VT-3	Inspected shroud support gusset welds and H8/H9 in conjunction with jet pump inspections. No indications
	RF-04 (7/94)	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.
	RF-05	EVT-1 (1/2 mil)	Inspected sample area 60-70 degree arc plus 180 degrees location on H8, H9, and gussets. No indications.
	RF-06	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. *Inspection performed in conjunction

	RF-07	EVT-1	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 a n 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.
	RF-08	EVT-1	The H8 and H9 welds were reinspected 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.
	RF-09	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.
	RF-10	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, CARD 05-20378). No indications identified.
	RF-11	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

	RF-12 (10/07)	EVT-1	<p>manual technique as required by BWRVIP-104. Approximately 19.6% of was examined with no indications.</p> <p>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.</p>
	RF-13 (04/09)	EVT-1	<p>Accessible areas on Gussets 5 and 6 were inspected with 75% coverage obtained using EVT-1. No indications identified. The O Degree Access Hole cover was reinspected and no additional cracking was identified. No repair installed.</p>
Core Spray Piping (BWRVIP-18/18-A)	each outage RF-01 thru RF-04	VT-1 (1mil)	<p>During RF-01 two small arc strikes were identified on loop piping. These have been reinspected each outage. No change in condition. Inspections performed per IEB 80-013 and SIL 289. No indication of cracking.</p>
	RF-05	EVT-1 (1/2mil) VT-1	<p>All welds brushed prior to inspection using 1/2 mil wire. Remainder of loop piping inspected without brushing. No indication of cracking.</p>
	RF-06	EVT-1	<p>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.</p>
	RF-07	EVT-1	<p>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.</p>
	RF-08	EVT-1	<p>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.</p>

	RF-09	EVT-1	Inspected all target welds on both loops of core spray and sample welds on Div 2 to EVT-1 stnds. Cleaning assessment was performed, cleaning was not necessary. No indications of cracking.
	RF-10	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%.
	RF-11	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%.
	RF-12	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%.
	RF-13	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%.
Core Spray Sparger (BWRVIP-18/18-A)	each outage RF-01-RF-04	VT-1 (1 mil)	During RF-01 one arc strike identified on upper CS sparger. Reinspections have not identified any changes. No indication of cracking

	RF-05	VT-1/EVT-1 (1/2mil)	1/2 mil wire used for junction box remainder utilized 1mil wire. No indication of cracking.
	RF-06	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.
	RF-07	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.
	RF-08	EVT-1/VT-1	Inspected per BWRVIP-18 using EVT-1 for S1, S2 and S4 welds. Selected S3a, S3b welds inspected using VT-1. 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.
	RF-09	EVT-1/VT-1	Inspected per BWRVIP-18 using EVT-1 for 50% of the S1, 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.
	RF-10	EVT-1/VT-1	Inspected per BWRVIP-18 using EVT-1 for 50% of the S1, 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.
	RF-11	EVT-1/VT-1	Inspected per BWRVIP-18-A using EVT-1 for 50% of the S1, S2 and S4 welds on the same spargers. 6 SB

			<p>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</p>
	RF-12	EVT-1/VT-1	<p>Inspected per BWRVIP-18-A using EVT-1 for 50% of the S1, 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.</p>
	RF-13	EVT-1/VT-1	<p>Inspected per BWRVIP-18-A using EVT-1 for 50% of the S1, 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.</p>
Top Guide (Rim, etc.) Beams (BWRVIP-26) (BWRVIP-183)	Each outage	VT-3	Inspected rim each outage. No indications.
	RF-03	VT-1	Inspected 6 locations (RICSIL 059). No indications.
	RF-04	VT-1	Inspected 6 locations (SIL 554). No indications.
	RF-05	VT-1	Inspected 15 locations (SIL 554). No indications.
	RF-06	VT-1	Inspected bottom edge of beams at 11 core locations per SIL 554. No indication of cracking.
	RF-07	VT-1	Inspected bottom edge of beams at 8 core locations per SIL 554. No indication of cracking.
	RF-08	VT-1	Inspected bottom edge of beams at 5 core

	RF-09	VT-1	locations per SIL 554. No indication of cracking. Inspected bottom edge of beams at 6 core locations per SIL 554. No indication of cracking.
	RF-10	VT-1	Inspected bottom edge of beams at 2 core locations per SIL 554. No indication of cracking.
	RF-11	VT-1	Inspected bottom edge of beams at 2 core locations per SIL 554. No indication of cracking. Inspected 90 degree segment of top guide rim and no indications were identified.
	RF-12	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. No indication of cracking.
Core Plate Rim Bolts, etc. (BWRVIP-25)	RF-05	VT-1 (1mil wire)	Inspected 6 core plate bolts located between 100 and 160 degrees and adjacent area. No indications.
	RF-06	VT-3	Inspected tops of approximately 20 bolts per SIL 588. No indications identified.
	RF-07	VT-3	Inspected tops of approximately 20 bolts per SIL 588. No indications identified.
	RF-08	VT-3	Inspected tops of approximately 20 core plate bolts (VT-3) per SIL 588. Did not meet BWRVIP requirements. No indications identified.
	RF-09	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2003-117 and TJ-2003-01)
	RF-10	N/A	No inspections performed. BWRVIP

			analysis concluded that inspections are not required. (Reference BWRVIP 2003-117 and TJ-2003-01)
	RF-11	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2006-041 and DD-2006-01)
	RF-12	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2006-041)
	RF-13	N/A	No inspections performed. BWRVIP analysis concluded that inspections are not required. (Reference BWRVIP 2006-041)
SLC (BWRVIP-27)	RF-04	VT-3	Performed a visual inspection from Reactor penetration to shroud support when access was provided during jet pump beam replacement. No indications.
	RF-05 - 07	N/A	No inspections performed as access was not provided.
	RF-08	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.
	RF-09	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.
	RF-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.
	RF-11	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.

	RF-12	VT-2*	<p>No leakage observed.</p> <p>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.</p>
	RF-13	VT-2*/UT	<p>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 PDI qualified ultrasonic inspection of the nozzle to safe end weld as well as additional base material of bored material. No indications identified.</p>
Jet Pump Assembly (BWRVIP-41)	Each outage examine at least 50% thru RF-05	VT-1 VT-3	<p>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 RF-05</p>
	RF-06	MVT-1, VT-3	<p>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 start-up. No other new indications identified.</p>
	RF-07	EVT-1	<p>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</p>

			and Low Priority locations. Reinspected previously identified indication on RS-1 weld, 1.75" long that was identified in RF-06. 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.
	RF-08	EVT-1	<p>Performed reinspections 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 1 & 2. Inspections included all High, Medium and Low Priority locations. Reinspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7&8 that was identified in RF-06. 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. Reinspected all restrainer screw tack welds with no changes observed.</p>
	RF-09	EVT-1	<p>Performed reinspections 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. Reinspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7&8 that was identified in RF-06. 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 BB1, BB2, and the transition area BB3 using the latest available technique from General Electric. No indications identified on the beams. Reinspected all</p>

			<p>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)</p>
	RF-10	EVT-1	<p>Performed reinspections 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. Reinspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF-06. No change in indication length / appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. Reinspected auxiliary spring wedge on Jet Pump 15. No other damage or indications identified on any location.</p>
	RF-11	EVT-1	<p>Performed reinspections 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. Reinspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF-06. 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.</p>
	RF-12	EVT-1	<p>Performed reinspections 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.</p>

	RF13	EVT-1	<p>Reinspected previously identified 1.75" long indication on RS-1 weld for Jet Pumps 7 & 8 that was identified in RF-06. No change in indication length / appearance. Existing Flaw Evaluation on hand prepared by GE referenced as acceptance limit. 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.</p> <p>Performed reinspections 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. Reinspected previously identified indication on RS-1 weld for Jet Pumps 7/8 identified in RF-06. 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.</p>
Jet Pump Diffuser (BWRVIP-41)	Each outage	VT-3	Diffusers will be sample inspected during refueling outages.
	RF-06	MVT-1	BWRVIP-41 on Jet Pumps 1-10 except inaccessible areas. No cracking.
	RF-07	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.
	RF-08	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.
	RF-09	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)

	RF-10	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)
	RF-11	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)
	RF-12	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)
	RF-13	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)
CRD Guide Tube (BWRVIP-47)	RF-04	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.
	RF-07	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

	RF-08	EVT-1 and VT-3	indications identified. Performed best effort exam on CRGT-3 as weld was not visible on inside of tube, CRGT-2 not accessible due to flow and FS/GT-ARPIN was not felt to be accessible. . No indications identified.
	RF-09	EVT-1 and VT-3	Performed exams on CRGT-1, CRGT-2, CRGT-3, and FS/GT-ARPIN at 10 Control Rod Guide Tubes/locations. No indications identified.
	RF-10	EVT-1 and VT-3	No inspection performed in RF-10.
	RF11	EVT-1 and VT-3	No inspection performed in RF-11.
	RF12	VT-3	Performed exams on CRGT-1 and FS/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	EVT-1 and VT-3	No inspections performed in RF-13.
CRD Stub Tube * (BWRVIP-47)	RF-04	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.
In-Core Housing * (BWRVIP-47)	RF-04	VT-3	Small portion visible during jet pump beam replacement. No indication of degradation.
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.
	RF-06	VT-1	Reinspected 12 dry tubes. No change from previous condition. No cracking.
	RF-07	VT-1	Inspected all 12 original design Dry Tubes. No change from previous

			conditions identified. No cracking identified.
	RF-08	VT-1	Inspected all 12 original design Dry Tubes from two sides. No change from previous conditions identified. No cracking identified.
	RF-09	N/A-1	No inspections performed in RF-09.
	RF-10	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 RF11. (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	VT-1	No inspections performed in RF-12.
	RF13	VT-1	No inspections performed in RF-13.
Instrument Penet.* (BWRVIP-49 & 41)	Each outage	VT-3	Inspected jet pump sensing lines and brackets each outage.
	RF-04	VT-3	SLC and peripheral bottom head penetrations inspected. No indications.
	RF-06	VT-3	Inspected JP sensing lines for pumps 1-10. No indications.
	RF-07	VT-3	Inspected JP sensing lines for pumps 11 thru 20 only. No indications.
	RF-08	VT-3	Inspected JP sensing lines for Pumps 1 & 2 only. No indications.
	RF-09	VT-3	Inspected JP sensing lines for Pumps 3 & 4 only. No indications.
	RF-10	VT-1	Inspected JP sensing lines for Pumps 5, 6, 7, 16, & 17. No indications
	RF-11	VT-1	Inspected JP sensing lines for Pumps 6,

	RF-12	VT-1	7, 16, & 17. No indications. Inspected JP sensing lines for Pumps 6, 7, 11, 12, 16, & 17. No indications.
	RF-13	VT-1	Inspected JP sensing lines for Pumps 6, 7, 13, 14, 16, & 17. No indications.
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.
	RF-06	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.
	RF-07	EVT-1	6 feedwater brackets. All core spray piping brackets. 4 steam dryer brackets 1 guide rod bracket No indication of cracking identified.
	RF-08	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 identified.
	RF-09	EVT-1	6 Feedwater brackets. 4 Core Spray piping brackets. 1 Jet Pump riser brace (Jet Pump 3 and 4) No indication of cracking identified.
	RF-10	EVT-1	6 Feedwater brackets. 3 Core Spray piping brackets. 1 Surveillance Holder bracket 4 Steam Dryer Support brackets

	RF-11	EVT-1/VT-1	4 Steam Dryer Hold Down 1 Guide Rod Bracket 1 Jet Pump riser brace (Jet Pump 5 and 6) No indication of cracking identified.
	RF-12	EVT-1/VT-1	No inspections performed in RF-11. 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.
LPCI Coupling	N/A	N/A	Fermi does not have a LPCI Coupling
Shroud Head Bolts/Shroud Head	RF-04	UT/VT	16 had indications, 17 replaced during RF-04.
	RF-05		Remaining bolts replaced (31) during RF-05 as a preventative measure. All 48 are now new style.
	RF-06	VT-3	Bolts 1-24 (of 48). No indication of cracking.
	RF-07	VT-3	Bolts 25-48 (of 48). No indication of cracking or damage. Springs were left compressed on 20 of the 24 inspected.
	RF-08	VT-3	Bolts 1-24 (of 48). No indication of cracking or damage
	RF-09	VT-3	Bolts 23 and 25-48 (of 48). No indication of cracking or damage. All retainer springs verified to be functioning properly.
	RF-10	VT-3	Bolts 1-24 (of 48). Inspected North 1/3 rd of Shroud Head/Separator and 2 lifting lugs. No indication of cracking or damage

	RF-11	VT-3	Inspected Bolts 25-48 (of 48) and inspected Center 1/3 rd of Shroud Head/Separators. No indication of cracking or damage.
	RF-12	VT-3	Bolts 1-24 (of 48). Inspected South 1/3 rd 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. Reference OE 25795.
	RF-13	VT-3	Bolts 25-48 (of 48). Inspected North 1/3 rd of Shroud Head/Separator and 2 lifting lugs. No changes identified in previous indications identified in RF12. No other indications identified.
Steam Dryer (RF01-RF-08 not previously reported)	RF-09	VT-3	Inspected approximately 1/3 of dryer including hood welds and cover plate welds. (Ref. SIL 644) No indications of additional cracking identified.
	RF-10	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.
	RF-11	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 reinspected and no changes were noticed. Inspected approximately 50% of dryer

	RF-12	VT-1/VT-3	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 reinspected and no changes were noticed.
	RF-13	VT-1/VT-3	Inspected approximately 20% of dryer including "F" Bank welds and a sampling of other locations following reinspection guidelines contained in NRC SE to BWRVIP-139. One new indication identified in support ring.
Dissimilar Metal Welds BWRVIP-75-A (Not previously reported, reference BWRVIP letter 2008-089)	RF-12	UT	Performed ultrasonic examinations on 4 Category B DM welds that contain alloy 82/182 using automated PDI qualified techniques and procedures. Since >90% coverage was not obtained on two welds, 2 additional welds were selected and >90% volume coverage was obtained. No indications of cracking identified.
	RF-13	UT	Performed ultrasonic examinations on 5 Category B DM welds that contain alloy 82/182 using automated and manual PDI qualified techniques and procedures. No indications of cracking identified.

*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.

Outages:

- RF-01: Fall of 1989
- RF-02: Spring of 1991
- RF-03: 09-21-92 10-31-92 Inspection sign on/off dates
- RF-04: 05-10-94 09-21-94 Inspection sign on/off dates
- RF-05: 09-30-96 11-04-96 Inspection sign on/off dates
- RF-06: 09-08-98 10-08-98 Inspection sign on/off dates
- RF-07: 04-03-00 05-04-00 Inspection sign on/off dates
- RF-08: 10-15-01 11-20-01 Inspection sign on/off dates

RF-09:	03-28-03	04-28-03	Inspection sign on/off dates
RF-10:	11-06-04	11-26-04	Inspection sign on/off dates
RF-11:	03-24-06	04-29-06	Inspection sign on/off dates
RF-12:	09-28-07	11-01-07	Inspection sign on/off dates
RF-13:	03-28-09	04-16-09	Inspection sign on/off dates

Reactor Internals Inspection History

Plant: **Hatch Unit 2**

Component in BWRVIP Scope	Date of Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Re-inspections
Core Shroud Horizontal Welds	1994	UT VT-1 (.001)	UT H-1 through H-4. Indications on all four (4) welds. Safe for continued operation. VT-1 (.001) with brushing on sample areas of H-5, H-6A(B), & H-7) at 190° and 350°. No indications. Installed four (4) Shroud Tie Rods in "95" which exempts horizontal welds H-1 through H-8 from inspection.
Core Shroud Tie Rods	1995	VT-3	Installed four (4) Shroud Tie Rods '95. Performed baseline. No indications.
	1997	VT-3 & Tightness	Performed first cycle inspections on all 4 Shroud Tie Rods. No indications.
	1998	VT-3 & Tightness	Shroud Tie Rod at 225 degrees. No indications. Future Shroud Tie Rod Inspections not to exceed 10 years.
	2007	EVT-1, VT-3 & Tightness	All Tie Rods – No indications. Upper Supports & Tie Rod Nuts have been determined to be susceptible to IGSCC. This will make corrective action necessary by next outage.
	Spring 2009 (2R20)	EVT-1. VT-3.	All four tie rod assemblies modified with replacement component items designed to not be susceptible to IGSCC. All component items replaced with the exception of the lower collet and clevis pin.
Core Shroud Vertical Welds	1995	EVT-1	Bottom ID/OD six (6) inches of V-3, V-4. Top ID/OD six (6) inches of V-3, V-4. Top ID/OD Twenty-four (24) inches of V-5 & V-6. No indications. Inspections to

	1997	EVT-1	support the Shroud Tie Rod installation. Performed baseline all verticals from the outside surface per BWRVIP-07. No indications.
	2000	EVT-1	Performed baseline all verticals from the outside surface per BWRVIP-07. No indications.
	2001	EVT-1	Performed EVT-1 examinations from the outside surface for welds V-1, V-2, V-9, V-10, & V-11. No Reportable Indications. These welds are scheduled in approximately six year intervals for single sided coverage per BWRVIP-63
	2005	EVT-1	Performed EVT-1 examinations on the inside & outside surfaces of vertical welds V-3, V-4, V-5, V-6, & V7. Inside surface indication was found on V-6 at the upper intersection (H-4) which parallels H-4. Also examined the outside surfaces of vertical welds V-12, V-13, V-14 with no indications.
	2007	EVT-1	Performed EVT-1 examinations from the outside surface for welds V-1, V-2, V-9, V-10, & V-11. No Reportable Indications. V-6 Inside surface indication was found in 2005 on at the upper intersection (H-4) which parallels H-4. Was re examined to determine if this indication had changed. No changes were recorded.
Core Shroud Ring Segment Welds	N/A	N/A	Hatch 2 does not have Ring Segment Welds
Core Shroud Support	1995	EVT-1	<u>Horizontal surfaces of Shroud Support Ledge</u> : Examined four (4) locations (45°, 135°, 225°, & 315°) between Jet Pumps on top surface adjacent to locations where Shroud Tie Rods to be installed. No indications.
	1997	VT-3	<u>H-9</u> : Examined 25% of accessible top surfaces. No indications.

	1998	VT-3	H-9: Examined 75% of accessible surfaces from top per BWRVIP-38. No indications.
	2007	VT-3	H-9: Examined 100% of accessible surfaces from top per BWRVIP-38. No indications.
Core Spray Internal Piping	1980-97	VT-1 (.001)	IEB 80-13/NUREG CR-4523. Examined 100% each outage prior to 96. No indications.
	1997	EVT-1	Baseline per BWRVIP-18 . No Indications.
	1998	EVT-1	Reinspection per BWRVIP-18. No Indications.
	2000	EVT-1	Reinspection per BWRVIP-18. No Indications.
	2001	EVT-1	Reinspection per BWRVIP-18. No Indications.
	2003	EVT-1	Reinspection per BWRVIP-18. No Indications.
	2005	EVT-1	Reinspection per BWRVIP-18. No Indications.
	2007	EVT-1	Reinspection per BWRVIP-18. No Indications.
	Spring 2009 (2R20)	EVT-1	Reinspection per BWRVIP-18. No Indications.
Core Spray Sparger	1980-96	VT-1 (.001)	IEB 80-13/NUREG CR-4523. Examined 100% each outage prior to '97. Indications reported in four (4) Sparger Bracket to shroud welds first reported in 1994, safe for continued operation. Indications reported on four more Sparger Bracket to shroud welds in 1995. Eight (8) locations total. Safe for continued operation.

	1997	CSVT-1	Examined all previously reported Sparger Bracket indications. No change.
	1998	CSVT-1 VT-3 (1/32)	Re-inspection per BWRVIP-18. No change in previously reported Sparger Brackets indications from 1994/1995. Can not clean or get a good close look at these indications to classify.
	2000	EVT-1 VT-1	Began sampling Sparger inspections as "Geometry Critical" instead of "Geometry Tolerant". No new indications. No change in previously reported eight (8) Sparger Brackets indications from 1994/1995. Can not clean or get a good close look at these indications to classify.
	2001	EVT-1 VT-1	No new indications. No change in previously reported eight (8) Sparger Brackets indications since 1994/1995. Can not clean or get a good close look at these indications to classify.
	2003	EVT-1 VT-1	No new indications. No change in previously reported eight (8) Sparger Brackets indications since 1994/1995. Can not clean or get a good close look at these indications to classify.
	2005	EVT-1 VT-1	No new indications. Could not find some of the previously reported sparger bracket indications despite relooks. No change in the observed Sparger Bracket indications since 1994/1995. Can not clean or get a good close look at these indications to classify.
	Spring 2009 (2R20)	EVT-1 VT-1	New sparger bracket-to-shroud indication at 272°. Previous sparger bracket-to-shroud indications tracked since 1994 remain unchanged. New indication recorded is acceptable and similar to previous indications.
Top Guide	1992	VT-1 (.001)	<u>Grid/beams:</u> SIL-554, VT-1 (.001)

BWRVIP-26, 1997 Hatch 2 Top Guide has wedges	1994	VT-1 (.001)	bottom of intersections. Examined 28 cells in '92. No indications. <u>Grid/beams:</u> SIL-554, VT-1 (.001) bottom of intersections. Examined 10 cells in '94. No indications. <u>Hold downs & aligners:</u> SIL-588, examined 2 of 4 1994. No indications.
	1995	VT-3	<u>Wedges (24):</u> No indications.
	1997	VT-1 (.001) VT-1/3	<u>Grid/beams:</u> SIL-554, VT-1 (.001) bottom of intersections. Examined 6 cells in '97. No indications. <u>Rim, upper/lower plates, bolting:</u> Examined in 1997. No indications.
	2001	VT-1	<u>Hold-downs</u> and attachments to the shroud (2 of 4) 180° apart every other outage. No relevant indications. The previous analysis was no longer valid since power & extended power up-rate.
	2005	VT-1/3	<u>Grid/beams:</u> SIL-554, Examined 16 cells in '05. No indications. <u>Rim, upper/lower plates, bolting:</u> Examined 50% in 2005. 100% Grid Beams VT-3 from top surfaces. No indications. <u>Hold-downs</u> and attachments to the shroud (2 of 4) 180° apart every other outage. No relevant indications.
	2007	VT-1	<u>Grid/beams:</u> SIL-554, Examined bottom surfaces of 14 cells. No indications.
	Spring 2009 (2R20)	VT-1	<u>Hold-downs</u> and attachments to the shroud (2 of 4) 180° apart every other outage. No relevant indications.
Core Plate	1994 1995	VT-3	<u>Surfaces:</u> Examined accessible areas during CRB replacement. No indications. <u>Hold down bolts:</u> No indications.

			No BWRVIP inspections are required. Core Plate wedges installed in 1995.
Standby Liquid Control	1980-96	VT-2	Not accessible from inside. Portion visible during '94 access hole cover replacement. Examined for leakage from outside during RPV leakage test each outage. No indications.
	2000 2001 2003	Direct VT-2	<u>Safe-end & Extension</u> : RPV Support Skirt was found to have an inspection cover to gain access during leakage test. No Leakage. Looking at performing UT in the future.
	2005	UT	Safe-end & Extension per ASME Supplement 10. No indications.
Jet Pump Assembly	1980-1998	UT	<u>Hold down beams</u> : UT each outage in '80 - '88 outages - indications in 1 beam, replaced with original design. Replaced all beams in '89 with improved design.
	1994	VT-1/3	<u>1994</u> : Riser Brace Pads & Arms, Restrainers. No Indications
	1995	VT-1/3	<u>1995</u> : All adjusting screw tack welds, sensing lines & support brackets, pads & arms. No Indications.
	1997	VT-1 (.001) & VT-3	<u>4 assemblies</u> : (riser brace pad, restrainer adjusting screw tack welds, riser brace arm tack welds, inlet mixer, sensing line, restrainer set screw gaps). No indications. <u>Hold down beams</u> : All 20 Hold down beams examined in '98 per BWRVIP-41. No indications. <u>Thermal Sleeve to Elbow Welds</u> : All 10. No indications.
	1998	MVT-1	<u>All High Priority Welds</u> (not TS to el.): per BWRVIP-41. Two small indications reported on one (1) RS-3 & one (1) DF-1 weld. Possibly non-relevant. Disposition acceptable, examine next outage.

	2000	EVT-1	Re-examination of two (2) previous indications reported in 1998, one (1) RS-3 & one (1) DF-1 weld. Indications determined to be non-relevant.
	2001	VT-1 & EVT-1	50% of the medium priority welds per BWRVIP-41. RS-6 to RS-7's, RS-8 to RS-9's, RB-1's, RB-2's, MX-1's, WD-1's, DF-1's. No relevant indications.
	2003	EVT-1	Thermal Sleeve to Elbow Welds (RS-1): 50% of the population. No indications
	2005	EVT-1	Performed 50% of the RS-2, RS-3, DF-2, AD-1, AD-2, RB-1a(b)(c)(d) & RB-2a(b)(c)(d). No indications.
	2007	VT-1 EVT-1 UT	Performed VT-1 100% of the WD-1's. Performed 100% UT of BB-1, BB2, & BB-3. Performed EVT-1 50% of RS-8 to RS-9's, IN-4's, MX-2's, DF-1's, RS-6,s & RS-7's. No indications.
	Spring 2009 (2R20)	EVT-1, VT-1	Performed 2 nd 50% reinspection of RS-1, RS-2, RS-3, DF-2, AD-1 & AD-2. Inspected (2) RB-1 locations. No indications.
Guide Tubes	1994	VT-3	Examine when accessible once/interval. Not normally accessible from inside. Portions visible during '94 access hole cover replacement – no indications. Examined 14 in '94. No indications.
	2001	EVT-1 & VT-1	<u>Guide Tube Welds:</u> Examined CRGT-1, 2, & 3 in 14 guide tubes with Anti/Rotation Pins.(14% of the population) per BWRVIP-47. No relevant indications. Future inspections based on industry inspection results. Also examined 14 Anti/Rotation Pins
Instrument Penetrations	1980-2005	VT-2	2N11, 2N12, 2N16 Nozzles. Examined during RPV leakage test each outage. No indications. Hatch ASME exempt.

<p>*RPV Interior Attachments (BWRVIP-48)</p> <p>*Other Attachments examined by other BWRVIP documents.</p>	1989	VT-1, VT-3	<p><u>Feedwater sparger brackets:</u> NUREG-0619, Examine every fourth outage. Examined in '89, '92 & '97. Mechanical damage on 1 bracket in '83 – bracket replaced. No new indications.</p>
	1992	VT-1, VT-3	<p><u>Guide rod brackets:</u> Examine once/interval. Examined in '92. Mechanical damage on 1 bracket in '92 – safe for continued operation.</p> <p><u>Steam dryer hold down brackets:</u> Examine once/interval. Examined in '92. No indications.</p> <p><u>Steam dryer support brackets:</u> Examine once/interval. Examined in '92, '94 & '97. Raised metal indications on 2 brackets in '92 – metal removed, safe for continued operation.</p> <p><u>Surveillance specimen brackets:</u> Examine once/interval. Examined in '92, '97 & '98. No indications. BWRVIP-48 in '98.</p>
	2001	EVT-1 VT-1	<p><u>Feedwater sparger brackets:</u> 50% of the brackets. No relevant indications. Once/10 years.</p> <p><u>Surveillance specimen brackets:</u> 1 of 3 brackets. No relevant indications. Once/10 years.</p>
	2003	EVT-1	<p>Steam Dryer Support Brackets: Scheduled 2 of 4. 1 had piece missing near corner. Expanded scope to all 4 and found another to be cracked on corner. Cracking was determined to be caused by fatigue. Cracked piece was removed. Future corrective action to be determined. Re-examine next outage.</p>
	2005	EVT-1	<p><u>Steam Dryer Support Brackets:</u> Found another with a piece missing on a corner. Modifications were made by flat toping all 4 brackets by EDM. All 4 Steam</p>

	2007	VT-3	<p>Dryer seating surfaces were also flattened by EDM. To examine next outage.</p> <p><u>Feedwater sparger brackets:</u> examined 2 of 4. No indications</p> <p><u>All Guide Rod Brackets:</u> VT-3. <u>30° Upper Surveillance Specimen Brackets:</u> VT-3. <u>30° Lower Surveillance Specimen Brackets:</u> EVT-1. <u>All Steam Dryer Support Brackets</u> EVT-1. No Indications.</p>
	Spring 2009 (2R20)	EVT-1 VT-1 VT-3	<p>Inspected (2) RB-1 locations, (2) PB locations , and upper & lower surveillance specimen at 300° location. No indications.</p>
LPCI Coupling (BWRVIP-42)	Not Applicable to Hatch	N/A	N/A
Steam Dryer (BWRVIP-139)	2007	VT-1	<p><u>BWRVIP-139</u></p> <p>2 – Steam Dryer Cover Plate Horizontal Welds at 0° & 180° – No indications</p> <p>2 – Steam Dryer Upper Hood Horizontal Welds – No indications</p> <p>2 – Steam Dryer Radial Cover plate Welds at 90° & 270° – No indications</p> <p>8 – Steam Dryer Drain Channel Welds – No indications</p> <p>1 – Steam Dryer Manway Cover Weld at 270 degrees – No indications</p> <p>49 – Steam Dryer Vertical End Plate & Partition Welds – No indications</p> <p>28 – Steam Dryer Tie Bars & Welds – No indications</p> <p>1 – Steam dryer Upper Support Ring 0-360° (Top & Vert Surfaces) Minor indications on upper support ring side are monitored for change.</p> <p>4 – Steam Dryer lifting eye and attachment welds</p> <p><u>Asset Management</u></p> <p>4 – Steam Dryer Seismic Brackets – Minor indications on upper support ring side are monitored for change.</p> <p>2 – Steam Dryer Lower Support Ring (24”</p>

	Spring 2009 (2R20)	VT-1 (89)	<p>either side of guides at 0° & 180°) – No indications</p> <p>1 – Steam dryer Upper Guide at 180° – No indications</p> <p>Inspected all four steam dryer seismic brackets and upper support ring top and vertical surfaces 0-360° – Minor indications on upper support ring side were being tracked for changes. No discernable changes.</p>
Moisture Separator	Spring 2009 (2R20)	VT-1 (89)	Lifting eye, rod brackets and attachment weld at all four locations. Guide rod brackets at both locations. Lower support ring gussets 0-360° (18 locations). No indications.
DM Welds	Spring 2009 (2R20)	UT	<p>18 DM weld examinations using automated Appendix VIII qualified UT.</p> <p>3 SM alloy 182 weld examinations using automated Appendix VIII qualified UT.</p> <p>3 examinations using manual Appendix VIII qualified UT.</p> <p>One axial flaw was identified in the “2G” recirculation riser nozzle-to-safe end weld. The flaw was characterized as ID connected in the weld butter on the safe end side and 0.26” (out of 1.22” thickness) deep. Analyzed as acceptable for one cycle of operation.</p>

Reactor Internals Inspection History

Plant: Hope Creek

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	Winter 1996 RF06	VT-1 1 mil	Examined H-4, H-5 at 4 cell locations. No indications found IAW SIL 572 R1
	Fall 1997 RF07	UT	Examined 100% accessible regions of H-3,4,5,7. No indications found
	Fall 2007 RF14	UT	Examined 100% accessible regions of H-3,4,5,7. Achieved 60.1 to 62.8% coverage. Found 5 indications in H4, all less than 2 inches length, less than 15% thru wall, 2.1% of examined length. Found 1 indication in upper side H5, 4.3 inches in length, depth 11%, 1.1% of examined length. Use as is for 10 years IAW VIP-76.
Shroud Support	Spring 1994 RF06	VT-3	Examined 6 shroud support pillar IAW Sec. XI. No indications found
	Fall 1997 RF07	VT3 EVT-1	Examined accessible portions of H-8 and H-9. No indications Examined access hole covers. No indications.
	Spring 2003 RF11	UT EVT-1	>10% of H-8/H-9 from the Vessel OD. No indications Examined access hole covers. No indications.
	Spring 2006 RF13	EVT-1	Examined access hole covers. No indications.
	Spring 2009 RF15	EVT-1	Examined access hole covers. No indications.
Core Spray Piping	Winter 1996 RF06	VT-1	Piping and welds in annulus examined IAW IEB 80-13. One indication found on a bracket bolt tack weld.

	Fall 1997 RF07	EVT-1 VT-1	Examined all creviced and non-creviced weld locations, no indications Examined all (8) header brackets, no new indications.
	Spring 1999 RF08	EVT-1 VT-1 & 3	Examined all creviced and 25% non-creviced locations, no indications. Examined 25% header brackets, no new indications.
	Spring 2000 RF09	EVT-1 VT-1 & 3	Examined all creviced weld locations, no indications. Examined 25% header brackets, no indications.
	Fall 2001 RF10	EVT-1 VT-1 & 3	Examined all creviced and 25% non-creviced locations, no indications. Examined 25% header brackets, no indications.
	Spring 2003 RF11	EVT-1 EVT-1 & VT-3	Examined all creviced weld locations, no indications. Examined 25% header brackets, no indications.
	Fall 2004 RF12	EVT-1 EVT-1 & VT-3	Examined all creviced and 25% non-creviced locations, no indications. Examined 25% header brackets, no new indications.
	Spring 2006 RF13	EVT-1 EVT-1 & VT-3	Examined all creviced weld locations, no indications Examined 25% header brackets, no indications.
	Fall 2007 RF14	UT & EVT-1 EVT-1 & VT-3	Examined all creviced and 100% non-creviced locations, no indications. Examined 25% header brackets, no new indications.
	Spring 2009 RF15	EVT-1 EVT-1 & VT-3	Examined all locations that could not be UT examined in the previous outage, no indications. Examined 25% header brackets. No indications.

Core Spray Sparger	Winter 1996 RF06	VT-1	Piping and spargers in shroud examined IAW IEB 80-13. No indications.
	Spring 1999 RF08	EVT-1 VT-1	All sparger welds, no indications. 50% nozzle welds and all bracket welds, no indications.
	Fall 2001 RF10	EVT-1 VT-1	All sparger welds, no indications. 50% nozzle welds and all bracket welds, no indications.
	Fall 2004 RF12	EVT-1 VT-1	All sparger welds, no indications. 50% nozzle welds and all bracket welds, no indications.
	Fall 2007 RF14	EVT-1 VT-1	All sparger welds, no indications. 50% nozzle welds and all bracket welds, no indications.
Top Guide (Rim, etc.)	Fall 1992/ Spring 1994/ Winter 1996	VT-1	Examined IAW SIL 554. Examined 4 cell locations made available during normal refuel. No indications.
	Winter 1996 RF06	VT-3	Examined Top Guide wedges IAW SIL 588 R1. No indications.
	Fall 1997 RF07	VT-1	Examined IAW SIL 554. Examined 4 cell locations made available during normal refuel. No indications.
	Spring 1999 RF08	VT-3	Examined 4 C-clamps, no indications.
	Spring 2009 RF15	EVT-1 VT-3	Examined 4 top guide grid beam locations. No indications. Examined 4 C-clamps, no indications
Core Plate (Rim, etc.)	Fall 1997 RF07	VT-3	Examined all hold down bolts, no indications.
	Spring 1999 RF08	VT-3	Examined 26 hold down bolts, no indications.
Jet Pump Assembly	Spring 1994 RF05	VT-1	50% riser braces, RB-1/2 & RS-8/9, no indications
		VT-3	100% wedges and setscrews IAW SIL 574. 3 screws with 1 tack cracked

	Winter 1996 RF06	VT-1	50% riser braces, RB-1/2 & RS-8/9, no indications
		VT-3	100% wedges and setscrews. 4 screws with 1 tack cracked, 2 screws with 2 tacks cracked
	Fall 1997 RF07	VT-1	50% riser braces (RB-1/2 & RS-8/9), 100% RS-1, no indications
		VT-1	100% sensing lines. Three pumps have cracked standoffs, installed clamps.
		VT-3	100% beams, no indications
		VT-3	100% wedges and setscrews. 1 screw with 1 tack cracked
	Spring 1999 RF08	EVT-1	50% riser brace(RB-1/2 & RS-8/9), no indications
		EVT-1	100% RS-1, no indications
		VT-1	100% sensing lines, no indications
		VT-3	100% beams, 100% wedges and setscrews, no indications
	Spring 2000 RF09	EVT-1	50% riser brace (RB-1/2 & RS-8/9), no indications
		VT-1	100% sensing lines, no indications
		VT-3	100% wedges and setscrews, no indications
	Fall 2001 RF10	VT-1	100% sensing lines, no indications
		VT-3	100% wedges
	Spring 2003 RF11	VT-1	100% wedges, no movement noted
		EVT-1	100% RS-3, 50% RS-2, 50% RS6/7 50% IN-4, 50% MX-2, 50% DF-1/2, 50% AD1/2, 50%, no indications
		VT-1	50% sensing lines, no indications
	Fall 2004 RF12	UT	100% beams, BB1/2, no indications
		VT-1	50% sensing lines, no indications
		EVT-1	25% RS-1, 50% RS-2, 50% IN-4, 50% MX-2, 50% DF-1/2, 50% AD1/2, 50% RS-6/7, no indications
	Spring 2006 RF13	VT-1	50% sensing lines, no indications
		VT-1	100% wedges, one had minor wedge wear, installed slip joint clamp

	Fall 2007 RF14	EVT-1 VT-1 VT-1 VT-1	25% RB-1/2, 25% RS-8/9, no indications 100% wedges, one had minor wedge wear and SS setscrew gap of 35 mil, installed auxiliary wedge 1 slip joint clamp, no issues 7 setscrew tack welds previously identified with cracks. One setscrew found with all tacks cracked. Staked setscrew, use as is one cycle without auxiliary wedge.
	Spring 2009 RF15	UT VT-1 VT-3 VT-1 VT-3 EVT-1	100% beams, BB1/2, no indications 100% wedges, no wear found. Slip joint clamp and aux wedge. No issue found. 11 sensing lines. No indications. Installed aux wedge for an issue found previous outage. 50% RS3, no indications.
CRD Guide Tube	Winter 1996 RF06	VT-3	Examined 6 guide tubes IAW Sec. XI. No indications
	Spring 1999 RF08	VT-3/1	Examined 4 guide tubes, no indications
	Spring 2003 RF11	VT-3/1	Examined 6 guide tubes no indications
	Fall 2004 RF12	VT-3/1	Examined 10 guide tubes, no indications
	Fall 2007 RF14	VT-1	Examined 5 guide tubes, no indications
CRD Stub Tube	Spring 94 RF05	VT-3	Examined IAW Sec XI. Examined CRD Housing through removed jet pump diffuser. No indications.
In-Core Housing	Not examined		
Dry Tube	Fall 1992 RF04	VT-1	Examined IAW SIL 409. No indications found.
	Spring 1999	EVT-1	All 12 dry tubes had circumferential

	RF08		cracking approx 1 inch below the upper collar
	Spring 2000 RF09		Replaced all 12 dry tubes
Instrument Penetrations	Fall 1997 RF07	VT-1 and VT-3	Examine IAW Sec. XI, no indications
Vessel ID Brackets	Winter 1996 RF06	VT-1	50% jet pump riser bracket, no indications
	Fall 1997 RF07	VT-1	100% core spray header bracket, 50% jet pump riser bracket, 100% surveillance sample bracket, no indications.
		VT-3	100% guide rod bracket, 100% feedwater bracket, 100% steam dryer holddown bracket, no indications
	Spring 1999 RF08	VT-1	25% core spray header bracket, 100% feedwater sparger bracket, 100% steam dryer support bracket, no indications.
		EVT-1	50% jet pump riser bracket, no indications
		VT-3	100% guide rod bracket, no indications
	Spring 2000 RF09	VT-1	25% core spray header bracket, no indications
		EVT-1	50% jet pump riser bracket, no indications
	Fall 2001 RF10	VT-1	25% core spray header bracket, no indications
		VT-3	100% guide rods, no indications
	Spring 2003 RF11	EVT-1	25% core spray header bracket, no indications
	Fall 2004 RF12	EVT-1	25% core spray header bracket, 100% steam dryer support bracket, 100% feedwater sparger bracket, no indications found.
		VT-3	100% guide rod bracket, no indications found.
	Spring 2006	EVT-1	25% core spray header bracket, 25% jet

	RF13	VT-1	pump riser bracket, no indications
		VT-3	100% surveillance sample bracket, no indications
	Fall 2007 RF14	EVT-1	100% steam dryer holddown bracket, no indications
	Spring 2009 RF15	EVT-1 EVT-1 & VT-1	25% core spray header brackets
			25% core spray header brackets. 100% feedwater brackets. Found minor pin wear on 2 pins. Evaluation justified operation for one cycle.
LPCI Coupling	Fall 2001 RF10	EVT-1 VT-1 VT-3	Examined 50% couplings, no indications
	Spring 2003 RF11	EVT-1 VT-1 VT-3	Examined 50% couplings, no indications
	Spring 2006 RF13	EVT-1 VT-1 VT-3	Examined 50% couplings, no indications
Steam Dryer	Fall 1997 RF07	VT-1	100% support ring, one indication identified on face, 2.25"
	Spring 1999 RF08	VT-1 VT-1	100% drain channels, no indications Re-look at previous support ring indication, no growth
	Spring 2000 RF09	VT-1	100% support ring, no new indications, no growth on previous indication
	Fall 2001 RF10	VT-1 VT-1	100% drain channels, one indication identified on skirt below a seismic lug access plate weld, 0.75" 100% support ring, no new indications, no growth on previous indication
	Spring 2003 RF11	VT-1 EVT-1 EVT-1 VT-1	100% support ring, no new indications, no growth on previous indication Re-look at skirt indication, no growth Manway coverplate 100% coverplates

	Fall 2004 RF12	VT-3	100% tie bars
		VT-1	100% lifting lug braces, one found severed.
		VT-1	100% support ring, no growth on previous indication, new indication identified; 0.625" across top, and 0.75" down face.
	Spring 2006 RF13	VT-1	Outlet plenum plate welds-between banks B&C and D&E, outer hood welds at hood stiffener, outer hood welds at top, 100% drain channels, inner hood welds at hood stiffener, no indications.
		VT-1	Previously identified indications on support ring, no growth found.
		VT-1	100% hood assembly welds (exterior surfaces only), 100% tie bars, 100% lifting assembly welds, 100% cover plate welds. 4 locations had IGSCC type indications. Two indications were above a construction (original) repair patch on hood C with a combined length of 4". Another was on the outlet plenum plate between banks A&B near bottom, 1.25". Adjacent to the cover plate on the support ring a 5" indication was identified. On a lifting rod two indications were found on the threads near a tack weld. No repairs were made.
	Fall 2007 RF14	VT-1	5 locations with previously found indications. No crack growth found.
	Spring 2009 RF15	VT-1	Re-baseline IAW BWRVIP-139 and all previous indications inspected following EPU implementation. One new IGSCC flaw found on the support ring. Previous flaws on a lifting lug tack weld were found joined. One creator crack found on a lifting rod bracket weld. All indications were evaluated for use as is. No repairs required.

RPV DM nozzle welds	Fall 2007 RF14	UT	Examined N2A, category C, automated UT. Found an 89.8% thru wall circumferential flaw and performed a weld-overlay repair. Expanded scope to examine N9, category C, manual UT and N2D, category C, automated UT. No indications found. Weld crowns ground flush for all three examinations. All three nozzles contain Alloy 82/182 weld material.
	Spring 2009 RF15	UT	Examined 8 category C welds with automated UT after weld crown reduction. Found embedded flaws on 3 welds, not ID surface connected. Evaluated IAW ASME section XI. No repair required.

Reactor Internals Inspection History

Plant: LaSalle 2

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Spray Piping	L2R12 (2009)	UT	UT of 34 welds; AP1, AP2, AP3, AP4a, AP4b, AP5, AP6, AP7, AP4c, AP8b, BP3, BP4a, BP4b, BP5, BP6, BP7, BP4c, BP8b, CP1, CP2, CP3, CP4a, CP4b, CP5, CP6, CP7, CP4c, DP3, DP4a, DP4b, DP5, DP6, DP7 and DP4c. Existing flaw on BP5 determined to be geometry. All others NRI. Four new welds identified, (AP4c-1, BP4c-1, CP4c-1, and DP4c-1) located between P4c and P7 (OE28372). All examined by UT with NRI.
		EVT-1	AP1, AP2, AP3, AP4a, AP4b, AP4c, AP4c-1, AP4d, AP8a, AP8b, BP3, BP4a, BP4b, BP4c, BP4c-1, BP4d, BP5, BP8a, BP8b, CP1, CP2, CP3, CP4a, CP4b, CP4c, CP4c-1, CP4d, CP8a, CP8b, DP3, DP4a, DP4b, DP4c, DP4c-1, DP4c-2, DP4d, DP5, DP8a, and DP8b. NRI. Five new welds identified, (AP4c-1, BP4c-1, CP4c-1, DP4c-1 and DP4c-2) located between P4c and P7. All examined by EVT-1 with NRI.
	L2R11 (2007)	EVT-1	Visual examinations of core spray piping welds for which the UT is not demonstrated. No indications (NRI). 8 piping brackets; NRI.
	L2R10 (2005)	UT	UT of 34 welds; AP1, AP2, AP3, AP4a, AP4b, AP5, AP6, AP7, AP4c, AP8b, BP3, BP4a, BP4b, BP5, BP6, BP7, BP4c, BP8b, CP1, CP2, CP3, CP4a, CP4b, CP5, CP6, CP7, CP4c, DP3, DP4a, DP4b, DP5, DP6, DP7 and DP4c.

		EVT-1	Existing flaw on BP5 re-sized with no growth. All others NRI.
		EVT-1	Welds for which UT is not demonstrated: AP1, AP4d, AP8a, BP5, BP4d, BP8a, CP1, CP4d, CP8a, CP8b, DP4d, DP8a, and DP8b. NRI.
	L2R09 (2003)	EVT-1	2 core spray piping brackets; NRI.
	L2R08 (2000)	UT	Visual examinations of those core spray piping welds for which the UT technique is not demonstrated. No indications.
Core Spray Sparger		UT	UT for those welds for which the UT tool is qualified.
		EVT-1	8 piping brackets; NRI.
	L2R12 (2009)	VT-1	6 sparger brackets; NRI.
	L2R11 (2007)	VT-1	S3A-a, S3A-b and S3A-c from 268 to 7.5°, S3A-a, S3A-b and S3A-c from 7.5 to 88°, S3B-a, S3B-b, and S3B-c from 172.5 to 268° and S3B-a, S3B-b, and S3B-c from 88 to 172.5°; bent sparger nozzle deflector identified in L2R11 unchanged. All others NRI.
		EVT-1	S3D-a, S3D-b and S3D-c from 352 to 88° and S3C-a, S3C-b and S3C-c from 7.5 to 88°; one bent sparger nozzle deflector; all others NRI. Bent nozzle accepted for one cycle.
		VT-1	S1A, S2A (Left and right), S4A, S1B, S2B (Left and right), S4B, S1C, S2C (Left and right), S4C, S1D, S2D (Left and right), S4D. NRI.
	L2R10 (2005)	VT-1	6 sparger brackets; NRI.
		VT-1	S3A-a and S3A-d from 268 to 008° and S3D-a and S3D-b from 352 to 268; NRI
			6 sparger brackets; NRI.

	L2R09 (2003)	EVT-1	Visual inspection of half of the core spray sparger welds. NRI. 6 sparger brackets; NRI.
	L2R08 (2000)	VT-1	100% of all sparger welds. NRI.
		EVT-1	12 sparger brackets. NRI.
Attachment Welds	L2R11 (2007)		(See jet pump and core spray sections of this report.)
	L2R10 (2005)	EVT-1	Steam dryer attachment welds, four locations, NRI
		VT-3	Upper bracket attachment welds for surveillance baskets at three locations, NRI.
		VT-1	Lower bracket attachment welds for surveillance baskets at three locations. Basket disengaged at 120° location and accepted for one cycle. All others NRI.
	L2R09 (2003)	EVT-1	All feedwater sparger attachment welds; NRI.
		EVT-1	All feedwater sparger attachment welds; NRI.
		VT-1	Steam dryer attachment welds, four locations, NRI
		VT-3	Guide Rod attachments at 0° and 180; NRI. Upper surveillance capsule brackets at three locations: NRI.
		VT-1	Lower surveillance capsule brackets at three locations; NRI.
Core Shroud (Note: LaSalle has two beltline horizontal welds and	L2R11 (2007)	VT-3	Surfaces of the shroud for ASME Section XI. NRI.
	L2R10 (2005)	UT	UT of welds H3, H5, H6, and H8 All welds are NRI.

thereby unique designation).	L2R07 (1996)	UT	UT of H5, H6, and H8. NRI.
	L2R06 (1995)	UT	UT of H3, H4, H5, H6, and H8. NRI.
Shroud Support	L2R12 (2009)	EVT-1	Access Hole Covers at 0 and 180°--NRI
	L2R11 (2007)	VT-3	Access Hole Covers at 0 and 180° for ASME Section XI. NRI Accessible portions of the top of the shroud support plate for ASME Section XI. NRI. Top of H9 weld (accessible locations) for ASME Section XI. NRI
	L2R10 (2005)	VT-1	Access Hole Covers at 0 and 180°--NRI
		VT-3	Inspection of the general condition of the RPV interior surface from the RPV closure flange elevation to the Steam Dam, 360° around the RPV interior. NRI. Inspection of the general condition of the cladding at the steam dam elevation, 360° around the RPV interior. NRI. Examined RPV cladding from below core plate to shroud support plate due to removal of the inlet mixers. NRI.
		EVT-1	H8a weld (BWRVIP weld H8) for >10%-NRI
		UT	UT of 100% of H9 from the RPV OD. NRI.
	L2R09 (2003)	VT-3	Inspection of the general condition of the RPV interior surface from the RPV closure flange elevation to the Steam Dam, 360° around the RPV interior. NRI.
			Inspection of the general condition of the cladding at the steam dam elevation,

			360° around the RPV interior. NRI.
Top Guide	L2R11 (2007)	VT-3	C-clamp at 0°. NRI Accessible portions of the top guide for ASME Section XI. NRI
	L2R10 (2005)	VT-3	C-clamps at 4 locations--NRI
SLC	L2R12 (2009)	VT-2	Visual inspection of the partial penetration weld to the bottom head during the Section XI system leak test. NRI.
	L2R11 (2007)	VT-2	Visual inspection of the partial penetration weld to the bottom head during the Section XI system leak test. NRI.
		UT	UT of the partial penetration weld and heat affected zone. NRI.
	L2R10 (2005)	VT-2	Visual inspection of the partial penetration weld to the bottom head during the Section XI system leak test. NRI.
	L2R09 (2003)	VT-2	Visual inspection of the partial penetration weld to the bottom head during the Section XI system leak test. NRI.
	L2R08 (2000)	PT	Surface examination. NRI.
		VT-2	Visual inspection of the partial penetration weld to the bottom head during the Section XI system leak test. NRI.
Jet Pump Assembly	L2R12 (2009)	VT-1	WD-1 on 9 pumps; all showed minor wear with most unchanged from previous examinations. Three auxiliary wedges examined, two vessel side and one shroud side. One vessel side auxiliary wedge had minor wear. Set screw on same pump

	L2R11 (2007)	VT-1	confirmed to be in contact with the belly band and tack welds intact. Other auxiliary wedges were NRI. WD-1 wedges on all 20 pumps; 7 wedges/rods showed minor wear; accepted-as-is. Auxiliary wedges installed at four locations on 3 pumps to compensate for observed gaps.
		VT-3	Examination of ratchet teeth engagement on 13 jet pump hold down beams due to fitup issues in the previous outage. NRI
	L2R10 (2005)	VT-1	All 20 inlet mixers were replaced with new inlet mixers with labyrinth seals in the slip joint area, and with new non-stellite main wedges. New hold down beams were installed on 17 pumps. After replacement, three point contact verified at all locations (AS-1 shroud side, AS-1 vessel side, and WD-1). NRI.
	L2R09 (2003)		Replacement of 3 beams. After a review of material certification paperwork that identified them as Group 1 beams, three holddown beams were replaced with low stress beams.
		VT-1	WD-1 on 3 pumps; NRI. Installed 3 aux. Wedges to ensure three point contact for three pumps.
	L2R08 (2000)	UT	UT exam of 10 beams at the BB-1 and BB-2 locations. NRI.
		VT-3	Exam of WD-1 on all 20 pumps; NRI. Exam of all set screw to belly band contact points; installed 7 auxiliary wedges to maintain three point contact; all others NRI.
Jet Pump Diffuser	L2R11 (2007)	EVT-1	AD-2 on 6 pumps; NRI. DF-1 on 10 pumps; NRI.

	L2R10 (2005)	EVT-1	AD-2 on 4 pumps; NRI. DC-3 on 10 pumps; NRI. DF-2 on 10 pumps; NRI. DF-3 on 10 pumps; NRI.
	L2R09 (2003)	EVT-1	AD-2 on 4 pumps; NRI. DF-1 on 4 pumps; NRI. DF-2 on 4 pumps; NRI. DF-3 on 4 pumps; NRI. IN-1 on 10 pumps; NRI. IN-2 on 10 pumps; NRI.
	L2R08 (2000)	EVT-1	AD-2 on 6 pumps; NRI. DF-1 on 6 pumps; NRI. DF-2 on 6 pumps; NRI.
		UT	DF-3 on 6 pumps; NRI.
Jet Pump Riser	L2R12 (2009)	EVT-1	All RS-1 welds (including pup piece welds) on 8 risers; Re-sized flaw on RS-1c on 19/20; no change in length. All others NRI.
	L2R11 (2007)	EVT-1	Re-sized flaw on RS-1c on 19/20; no change in length. RS-1 on 2 risers; NRI. RB-1 on 12 jet pumps; NRI.
	L2R10 (2005)	EVT-1	Examined strain relief welds on all 10 risers. NRI Re-sized flaw on RS-1c on 19/20; no change in length. RS-2 on 3 risers; NRI. RS-3 on 5 risers; NRI. RS-6/7 on 10 jet pumps; NRI. RS-8/9 on all 20 jet pumps; NRI. RB-1 on 10 jet pumps; NRI. RB-2 on all 20 jet pumps; NRI.
	L2R09 (2003)	EVT-1	Re-examined flaws on two RS-1 welds; that on the 1/2 riser was determined to be non-relevant; those on the 19/20 riser were re-sized, with no change since L2R07 (1996). MX-2 on 4 pumps; NRI. RS-6/7 on ten pumps; NRI.

	L2R08 (2000)	UT	UT exam of MX-2 on 6 pumps; NRI.
	L2R07 (1996)	VT-1	RS-1 on all ten risers; two indications; one on the 1/2 riser and the second on the 19/20 riser; both accepted for two cycles. RS-2 on all ten risers. NRI. RS-3 on all ten risers. NRI.
Steam Dryer	L2R12 (2009)	VT-1	11 vertical welds on the 90° side, all NRI. 6 horizontal welds; all NRI. Upper and lower guide bracket at 180° and lower guide bracket at 0°. All RI as was the top of the guide rod at 180°. Conditions accepted as-is. Upper guide bracket at 0°; NRI. 15 tie bars. Previous indications on tie bars reviewed and unchanged. All others NRI. Two tie rods; previous indication re-confirmed with no change. Second tie rod was NRI. Upper support ring from 0-360°; top and side RI; bottom NRI. All indications accepted as-is.
	L2R11 (2007)	EVT-1	All welds recommended by BWRVIP-139 and SIL 644 Revision 2 for a curved hood dryer on the 90° side of the dryer, tie rods on both sides, upper support ring external surfaces, upper and lower guide at 180°, (indication on the lower guide bracket accepted for one cycle), lifting lugs and lifting assembly brackets at 45 and 135°, and 18 tie bars. Previous indications on tie bars reviewed and no change in sizes. All other welds NRI.
	L2R10 (2005)	VT-1	All welds recommended by SIL 644 Revision 1 for a curved hood dryer on the 270° side of the dryer, horizontal bank welds on both the 90° and 270° sides, all four lifting lugs; lifting assembly brackets at 225° and 315°

			locations, and all tie bars. Indications found on three tie bars and accepted for one cycle. Upper strap on lifting assembly at 215° found broken and was removed. All other welds NRI.
Vessel	L2R10 (2005)	VT-3	Inspection of the general condition of the RPV interior surface from the RPV closure flange elevation to the Steam Dam, 360° around the RPV interior. NRI.
	L2R09 (2003)	VT-3	Inspection of the general condition of the cladding at the Steam Dam elevation, 360° around the RPV interior. NRI.
Lower Plenum	L2R10 (2005)	VT-1	Examined all areas below the core plate made accessible by disassembly of 20 jet pumps. Areas examined included CRD/ST-1, ST/RPV-1, H8a, H9, H10, H11, H12, ICH/RPV-1, and bottom head cladding. NRI for all twenty locations.
	L2R09 (2003)	VT-3 / EVT-1	Visual examination of the fuel support guide tube pins (FS/GT-ARPIN-1) at 4 locations, CRGT-1 at 4 locations, CRGT-2 at 21 locations, and CRGT-3 at 21 locations. No indications.
	L2R08 (2000)	VT-3	Visual examination of the fuel support guide tube pins (FS/GT-ARPIN-1) at 14 locations, CRGT-1 at 15 locations. No indications.
DM Welds— BWRVIP-75-A Category D	L2R12 (2009)		Two previous un-identified Category D welds were identified and the spoolpiece on which the welds were located was replaced with a spoolpiece with non-IGSCC susceptible welds.
Other	L2R11 (2007)	VT-3	Removal of the surveillance capsule basket from 120° due to a broken spring.

Reactor Internals Inspection History

Plant: **Limerick Generating Station, Unit 2**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	1999 (2R05)	UT	<p>A UT baseline of H3, H4, H5 and H7 was performed. H4 was the only shroud weld examined from two-sides. Indications identified on I.D. of H3, H5, and on O.D. of H3, H4, and H5. No indications identified at H7. Scope expanded to include UT of all remaining circumferential welds (H1, H2, and H6). Indications identified on I.D. of H1, H2, and H6 and on O.D. of H1. Shroud was reclassified as a Category C, un-repaired shroud.</p> <p>Full structural margin was calculated using one cycle of crack growth. Structural analysis was re-performed in 2R06 and again in 2R07. Re-examination was scheduled for H1, H2, H3, H4, and H6 in 2R08 per site-specific evaluations. H5 and H7 are scheduled for re-examination in 2R10.</p>
	2005 (2R08)	UT	<p>UT was performed on H1 and H6 from one-side with approximately 60% coverage. A two-sided UT was performed on H2, H3, and H4 with approximately 60-63% coverage. Approx 21.5% of the ring-side scans were obtained for H2 and H3 with a new phased array technique.</p>
		EVT-1	<p>Due to equipment problems, vertical welds could not be screened by UT per BWRVIP-76. As a result, all vertical welds were assumed to "screen in", and an EVT-1 was performed on these welds from the shroud OD. Reinspection of the vertical welds, either UT or two-sided</p>

	2007 (2R09)	EVT-1	<p>EVT-1, is scheduled for 2007(2R09).</p> <p>Fuel was removed from areas surrounding the shroud vertical welds, and an EVT-1 examination was performed from the ID and the OD surfaces of the shroud on four vertical welds V15, V16, V17, and V18. No indications were identified.</p> <p>Another analysis of the indications found in 2R08 (2005) on horizontal welds H1, H2, H3, H4, and H6 was performed to demonstrate that structural margins are maintained until 2009 (2R10). The analysis demonstrated acceptable safety factors are maintained and a reinspection by UT is scheduled for 2R10.</p>
	2009 (2R10)	UT	<p>UT was performed on H3, H4, H5 and H7 from two-sides. A one-sided UT was performed on H2 ring-side concurrent with H3 ring-side exam. Coverage and results are as follows:</p> <p style="padding-left: 40px;"> H-2 LKUP – 83.3% - 0.7% flawed H-3 LKDN – 83.3% - 0% flawed H-3 LKUP – 91.0% - 70% flawed H-4 LKDN – 97.7% - 39.9% flawed H-4 LKUP – 98.2% - 35.4% flawed H-5 LKDN – 77.2% - 12.8% flawed H-5 LKUP – 76.6% - 0% flawed H-7 LKDN – 63.2% - 0% flawed H-7 LKUP – 63.5% - 0% flawed </p> <p>A re-analysis of the H1, H2, and H6 welds was performed prior to this refuel outage and the results supported a 10-year reinspection. Therefore, these three welds are scheduled for inspection in 2015 (2R13).</p> <p>The structural analysis performed at the end of 2R10 only supports one-cycle of operation for the H3, H4, and H5 welds. A site-specific analysis is currently in progress to justify additional cycles of</p>

		EVT-1	<p>operation prior to reinspection. Since the H7 weld had no flaws identified and coverage was greater than 50%, the reinspection interval was determined to be 10 years per BWRVIP-76 Table 2-1.</p> <p>Due to multiple tooling issues and failures, portions of the H5 and H7 welds were also visually examined via EVT-1 method from the OD surface only. Visual coverage on the H5 welds is 19.5% of the weld length with no recordable indications identified. Visual coverage on the H7 welds is 13.2% of the weld length with no recordable indications identified.</p>
Shroud Support/ Access Hole Covers	1991 (2R01)	VT-3	VT-3 examination of accessible portions of H-8 and H-9 welds from annulus. VT-3 examination of both access hole covers and welds. No indications identified.
	1993 (2R02)	VT-3	VT-3 examination of shroud support leg welds at Azimuth 300 deg through disassembled jet pump #18. No indications identified.
	1995 (2R03)	VT-3	VT-3 examination of both access hole covers and welds. No indications identified.
	1999 (2R05)	EVT-1	EVT-1 examination 10% of the weld H-8 & H-9 length; in areas of 0 & 180 deg access hole covers. No indications identified.
		VT-3	VT-3 examination of both access hole covers and welds. No indications identified.
	2003 (2R07)	UT	UT of 10% of weld H-9 length. No indications identified.
		VT-3	VT-3 examination of both access hole covers and welds. No indications identified.

	2005 (2R08)	EVT-1	EVT-1 examination of 10% of weld H-8 length. No indications identified.
	2007 (2R09)	VT-1	VT-1 examination of both access hole covers and welds. All three welds were examined on the 180 deg Top Hat. No indications identified.
		Best effort VT-1/VT-3	Best effort VT-1 / VT-3 of the lower side of H-8 and H-9, and six shroud support legs (3 welds H10, H11, H12 on each leg) were examined via access through the disassembly of Jet Pumps 1, 12, and 17. No indications were identified.
Core Spray Piping	1991 (2R01) – 1995 (2R03)	VT-1	Enhanced VT-1 (1 mil resolution) examination performed every refueling outage on piping and welds per IEB 80-13. No indications identified.
	1997 (2R04)	EVT-1	EVT-1 (1/2 mil resolution) examination of welds per IEB 80-13 and BWRVIP-18 baseline. No indications identified.
	1999 (2R05)	UT	UT examination of welds (P1 thru P8) per BWRVIP-18 baseline UT. No indications identified.
		EVT-1	EVT-1 supplemental examination on P4dA, P4dB, P4dC, P4dD, P8aA, P8aB, P8aC, and P8aD. No indications identified.
	2001 (2R06)	EVT-1	EVT-1 of P4dA, P8aA, P8aB, P8aC, and P8aD. No indications identified.
	2003 (2R07)	UT	UT examination of welds (P1 thru P8) with the exception of P4a, P4b, P4d and P8a welds. No indications identified.
		EVT-1	EVT-1 of P4dB, P8aA, P8aB, P8aC, and P8aD. No indications identified.
	2005 (2R08)	EVT-1	EVT-1 of P4dA, P4dC, P8aA, P8aB, P8aC, and P8aD. No indications

	2007 (2R09)	UT	identified. UT examination of P1, P2, P3a, P3b, P4b, P5, P6, P7, and P8b welds was performed. No indications were identified.
		EVT-1	EVT-1 of the far side of P1, P2, P3a, P3b, P4b, and P8b welds, as well as an EVT-1 examination of P4dD and P8a welds was performed. A small piece of raised metal was identified and evaluated as acceptable on the P8aC weld. Also, a small indentation on the collar near the P8aD weld was identified and evaluated as acceptable.
	2009 (2R10)	EVT-1	EVT-1 of the far side of P1, P2, P3a, P3b, P4b, and P8b welds, as well as an EVT-1 examination of P4dA and P8a welds was performed. No indications were identified. Previously identified indications on P8aC and P8aD could not be found in 2R10.
Core Spray Piping Brackets	1999 (2R05)	EVT-1	EVT-1 of 2 piping support brackets PB-7 & PB-8. No indications identified.
	2001 (2R06)	EVT-1	EVT-1 of 2 piping support brackets PB-7 and PB-8. No indications identified.
	2003 (2R07)	EVT-1	EVT-1 of 3 piping support brackets PB-4, PB-5, and PB-6. No indications identified.
	2005 (2R08)	EVT-1	EVT-1 of 3 piping support brackets PB-1, PB-2, and PB-3. No indications identified.
	2007 (2R09)	EVT-1	EVT-1 of 2 piping support brackets PB-7 and PB-8. No indications identified.
	2009 (2R10)	EVT-1	EVT-1 of 2 piping support brackets PB-5 and PB-6. No indications identified.
Core Spray Sparger	1991 (2R01)	VT-1	Enhanced VT-1 (1 mil resolution)

	– 1995 (2R03)		examination performed every refueling outage on piping and welds per IEB 80-13. No indications identified.
	1997 (2R04)	EVT-1	EVT-1 (1/2 mil resolution) examination of welds per IEB 80-13 and BWRVIP-18 baseline. No indications identified.
	1999 (2R05)	EVT-1	EVT-1 examination of welds S1A, S1B, S2aA, S2bA, S2aB, S2bB S4aA, S4bA, S4aB, and S4bB per BWRVIP-18. No indications identified.
		VT-1	VT-1 examination of welds S3aXXA, S3bXXA, and S3dXXA on nozzles 1A thru 65A. No indications identified.
	2001 (2R06)	EVT-1	EVT-1 examination of welds S1C, S1D, S2aC, S2bC, S2aD, S2bD, S4aC, S4bC, S4aD, and S4bD per BWRVIP-18. No indications identified.
		VT-1	VT-1 examination of welds S3aXXB, S3bXXB, and S3dXXB on nozzles 1B thru 65B. VT-1 examination of welds S3c4B, S3d4B, S3c62B, and S3d62B. No indications identified.
	2003 (2R07)	EVT-1	EVT-1 examination of welds S1A, S1B, S2aA, S2bA, S2aB, S2bB S4aA, S4bA, S4aB, and S4bB per BWRVIP-18. No indications identified.
		VT-1	VT-1 examination of welds S3aXXC, S3bXXC, and S3dXXC on nozzles 1C thru 65C. No indications identified.
	2005 (2R08)	EVT-1	EVT-1 examination of welds S1A, S1C, S1D, S2aA, S2aC, S2bC, S2aD, S2bD, S4aA, S4bA, S4aB, S4bB, S4aC, S4bC, S4aD, and S4bD per BWRVIP-18. No indications identified.
		VT-1	VT-1 examination of welds S3aXXD, S3bXXD, and S3dXXD on nozzles 1D thru 65D. VT-1 examination of welds

	2007 (2R09)	EVT-1	S3c4D, S3d4D, S3c62D, and S3d62D. No indications identified.
		VT-1	EVT-1 of S1A, S1B, S2aA, S2aB, S2bA, S2bB, S4aA, S4aB, S4bA, and S4bB was performed. No indications were identified
	2009 (2R10)	EVT-1	VT-1 examination of welds S3aXXA, S3bXXA, and S3dXXA on nozzles 1A thru 65A was performed. No indications identified.
		VT-1	EVT-1 examination of welds S1C, S1D, S2aC, S2bC, S2aD, S2bD, S4aC, S4bC, S4aD, and S4bD was performed. No indications identified.
Core Spray Sparger Brackets	1999 (2R05)	VT-1	VT-1 examination of welds S3aXXB, S3bXXB, and S3dXXB on nozzles 1B thru 65B was performed. VT-1 examination of welds S3c4B, S3d4B, S3c62B, and S3d62B was performed. No indications identified.
	2001 (2R06)	VT-1	VT-1 examination of sparger brackets SB1, SB2, and SB3. No indications identified.
	2003 (2R07)	VT-1	VT-1 examination of sparger brackets SB4 through SB12. No indications identified.
	2005 (2R08)	VT-1	VT-1 examination of sparger brackets SB1 through SB6. No indications identified.
	2007 (2R09)	VT-1	VT-1 examination of sparger brackets SB7, SB8, and SB9. One indication, a slightly bent sparger bracket, was identified on SB8 and was evaluated as acceptable.
	2007 (2R09)	VT-1	VT-1 examination of sparger brackets SB1, SB2, SB3, SB4, SB5, SB6, SB8, SB10, SB11, and SB12 was performed.

	2009 (2R10)	VT-1	<p>The middle bracket of SB5 was identified as being offset to the right of the top bracket. This was evaluated as acceptable. SB8 was re-inspected with no change in condition from 2R08.</p> <p>VT-1 examination of sparger brackets SB7, SB8, SB9, SB10, SB11, and SB12 was performed. One additional scrape on pipe at SB8 bracket was identified and evaluated as acceptable. No other indications were identified.</p>
Top Guide (Rim, etc.)	1991 (2R01)	VT-3	VT-3 examination of accessible welds and surfaces. No indications identified.
	1993 (2R02)	VT-3	VT-3 examination of accessible welds and surfaces. No indications identified.
	1995 (2R03)	VT-1	VT-1 examination of accessible welds and surfaces at cells 14-23, 22-31, 22-39, 38-23, and 38-47.
		VT-3	VT-3 examination of 32 wedges, bolts, and keepers. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination of surfaces at cell locations 26-27 & 30-31 and VT-3 examination of radial restraints, 32 wedges, bolts, and keepers. No indications identified.
	2005 (2R08)	VT-3	VT-3 examination of all four Top Guide C-Clamps. No indications identified.
Core Plate (Rim, etc.)	1995 (2R03)	VT-3	VT-3 examination of accessible welds and surfaces at core locations 14-23, 22-31, 22-39, 38-23, and 38-47. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination of accessible welds & surfaces at core plate location 30-31. No indications identified.
SLC			N/A, SLC connects to Core Spray System.

			(See summary of Instrument Penetrations)
Jet Pump Assembly	1991 (2R01)	VT-3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
	1993 (2R02)	VT-3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
	1995 (2R03)	VT-3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
		UT	UT examination of all 20 Jet Pump hold down beams per BWRVIP-41. No indications identified.
		EVT-1	EVT-1 examination of welds RS-1, RS-2 and RS-3 per BWRVIP-41 on Jet Pumps 11 - 20. No indications identified.
	2001 (2R06)	EVT-1	EVT-1 examination of RB-1 and RB-2 welds on Jet Pumps 1 - 4.
			EVT-1 examination of IN-4 and MX-2 welds on Jet Pumps 2 - 4.
			EVT-1 examination of RS-1, RS-2, RS-6, RS-7, RS-8, and RS-9 welds of Jet Pumps 3 - 4.
			No indications identified.
	2003 (2R07)	EVT-1	EVT-1 examination of welds RS-1 and RS-2 welds on Jet Pumps 1, 2, 5, and 6.
			EVT-1 examination of RS-3 welds on JPs 1 - 10.
			EVT-1 examination of welds RS-6, RS-7, RS-8, and RS-9 on Jet Pumps 1, 2, 5, 6, and 11 - 14.
			EVT-1 examination of IN-4 and MX-2 on

	2005 (2R08)	<p>UT</p> <p>EVT-1</p> <p>VT-1</p>	<p>Jet Pumps 1, 5, 6, and 11 - 14.</p> <p>No indications identified.</p> <p>UT examination of all 20 Jet Pump hold down beams (BB-1, BB-2, and BB-3) per BWRVIP-41. Supplemental EVT-1 of the BB-2 location on Jet Pumps 1 and 2 due to UT fixture seating issues on the 90-degree placement only.</p> <p>No indications identified.</p> <p>EVT-1 examination of RS-3 welds on Jet Pumps 11 - 14.</p> <p>EVT-1 examination of RB-1 welds on Jet Pumps 7 through 10.</p> <p>EVT-1 examination of RB-2 welds on Jet Pumps 7 and 8.</p> <p>EVT-1 examination of RS-1, RS-2, RS-6, and RS-7 welds of Jet Pumps 7 - 10.</p> <p>EVT-1 examination of IN-4 and MX-2 welds of Jet Pumps 7 and 8.</p> <p>EVT-1 examination of RS-8 and RS-9 welds of Jet Pumps 1 - 4, 7 - 14, and 17 - 20.</p> <p>No indications identified.</p> <p>A VT-1 examination of 8 wedges (WD-1 on Jet Pumps 2, 6 - 10, 16, and 18) in the original scope identified significant wedge wear. The scope was expanded to all remaining wedges and setscrew gaps (AS-1 and AS-2) were measured on all 20 Jet Pumps. Jet Pumps 1, 2, 4, 8, 10 - 14, 17, 19, and 20 showed main wedge wear and set screw gaps were identified on all Jet Pumps with the exception of Jet Pump 3, 6, and 7. The largest setscrew gap was 31 mils on Jet Pump 18 (with no wear). For those wedges that had</p>
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	2007 (2R09)	EVT-1	<p>identified wear, MX-7, WD-2a/b, RS-8, and RS-9 welds were examined with no further degradation identified. Jet Pump slip joint clamps were installed on all 12 Jet Pumps with identified wear. Also, 13 Auxiliary wedges were installed where gaps exceeded the acceptance criteria.</p> <p>EVT-1 inspection was performed on the RS-6 welds of JP 1, 9, 11, 17, and 19 and on the RS-7 welds of JP 2, 4, 8, 12, 14, and 20.</p> <p>EVT-1 inspection was performed on the RS-8 and RS-9 welds of JP 1/2, 3/4, 7/8, 9/10, 11/12, 13/14, 17/18, and 19/20.</p> <p>EVT-1 inspection was performed on RB-2 welds on JP 9/10, and RB-1 and RB-2 welds on JP 15/16. Also, RB-1a and RB-1c welds on JP 17/18 were examined by EVT-1.</p> <p>EVT-1 inspection was performed on RS-1 and RS-2 welds on JP 17/18.</p> <p>No indications were identified.</p>
		VT-1	<p>A VT-1 examination of all 20 main wedges (WD-1) was performed. The main wedges associated with JP 1, 12, 17, and 20 were replaced with an oversized wedge and the corresponding restrainer brackets were resurfaced. 10 of 12 jet pumps with previously identified wedge wear from 2R08 showed minor additional wedge wear in 2R09 even though a slip joint clamp was installed. JP 9 main wedge was identified with new wedge wear (low) but had no wedge wear identified in the previous cycle.</p> <p>All setscrews were inspected for gaps, except for JP 14. Gaps were identified on the vessel side of JP 4, 5, 7, 9, and 20 with the largest gap being 0.030 inch (JP</p>

		VT-3	<p>7).</p> <p>For those wedges that had newly identified wedge wear (JP 9) or additional wedge wear (JP 1, 2, 4, 8, 11, 12, 14, 17, 19, and 20), the MX-7, WD-2a/b, RS-6 or RS-7, RS-8 and RS-9 welds, as applicable, were examined as required expanded scope. Minor wedge rod wear was identified on JP 2, 4, 9, 11, and 19. No other indications were identified.</p> <p>A VT-3 examination was performed on all previously install Auxiliary Wedges (AW) and Slip Joint Clamps (SJC).</p> <p>Minor wear was identified on the AW installed on JP 1, 10, 11, and 13.</p> <p>Aux wedges were removed and not reinstalled on JP 1 and 17.</p> <p>Aux wedges were installed on both the vessel side and shroud side of JP 2, 4, 11, 14, and 19. One aux wedge was installed on the vessel side of JP 7 and 9, and one was installed on the shroud side of JP 12 after reassembly identified a 0.043 inch gap.</p> <p>Jet Pump SJC were inspected by VT-3 with no indications and were installed on JP 3, 5, 6, 7, 9, 15, 16, and 18. All 20 jet pumps now have a SJC installed.</p>
	2009 (2R10)	EVT-1	<p>EVT-1 inspection was performed on the RS-3 welds of JP 15/16, 17/18, and 19/20.</p> <p>EVT-1 inspection was performed on the RS-6 welds of JP 3 and 15 and on the RS-7 welds of JP 4, 6, 12, 14, 16, 18, and 20.</p> <p>EVT-1 inspection was performed on the RS-8 and RS-9 welds of JP 3/4, 5/6,</p>

		<p>11/12, 13/14, 15/16, 17/18, and 19/20.</p> <p>EVT-1 inspection was performed on the IN-4 and MX-2 welds of JP 9, 10, 15, 16, 17, 18, 19, and 20.</p> <p>EVT-1 inspection was performed on RB-2 welds on JP 17/18 and 19/20, and RB-1 welds on JP 19/20. Also, RB-1b and RB-1d welds on JP 17/18 were EVT-1 examined.</p> <p>EVT-1 inspection was performed on RS-1 and RS-2 welds on JP 19/20.</p> <p>No indications were identified.</p> <p>VT-1</p> <p>A VT-1 examination of all 20 main wedges (WD-1) was performed. The main wedges associated with JP 2, 8, 14, and 19 were replaced with a standard replacement wedge (wider than original) and the corresponding restrainer brackets had repair plates installed to increase the wedge bearing surface. In addition, restrainer bracket repair plates were also installed on JP 12 to raise the height of the main wedge to an acceptable level.</p> <p>JP 4 and 14 had previously identified wedge wear from 2R09 and showed minor additional wear in 2R10. JP 3, 6, and 18 were identified with new wedge wear but had no wedge wear identified in the previous cycle. JP 1, 12, and 20 had main wedge movement identified between 2R09 and 2R10.</p> <p>All setscrews were inspected for gaps. Gaps were identified on the vessel side (VS) of JP 3 and JP 5 of 0.012 inch. One auxiliary wedge was required to be installed on the VS setscrew of JP 3.</p> <p>For those wedges that had new or additional wedge wear or movement (JP</p>
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			<p>3, 4, 6, 12, 14, 18, and 20), the MX-7, WD-2a/b, RS-6 or RS-7, RS-8 and RS-9 welds, as applicable, were examined as required expanded scope.</p> <p>No change in minor wedge rod wear on JP 2, 4, 9, and 14. New wedge rod wear identified on JP 3, 6, 12, 18, and 20. Minor additional rod wear identified on JP 11 and 19.</p> <p>Slip joint clamps (SJC) were inspected on all 20 jet pumps. JP 1, 4, and 11 SJCs were identified with wear of the center strut into the diffuser collar. JP 1 and 11 SJCs were repositioned during 2R10. JP 7 SJC was identified as being improperly installed but acceptable. JP 12 SJC was identified as having moved during the previous cycle but was acceptable as-is.</p> <p>No other indications were identified.</p> <p>VT-3 examination was performed on JP 1, 12, 17, and 20 hold down beams after one cycle of installation as a post-mod exam.</p> <p>VT-3 examination was performed on the following vessel side (VS) or shroud side (SS) auxiliary wedges either as a post-mod exam or as part of expanded scope due to wedge wear: JP 2 VS, JP 2 SS, JP 4 VS, JP 4 SS, JP 7 VS, JP 8 VS, JP 8 SS, JP 9 VS, JP 10 VS, JP 11 VS, JP 11 SS, JP 12 SS, JP 13 VS, JP 14 VS, JP 14 SS, JP 18 VS, JP 19 VS, and JP 19 SS. No change in auxiliary wedge wear was identified on JP 10 VS or JP 13 VS. Movement was identified on JP 11 VS and JP 11 SS auxiliary wedges.</p>
		VT-3	
		UT	<p>No other indications were identified.</p> <p>UT examination of 16 of 20 Jet Pump hold down beams (BB-1, BB-2, and BB-</p>

			3) was performed. The remaining 4 beams are of the group 3 design and not yet required to be examined. No indications identified.
Jet Pump Diffuser	1991 (2R01)	VT- 3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
	1993 (2R02)	VT- 3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
	1995 (2R03)	VT- 3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination of all 20 Jet Pump assemblies. No indications identified.
	2001 (2R06)	EVT-1	EVT-1 examination of DF-1, DF-2, AD-1, and AD-2 welds on Jet Pumps 2 - 4. No indications identified.
	2003 (2R07)	EVT-1	EVT-1 examination of DF-1, DF-2, AD-1, and AD-2 welds on Jet Pumps 1, 5, 6, and 11 - 14. No indications identified.
	2005 (2R08)	EVT-1	EVT-1 examination of DF-1, DF-2, AD-1, and AD-2 welds on Jet Pumps 7 and 8. No indications identified.
	2007 (2R09)	EVT-1	EVT-1 examination of DF-1, DF-2, AD-1, and AD-2 welds on JP 9, 10, and 15. No indications identified.
	2009 (2R10)	EVT-1	EVT-1 inspection was performed on the AD-1, AD-2, DF-1, and DF-2 welds of JP 16, 18, and 19. No indications identified
		UT	EVT-1 inspection was performed on the DF-1 and DF-2 welds of JP 17 and DF-1 only of JP 20. No indications identified. UT examination was performed on JP 17 AD-1 and AD-2 welds, as well as JP 20 AD-1, AD-2, and DF-2 welds. No indications identified.
CRD Guide Tube	1991 (2R01)	VT-3	VT-3 examination of control rod

			assemblies at core positions 22-14 and 14-31. No indications identified.
	1993 (2R02)	VT-3	VT-3 examination of control rod assembly at core location 34-07. Minor scratches noted. Acceptable for continued service.
	1995 (2R03)	VT-3	VT-3 PSI examination of replacement CRDs at core locations 06-19, 10-27, 10-47, 14-39, 18-03, 18-15, 18-55, 22-35, 22-39, 30-51, 34-47, 38-15, 38-27, 38-39, 42-43, 46-39, 46-43, 50-15, and 54-35. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination of CRD guide tube accessible surfaces of 26-27 from ID and 30-31 from OD. No indications identified.
	2003 (2R07)	EVT-1/VT-3	CRD guide tube welds were examined at core locations 06-19, 06-43, 18-43, 22-31, 30-23, 30-39, 38-31, 42-19, 42-43, and 54-43. This includes a VT-3 of CRGT-1 welds, an EVT-1 of CRGT-2 and CRGT-3 welds, and a VT-3 of CR/FS/GT - ARPIN-1 welds for the above locations. No indications identified.
	2007 (2R09)	EVT-1/VT-3	CRD guide tube welds were examined at core locations 18-27, 18-35, 26-27, 42-27, and 42-35. This includes an EVT-1 of CRGT-2 and CRGT-3 welds. A VT-3 of the CRGT-1 and ARPIN-1 welds was credited via CRB removal/reinstallation procedure. No indications identified.
	2009 (2R10)	EVT-1/VT-3	CRD guide tube welds were examined at core locations 06-31, 18-19, 26-43, and 34-43. This includes an EVT-1 of CRGT-2 and CRGT-3 welds. A VT-3 of the CRGT-1 and ARPIN-1 welds was credited via CRB removal/reinstallation procedure. No indications identified.

CRD Stub Tube	1993 (2R02)	VT-3	VT-3 examination of stub tube to vessel weld and stub tube to housing weld at azimuth 300 deg. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination at core location 30-31, 30-35, 26-31 & 34-31. No indications identified.
	2007 (2R09)	Best effort VT-1 / VT-3	Best effort VT-1 / VT-3 of stub tube to vessel welds and stub tube to housing welds at core locations 02-39, 02-43, 06-47, 10-11, 14-07, 14-11, 38-59, 42-59, and 46-55 were examined via access through the disassembly of Jet Pumps 1, 12, and 17. No indications were identified.
In-Core Housing	1999 (2R05)	VT-3	VT-3 examination of housings, guide tubes, stabilizers & housing to RPV welds at core locations 24-29 & 32-29. No indications identified.
Dry Tube	1995 (2R03)	VT-1	VT-1 examination of accessible portions of upper 2 feet of dry tube at core locations 16-21, 40-21, 40-45, 24-29, 24-37, and 32-37. No indications identified.
	1999 (2R05)	VT-1	VT-1 examination of accessible portions of upper 2 feet of dry tube at core locations 24-29 & 32-29. No indications identified.
	2005 (2R08)	VT-1	VT-1 examination of accessible portions of upper 2 feet of dry tube at core locations 16-13, 16-21, 16-45, 24-29, 40-21, and 48-13. No indications identified.
	2007 (2R09)	Replaced	IRM 24-29, 24-37, 32-39, 48-53, and SRM 16-45, 40-21 were replaced with new universal style dry tubes. The remaining 6 are scheduled for replacement in 2009 (2R10).
	2009 (2R10)	Replaced	IRM 16-13, 16-53, 32-37, 48-13, and SRM 16-21, 40-45 were replaced with

			new universal style dry tubes.
Instrument Penetrations	1991 (2R01)	VT-3	VT-3 examination of interior attachment of instrument nozzles N11A, N11B, and N12A through N12D. No indications identified.
		PT	PT examination performed on all instrument nozzle to safe end welds once per interval, per Section XI (Includes N10 Core Differential Pressure penetration). No indications identified.
	1999 (2R05)	UT/PT	UT & PT examination of jet pump instrument nozzle to safe end N8A & N8B. No indications identified.
	2009 (2R10)	VT-2	VT-2 examinations of instrument nozzles N11A-B, N12A-D, and N16A-D were performed during the system leakage test.
Vessel ID Brackets	1991 (2R01)	VT-1/VT-3	VT-1 or VT-3 performed on all ID bracket welds once every other outage per Section XI. No indications identified.
	1993 (2R02)	VT-1/VT-3	VT-1 or VT-3 performed on all ID bracket welds once every other outage per Section XI. No indications identified.
	1995 (2R03)	VT-1/VT-3	VT-1 or VT-3 performed on all ID bracket welds once every other outage per Section XI. No indications identified.
	1997 (2R04)	VT-1/VT-3	VT-1 or VT-3 performed on all ID bracket welds once every other outage per Section XI. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination of feedwater sparger brackets (5, 55, 65, 115, 125, 175, 185, 235, 245, 295, 305 & 355 DEG), including bracket weld to RPV. No indications identified.
	2001 (2R06)	EVT-1	EVT-1 examination of feedwater sparger brackets at 5 degrees and 175 degrees, and core spray sparger brackets at 274.5 degrees and 345 degrees. No indications

	2003 (2R07)	EVT-1	identified. EVT-1 examination of feedwater sparger brackets at 65 degrees and 115 degrees; core spray sparger brackets at 165 degrees, 195 degrees, and 247.5 degrees; steam dryer support brackets at 4 degrees and 94 degrees; and jet pump riser brace arm attachment welds at jet pumps 1/2, 3/4, 5/6, 11/12, and 13/14. No indications identified.
		VT-1	VT-1 examination of the 30 degree surveillance sample holder attachment to vessel weld. No indications identified.
	2005 (2R08)	EVT-1	EVT-1 examination of feedwater sparger brackets at 55 degrees and 125 degrees; core spray sparger brackets at 15 degrees, 85.5 degrees, and 112.5 degrees; and jet pump riser brace arm attachment welds at jet pumps 7/8 and 9/10. No indications identified.
		VT-3	VT-3 examination of guide rod bracket attachment welds at 0 degrees and 180 degrees. No indications identified.
	2007 (2R09)	EVT-1	EVT-1 examination was performed for core spray piping brackets at 274.5 Az. and 345 Az, feedwater sparger end brackets at 185 Az. and 235 Az., and jet pump riser brace arm attachment welds at JP 15/16. No indications were identified.
		VT-1	VT-1 examination was also performed on jet pump riser brace arm attachment welds at JP 15/16 (for Code credit), and at the upper and lower surveillance specimen brackets at 120 Az. and 300 Az.
		VT-3	VT-3 examination was also performed on core spray piping brackets at 274.5 Az. and 345 Az, and feedwater sparger end brackets at 185 Az. and 235 Az.(for Code

	2009 (2R10)	EVT-1	credit). No indications were identified. EVT-1 examination was performed for core spray piping brackets at 195° and 247.5°, feedwater sparger end brackets at 245°, 295°, 305°, and 355°, jet pump riser brace arm attachment welds at JP 17/18 and 19/20, and steam dryer support brackets at 184° and 274°. No indications were identified.
LPCI Coupling	1991 (2R01)	VT-3	VT-3 examination of all 4 couplings. No indications identified.
	1995 (2R03)	VT-3	VT-3 examination of all 4 couplings. No indications identified.
	1999 (2R05)	VT-3	VT-3 examination of all 4 couplings. No indications identified.
	2001 (2R06)	EVT-1	EVT-1 examination of 'C' and 'D' LPCI 45-3b welds. No indications identified.
	2003 (2R07)	EVT-1	EVT-1 examination of 'A' and 'B' LPCI 45-3b welds and EVT-1 examination of 'A', 'B', 'C', and 'D' LPCI 45-12 welds. No indications identified.
	2005 (2R08)	EVT-1	EVT-1 examination of 'A', 'B', 'C', and 'D' LPCI 45-3b and 45-12 welds. No indications identified.
		VT-3	VT-3 examination of 'D' LPCI 45-6a through 45-6d welds. No indications identified.
		VT-1	VT-1 examination of 'D' LPCI 45-8a through 45-8d welds. No indications identified.
	2007 (2R09)	EVT-1	EVT-1 examination of 'C' and 'D' LPCI couplings (45-3b and 45-12) welds was performed. No indications identified.
		VT-3	VT-3 examination of 'C' LPCI 45-6a through 45-6d welds. No indications

		VT-1	identified.
	2009 (2R10)	EVT-1	VT-1 examination of 'C' LPCI 45-8a through 45-8d welds. No indications identified.
		VT-3	EVT-1 examination of 'B' LPCI coupling (45-3b and 45-12) welds was performed. No indications identified.
		VT-1	VT-3 examination of 'B' LPCI 45-6a through 45-6d welds. No indications identified.
Steam Dryer	1995 (2R03)	VT-3	VT-1 examination of 'B' LPCI 45-8a through 45-8d welds. No indications identified.
	1997 (2R04)	UT	VT-3 examination of overall Steam Dryer assembly. Linear indications were identified in the support ring during the VT-1 of the adjacent drain channel welds. These indications were accepted by engineering evaluation.
		VT-3	UT examination performed to determine baseline crack depth of indications observed visually between 0 degree azimuth and 41 degree lifting eye during 2R03. Results show crack to be 0.384 inches in depth. These indications were accepted by engineering evaluation.
	1999 (2R05)	VT-3	VT-3 examination of overall Steam Dryer assembly. No indications identified.
	2001 (2R06)	VT-1	VT-3 examination of overall Steam Dryer assembly. Examination revealed cracking in upper support ring at 135 degree and 315 degree lifting lugs. These indications were accepted by engineering evaluation.
	2003 (2R07)	VT-3	VT-1 examination of Steam Dryer Drain Channel welds. No indications identified.

		VT-1	VT-3 examination of overall Steam Dryer assembly. No indications identified.
	2005 (2R08)	VT-1	VT-1 examination of Steam Dryer Drain Channel welds. No indications identified.
	2007 (2R09)	Best Effort VT-1	<p>VT-1 examination of Steam Dryer Drain Channel welds. VT-1 examination of Steam Dryer Hood Bank #1 and Bank #6 seam welds. VT-1 examination of Steam Dryer Cover Plate welds at 90 degree and 270 degree. No indications identified.</p> <p>Performed Best Effort VT-1 inspections of bottom hood seam welds (SDBH 1a-b, 2a-b, 3a-b, 4a-b, 5a-b, 6a-b), end bank welds (SDEB 1a-d, 2a-d, 3a-d, 4a-d, 5a-d, 6a-d), guide bracket at 0 Az (SDGB), hood vertical seam welds (SDHS 2b-d, 3b-d, 4b-d, 5b-d), hood reinforcement welds (SDHSR 2a-d, 3a-d, 4a-d, 5a-d), welds on all four lifting rods (SDLRx 1a-c, 2a-b, 3a-b, 4a-b, CP, LE, TW), man way welds (SDMW a-d), plenum partition welds (SDPP 2a-b, 3a-b, 4a-b, 5a-b), support ring (SDSR), and tie bars (SDTB 1-5, 8-9, 17, 22-24).</p> <p>Minor IGSCC identified on the support ring and evaluated as acceptable. A small piece of raised metal was identified on SDTB 3 and evaluated to be acceptable. One indication approximately 1.5 inches in length was identified and evaluated as acceptable on SDHS4c weld near the intersection of the bottom of the hood seam and the horizontal joining plate.</p> <p>No other indications identified.</p>
	2009 (2R10)	Best Effort VT-1	<p>Performed Best Effort VT-1 inspections of guide bracket at 180 Az (SDGB), hood vertical seam welds (SDHS 1a-d, 2b-d,</p>

			<p>4c), hood reinforcement welds (SDHSR 2a-d), plenum partition welds (SDPP 2a-b), top horizontal welds (SDTH 1, 6), drain channel welds (SDDC 1a-c), cover plate welds (SDCP 7a-b), and tie bars (SDTB 3, 6, 7, 10-16, 18-21, 25-37).</p> <p>No change noted in IGSCC identified on the support ring during the cover plate exam or on the small piece of raised metal identified on SDTB03.</p> <p>One of two tack welds was identified as cracked on the 221.5 Az. lifting rod between the lifting rod and the eye during a VT-1 examination performed for the site heavy loads program (non-BWRVIP exam). This indication was evaluated as acceptable for continued operation.</p> <p>One indication on SDHS4c weld near the intersection of the bottom of the hood seam and the horizontal joining plate showed minimal growth of 0.2 inches. This indication was evaluated as acceptable for another cycle of operation.</p> <p>No other indications identified.</p>
DM Welds - BWRVIP-75-A Cat. A	2007 (2R09)	UT	2 welds inspected: PDI qualified, automated exams, no flaws identified, no repairs
DM Welds - BWRVIP-75-A Cat. B	2007 (2R09)	UT	2 welds inspected with 82/182: PDI qualified, automated exams, no flaws identified, no repairs
	2009 (2R10)	UT	2 welds inspected with 82/182: PDI qualified, manual exams, no flaws identified, no repairs

Reactor Internals Inspection History

Plant: Monticello

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	1994-1996	UT and VT-1	<p>Baseline per BWRVIP-01 and reinspected per BWRVIP-07. Indications in several circumferential welds as identified below:</p> <p>H1 17% flawed over 307.6" total scan length.</p> <p>H2 1% flawed over 287.7" total scan length.</p> <p>H3 28% flawed over 263" total scan length.</p> <p>H4 6% flawed over 289.1" total scan length.</p> <p>H5 0% flawed over 298.4" total scan length.</p> <p>H6 4.5% flawed over 298.4" total scan length.</p> <p>H7 0% flawed over 291.7" total scan length.</p> <p>Note: 1. All flaws identified were less than 1/2 T deep.</p> <p>2. Scan coverage for each weld was greater than 50%.</p> <p>3. Differences in inspection methodology did not permit a rigorous correlation of the 1994 and 1996 data.</p> <p>4. Full structural margins exist on all welds.</p> <p>VT-1 of accessible vertical welds & ring segment welds. Minor indication identified on ring segment weld @ 73 deg azimuth between H5 and H6.</p> <p>Visually examined 2 feet of the following vertical welds; V3, V4, V5, and V6. Minor indications were observed on V3 and V6.</p>

	2005	UT and VT-1	<p>Baseline per BWRVIP-01 and reinspected per BWRVIP-76. Indications in several circumferential welds as identified below:</p> <p>H1 75.51% Inspected, 16.21% Flawed</p> <p>H2 59.26% Inspected, 6.02% Flawed</p> <p>H3 71.56% Inspected, 27.19% Flawed</p> <p>H4 Upper 68.46% Inspected, 8.33% Flawed Lower 68.46% Inspected, 5.02% Flawed</p> <p>H5 68.46% Inspected, 0.5% Flawed H6 68.88% Inspected, 2.52% Flawed H7 68.88% Inspected, 0% Flawed</p> <p>V2 CW 63.3% Inspected, 0% flawed CCW 83.6% Inspected, 23.74% flawed</p> <p>V3 CCW 42.5% Inspected, 0% Flawed</p> <p>V4 EVT-1: Top 18" to H3, No indications</p>
	2007	EVT-1	Visual inspection of the v4 and v3 from the shroud ID
Shroud Support	1994-1996	VT-1 & VT-3	<p>VT of H8 and H9 from the annulus have been performed. No reportable indications to date.</p> <p>VT of access hole covers, performed every other outage per the IVVI program. No indications have been reported to date.</p> <p>In 1984, two CRD guide tubes were removed which allowed access below the core plate. A VT-3 inspection was performed on the shroud support legs. No problems were observed.</p> <p>Note: Monticello has an oval shaped access hole cover. This design is superior to the round design in</p>

			that it provides more shroud support plate material between the access hole cover welds and the vessel wall.
	2000	EVT-1	Core Plate Support Ring at 65°, 185°, and 305°
		EVT-1	H8 and H9 Welds at Manway Cover Areas
		VT-1	Access Hole Cover Plate Welds at 0° and 180°
		VT-3	Shroud Support Legs (14) <ul style="list-style-type: none"> Crack indication in the 210° shroud support leg to shroud support cylinder weld. The majority of the indication appears to be contained within the weld material, with the lower tip extending into the shroud support leg base material.
	2001	VT-3	Re-inspection of the 210 degree location of the shroud support leg. No change in condition.
		EVT-1	Core Plate support ring at 65, 185, and 305 degrees. No indications.
		VT-1	Access hole cover plate welds at 0 and 180 degrees. No reportable indications.
	2003	VT-3	Re-inspection of the 210 degree location of the shroud support leg. No change in condition.
	2005	EVT-1	H8 and H9 from 338 degree to 22 degree and 158 degree to 202 degree, NRI
		VT-3	Accessible areas of ledge for AMSE section XI, NRI
	2009	VT-3	Previously discovered indication on H10 weld at

		<p>P6, 100% coverage P7, 64% coverage P4D, 54% coverage</p> <p><u>166.5 deg location</u></p> <p>P4A, 41% coverage P4B, 72% coverage</p> <p><u>193.5 deg location</u></p> <p>P4A, 26% coverage P4B, 43% coverage</p> <p><u>346.5 deg location</u></p> <p>P4A, 44% coverage P4B, 62% coverage</p> <p>Flaws identified during the 1998 RFO inspection were all located at the 13.5 deg location and are listed as follows:</p> <table border="1"> <thead> <tr> <th>Weld/</th><th>Start Location</th><th></th></tr> </thead> <tbody> <tr> <td>Flaw #</td><td>Start</td><td>End Flaw Length</td></tr> <tr> <td>P5/1</td><td>313 °</td><td>351° 1.83"</td></tr> <tr> <td>P6/1</td><td>343 °</td><td>37° 2.78"</td></tr> <tr> <td>P6/2</td><td>55 °</td><td>74° 0.97"</td></tr> <tr> <td>P6/3</td><td>87 °</td><td>98° 0.54"</td></tr> <tr> <td>P6/4</td><td>295 °</td><td>327° 1.65"</td></tr> <tr> <td>P6/5</td><td>199 °</td><td>279° 4.19"</td></tr> <tr> <td>P6/6</td><td>112 °</td><td>145° 1.71"</td></tr> <tr> <td>P6/7</td><td>175 °</td><td>187° 0.60"</td></tr> </tbody> </table> <p>NOTE: Flaws 1 and 4 on P6 are the only flaws that appear to be through wall. Flaws 1,2,3,8 on P6 are on the top side of the weld and flaws 4,5,6,7,9 on P6 are on the bottom side of the weld.</p> <p>EVT-1</p> <p>An enhanced visual examination was performed on all target welds that were not UT examined. No reportable indications were identified visually.</p>	Weld/	Start Location		Flaw #	Start	End Flaw Length	P5/1	313 °	351° 1.83"	P6/1	343 °	37° 2.78"	P6/2	55 °	74° 0.97"	P6/3	87 °	98° 0.54"	P6/4	295 °	327° 1.65"	P6/5	199 °	279° 4.19"	P6/6	112 °	145° 1.71"	P6/7	175 °	187° 0.60"
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	2000	VT-1	Header Piping Brackets to Vessel Wall
		VT-1	Bracket Bolt Head Tack Welds
		VT-3	General Condition of Brackets
		VT-1	Clamp Assemblies on Tee Box Junctions
		EVT-1	Flaw at 90° Tee Box for Crack Extension
		EVT-1	Welds P5, P6, P7, P8a, P8b on all 4 Downcomers, and P4a, P4b, P4c, P4d on "A" Downcomer (13°)
	2001		The crack indication in the 90° core spray tee box to header weld was estimated to be five inches in length during the RF18 Refuel Outage. Image overlaying techniques along with pixel counting software were used to measure the indication during the RF19 Refuel Outage. These more reliable methods of measurement found the indication to be 2.25 inches in length.
		VT-1	Header piping to wall brackets.
		VT-1	Bracket Bolt Tack Welds
		VT-3	General condition of Brackets
		EVT-1	Flaw at 90 degrees tee box for crack extension. No change.
		EVT-1	Welds P5,P6,P7,P8a, P8b on all 4 downcomers. P4 (a-d) on "B" downcomer". No indications
	2003	UT	UT of the following welds in 1998 were performed per the BWRVIP-18 guidelines: <u>13.5 deg location</u> P5, 100% coverage

			<p>P6, 100% coverage</p> <p><u>166.5 deg location</u></p> <p>P5, 100% coverage</p> <p>Flaws identified during the 2003 RFO inspection were all located at the 13.5 deg location and are listed as follows:</p> <table> <tr> <th>Weld/</th> <th>Start Location</th> <th></th> </tr> <tr> <th>Flaw #</th> <th>Start End</th> <th>Flaw Length</th> </tr> <tr> <td>P5/1</td> <td>312.5 ° 344.1°</td> <td>1.53"</td> </tr> <tr> <td>P6/1</td> <td>54.9 ° 73.0°</td> <td>0.96"</td> </tr> <tr> <td>P6/2</td> <td>86.5 ° 99.9°</td> <td>0.71"</td> </tr> <tr> <td>P6/3</td> <td>106.6° 145.6°</td> <td>2.06"</td> </tr> <tr> <td>P6/4</td> <td>153.7 ° 269.6°</td> <td>6.13"</td> </tr> <tr> <td>P6/5</td> <td>286.7 ° 317.4°</td> <td>1.62"</td> </tr> <tr> <td>P6/6</td> <td>347.7 ° 44.3°</td> <td>2.99"</td> </tr> </table> <p>NOTE: Flaws 1,2,3,6 on P6 are on the top side of the weld and flaws 4,5 on P6 are on the bottom side of the weld.</p> <p>An enhanced visual examination was performed on all target welds that were not UT examined. No reportable indications were identified visually.</p> <p>EVT-1 of P4(a-d) of "C" leg(193 Degrees). All P5, P6, P7, P8(a,b). No indications.</p>	Weld/	Start Location		Flaw #	Start End	Flaw Length	P5/1	312.5 ° 344.1°	1.53"	P6/1	54.9 ° 73.0°	0.96"	P6/2	86.5 ° 99.9°	0.71"	P6/3	106.6° 145.6°	2.06"	P6/4	153.7 ° 269.6°	6.13"	P6/5	286.7 ° 317.4°	1.62"	P6/6	347.7 ° 44.3°	2.99"
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		VT	<p>Visual inspection of core spray T-Box Repair. No change in previous indication at 90 degrees.</p>																											
	2005	VT	<p>EVT-1 of P4(a-d) of "D" leg(13 Degrees). All P5, P6, P7, P8(a,b) Welds. No indications.</p> <p>Visual inspection of core spray T-Box Repair. No change in previous indication at 90 degrees.</p>																											

	2007	VT	EVT-1 of P4(a-d) of "A" leg(193 Degrees). All P5, P6, P7, P8(a,b) Welds. No indications.
	2009		Visual inspection of core spray T-Box Repair. No change in previous indication at 90 degrees.
		EVT-1	P1 and P2 at 90 and 270 degrees. P3A-DP4Ba-d, P5A-D, P6A-D, P7A-D, P8Aa-b, P8Ba-b, P8Ca-b, P8Da-b. Piping brackets at 30, 150, 210 and 330.
		VT-3	Header repair clamp. Piping brackets at 30,150, 210, 330. No change to previously identified indication in header repair clamp. No new indications.
Core Spray Sparger	1980's to present	VT-1	IEB 80-13 of welds on sparger. During the 1993 refueling outage, a circumferential crack indication on the core spray loop B header where the piping and the T-box meet was identified. A repair was installed during the 1994 outage. The repair is inspected every refueling outage. No problems have been identified to date.
	2000	EVT-1	Tee Box Cover Plate (S1), Sparger Branch Welds to Tee Box (S2), Sparger End Caps (S4)
		VT-1	Mounting Brackets and End Brackets (SB)
		EVT-1	Nozzle Welds (S3a, S3b)
	2001	VT-3	Spargers • No reportable indications identified.
		EVT-1	Tee box cover plate (S1), Sparger Branch welds to tee box (S2), Sparger End caps (S4). "B" and "C" spargers. No indications.

	2003	VT-1	Brackets on "B" and "C" Spargers. No indications.
		EVT-1	Nozzle welds S3a and S3b on B and C. No indications.
		VT-3	Spargers B and C. No indications.
	2005	EVT-1	Upper S4-1@272°, Upper S2-1@344°, Upper S1@346°, Upper S2-2@348°, Upper S4-2@87°, Lower S4-1@272°, Lower S2-1@11°, Lower S1@ 13°, Lower S2-2@15°, Lower S4-2@ 87°: No indications found.
		VT-1	Upper & lower S3(a&b) from 272° to 87°, Upper & lower S3c-1 &-2, 272° SB, 306° SB, 346° SB, 13° SB, 54° SB, 87° SB: No indications
			Upper S4-2@267°, Upper S2-2@195°, Upper S1@193°, Upper S2-1@191°, Upper S4-1@93°, Lower S4-2@267°, Lower S2-2@168°, Lower S1@ 166°, Lower S2-1@164°, Lower S4-1@ 93° :No indications found.
2007			Upper & lower S3(a&b) from 93° to 267°, Upper & lower S3c-1 &-2, 93° to 267 degree
			93° SB, 126° SB, 166° SB, 193° SB, 234° SB, 267° SB: No indications
		EVT-1	Upper S4-1@272°, Upper S2-1@344°, Upper S1@346°, Upper S2-2@348°, Upper S4-2@87°, Lower S4-1@272°, Lower S2-1@11°, Lower S1@ 13°, Lower S2-2@15°, Lower S4-2@ 87° :No indications found.
		VT-1	Upper & lower S3(a&b) from 272° to 87°, Upper & lower S3c-1 &-2, 272° SB,

	2009	EVT-1	306° SB, 346° SB, 13° SB, 54° SB, 87° SB: No indications
			S1B, S1C, S2B1, S2B2, S2C1, S2C2, S4B1, S4B2, S4C1, and S4C2 welds.
		VT-1	BS3C-1, BS3C-2, BS3A, BS3B, CS3C-1, CS3C-2, CS3A and CSB
			Core Spray Sparger Brackets at 93, 126, 166, 193, 234 and 267 degrees.
			No indications found.
Top Guide (Rim, etc.)	1993 and 1994	VT-1	A VT-1 inspection was performed at 15 cell locations which were considered to be high fluence areas. No discrepancies were identified.
	1996 to present		Also inspected every outage are the Hold Down Latches, Top Guide Ring Bolts and Top Guide Beams. No indications have been identified to date.
	2000	VT-1	Ring Bolts (80 Total)
		VT-1	Hold Down Latches
		EVT-1	Rim Welds at 4 Locations Adjacent to Guide Blocks
		VT-3	Guide Blocks and Aligner Pins
			No problems identified
	2003	VT-1	Top Guide Aligner Pin and Socket Assemblies (252° and 341°): No indications
			Top Guide Hold Down Latches (18° & 198°): No Indications
	2007	VT-1	Top Guide Aligner Pin and Socket Assemblies (72° and 162°): No indications

	2009		<p>Top Guide Grid Beams (B-N-1):</p> <p>06-19, 06-27, 06-35, 10-11, 10-43, 14-11, 14-15, 14-19, 14-35, 18-07, 18-31, 18-43, 22-03, 22-07, 22-11, 22-23, 22-31, 22-43, 26-03, 26-11, 26-47, 30-23, 30-31, 34-07, 34-15, 34-39, 34-4, 38-11, 38-15, 42-11, 42-15, 14-07, 38-07</p> <p>Top Guide Perimeter 360 degrees around</p> <p>No indications found.</p>
Core Plate (Rim, etc.)	N/A	N/A	N/A
	2009		<p>Tops of accessible fuel support channels.</p> <p>Core Plate (B-N-1, B-N-2): 06-19, 06-27, 06-35, 10-11, 10-43, 14-11, 14-15, 14-19, 14-35, 18-07, 18-31, 18-43, 22-03, 22-07, 22-11, 22-23, 22-31, 22-43, 26-03, 26-11, 26-47, 30-23, 30-31, 34-07, 34-15, 34-39, 34-47, 38-11, 38-15, 42-11, 42-15, 14-07, 38-07</p> <p>No indications found.</p>
SLC	1984 & 1989	LP	<p>Section XI performed baseline in 1984 and reinspected in 1989, of the following welds:</p> <p>Nozzle number 10 was inspected at the inner radius to vessel weld, safe end weld, and tee to safe-end weld.</p> <p>Inspections have identified minor indications which appear to have been determined to be manufactured induced.</p>
	2003	EVT-2	No Indications
	2005	EVT-2	No Indications
	2007	EVT-2	No indications

Jet Pump Assembly- 20 Assemblies	1993-1996	VT-1	<p>VT-1 of the following components performed every refueling outage for each jet pump:</p> <ol style="list-style-type: none"> 1. Beam Bolt & Tack Welds. 2. Lock Plate, 2 Plug Welds, 4 Tack Welds. 3. Hold Down Beam (Latched Position) 4. Inlet. 5. Inlet Mixer Coupling. 6. Wedge and Restrainer. 7. Set Screw Tack Welds. 8. Transition Piece. 9. Upper (Original) Brace & Reclad Area. 10. Lower (Modification) Brace & Reclad Area. 11. Sensing Lines. <p>Item 7 above had Several tack welds cracked. Weld repair performed on 11 set screws during 1994 outage. Tack welds on jet pump #10 vessel side were discovered to be cracked during the 1996 outage. An evaluation was performed which justified operability of the set screw with the cracked tack welds. No repair was performed.</p> <p>A preemptive repair of the jet pump hold-down beams was performed during the 1982 refueling outage.</p> <p>During the 1989 refueling outage, a jet pump riser brace for jet pump # 7 and # 8 was discovered to be cracked. An evaluation was performed to justify operating with the cracked riser brace. Each refueling outage the crack is reinspected and compared with previous inspection results. To date, no crack growth has been reported.</p>
	1998	EVT	<p>An Enhanced Visual Exam was performed on the high priority riser welds (RS-1, RS-2, RS-3) for Jet Pumps JP-3/4, JP-5/6, JP-7/8 JP-9/10, and JP-17/18. No reportable indications were</p>

			identified.
			The following flaws were identified as a result of the IVVI exam:
			JP-14, Beam Bolt Retainer Tack Weld crack like indication.
			JP-18, Crack like indication on upper leaf to yoke weld.
			JP-19, Beam Bolt Retainer Tack Weld crack like indication.
			All 20 Jet Pump Hold Down Beams were UT examined per the BWRVIP-41 document. JP-10 had an indication and was replaced. All other beams had no reportable indications.
	2000	VT-1	Beam Bolt Keeper and Tack Welds
		VT-1	Lock Plate, Flat Head Screws, and Tack Welds
		VT-3	Hold Down Beam
		VT-3	Beam Bolt Retainer
		VT-3	Rams Head and Inlet Suction Area
		VT-1	Riser Brace Attachments to Vessel Pad (RB-1 on Primary and Secondary Riser Braces)
		VT-1	Riser Brace Leaf to Yoke Welds (RB-2 on Primary and Secondary Riser Braces)
		VT-1	Riser Brace to Riser Welds (RS-8 to RS-11 on Primary and Secondary Riser Braces)
		VT-3	Inlet to Mixer Clamp Bolting (IN-5)
		VT-1	Wedge Assembly
		VT-1	Restrainer Bracket, Set Screws, and Welds, Including Gaps

		VT-1	Slip Joint
		VT-1	Sensing Line Attachment Welds to Brackets
		VT-1	<p>Bracket to Diffuser Welds</p> <ul style="list-style-type: none"> • Crack indication in the #17 Jet pump beam bolt retainer tack weld. • Crack indication in the #10 jet pump vessel side restrainer set screw • Crack indication in the jet pump #19 secondary riser brace lower leaf to block weld. The indication appears to travel approximately 50% across the width of the leaf and is contained within the block material. It also appears to have propagated radially into the block to reactor vessel pad weld. <p>The examinations performed also reconfirmed previously recorded and unrepaired relevant indications in the following reactor vessel internal components:</p> <ul style="list-style-type: none"> • Crack indication in the #14 jet pump beam bolt retainer tack weld. (CR19980794) • Crack indication in the #19 jet pump beam bolt retainer tack weld. (CR19980794) • Crack indication in the 325° steam dryer jacking bolt tack weld. (CR19980794) • Crack indication in the #8 jet pump secondary riser brace lower leaf to vessel block weld. No apparent crack

			<p>growth was observed. (SRI 89-028)</p> <p>Due to enhanced inspection and measurement techniques, evaluation of the previously recorded indications on the following components has changed since the RF18 Refueling Outage:</p> <p>The crack indication previously reported in the #18 jet pump secondary riser brace upper leaf to yoke weld has been determined to be weld geometry. An RCS 600 color camera, along with auxiliary lighting was used to reinspect the previously recorded indication during the RF19 Refuel Outage. This technique clearly showed the indication to be the juncture of two weld passes.</p>
	2001	VT-1	
		VT-1	Beam Bolt Keeper and Tack Welds
		VT-3	Lock Plate, Flat Head Screws, and Tack Welds.
		VT-3	Hold Down Beam
		VT-3	Beam Bolt Retainer
		EVT-1(11-18,20)	Rams Head and Inlet Suction Area
		VT-1 (1-10,19)	RB-1
		EVT-1(11-18,20)	
		VT-1 (1-10,19)	RB-2
		EVT-1(11-18,20)	
		VT-1 (1-10,19)	RS-8 to RS-11
		VT-1	

	2003	EVT-1	<p>Restrainer bracket , Set Screws, and welds (Including gaps)</p> <p>JP#1 (MX-1, MX-2, MX-4) JP#2 (MX-1, MX-2, MX-4) JP#3 (MX-1, MX-2, MX-4) JP#4 (MX-1, MX-2, MX-4) JP#5 (MX-1, MX-2, MX-4) Riser@30° (RS-1, RS-2, RS-3) Riser@240° (RS-1, RS-2, RS-3) Riser@330° (RS-1, RS-2, RS-3) JP#19 (RB-4d): No New Indications Transition region of all beams inspected EVT-1 no cleaning: No Indications</p>
	2005	VT	<p>JP#20 (WD-1), JP#19 (WD-1), JP#10 (WD-1): No Indications</p> <p>JP#6 (MX-1, MX-2, MX-4) JP#7 (MX-1, MX-2, MX-4) JP#8 (MX-1, MX-2, MX-4) JP#9 (MX-1, MX-2, MX-4) JP#10 (MX-1, MX-2, MX-4) Riser@30° (RS-4, RS-5) Riser@60° (RS-4, RS-5) Riser@90° (RS-4, RS-5) Riser@150° (RS-4, RS-5) Riser@210° (RS-1, RS-2, RS-3) Riser@270° (RS-1, RS-2, RS-3)</p>
	2007	UT	No Indications
	2009	EVT-1	<p>BB-1, BB-2 and BB-3 of all 20 Holddown Beams</p> <p>JP#11 (MX-1, MX-2, MX-4) JP#12 (MX-1, MX-2, MX-4) JP#13 (MX-1, MX-2, MX-4) JP#14 (MX-1, MX-2, MX-4)</p> <p>Riser@30 degrees (RS-1, RS-2, RS-3) Riser@60 degrees (RS-1, RS-2, RS-3) Riser@90 degrees (RS-1, RS-2, RS-3) Riser@210 degrees (RS-4, RS-5)</p>

			Riser@240 degrees (RS-4, RS-5) No indications found.																																																				
Jet Pump Diffuser	1996	VT-1	Perform VT-1 inspection per the IVVI program each refueling outage. No indications have been identified to date.																																																				
	1998	UT	The following Jet Pump Diffuser welds were UT examined from the ID per the BWRVIP-41 guidelines:																																																				
			<table><tr><td>Jet Pump</td><td>Weld #</td><td>Coverage</td><td>Results</td></tr><tr><td rowspan="5">JP-14</td><td>DF-2</td><td>100%</td><td>NRI</td></tr><tr><td>DF-3</td><td>100%</td><td>NRI</td></tr><tr><td>AD-3A</td><td>100%</td><td>NRI</td></tr><tr><td>AD-3B</td><td>100%</td><td>NRI</td></tr><tr><td>AD-2</td><td>100%</td><td>NRI</td></tr><tr><td rowspan="5">JP-16</td><td>MX-2</td><td>100%</td><td>NRI</td></tr><tr><td>MX-4</td><td>100%</td><td>NRI</td></tr><tr><td>DF-2</td><td>100%</td><td>NRI</td></tr><tr><td>DF-3</td><td>100%</td><td>NRI</td></tr><tr><td>AD-3A</td><td>100%</td><td>NRI</td></tr><tr><td rowspan="5">JP-17</td><td>AD-3B</td><td>100%</td><td>NRI</td></tr><tr><td>AD-2</td><td>100%</td><td>NRI</td></tr><tr><td>DF-2</td><td>100%</td><td>NRI</td></tr><tr><td>DF-2</td><td>100%</td><td>NRI</td></tr><tr><td>AD-3A</td><td>100%</td><td>NRI</td></tr></table>	Jet Pump	Weld #	Coverage	Results	JP-14	DF-2	100%	NRI	DF-3	100%	NRI	AD-3A	100%	NRI	AD-3B	100%	NRI	AD-2	100%	NRI	JP-16	MX-2	100%	NRI	MX-4	100%	NRI	DF-2	100%	NRI	DF-3	100%	NRI	AD-3A	100%	NRI	JP-17	AD-3B	100%	NRI	AD-2	100%	NRI	DF-2	100%	NRI	DF-2	100%	NRI	AD-3A	100%	NRI
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EVT	An Enhanced Visual Exam from the ID was performed on the high priority diffuser welds (DF-2, DF-3 and AD-2) for Jet pumps JP-11, JP-12, JP-13, JP-15, JP-18, JP-19 and JP-20. No reportable indications were identified.																																																						
2003	EVT-1	JP#1 (DF-1, DF-2, AD-3a, AD-2)																																																					
		JP#2 (DF-1, DF-2, AD-3a, AD-2)																																																					
		JP#3 (DF-1, DF-2, AD-3a, AD-2)																																																					
		JP#4 (DF-1, DF-2, AD-3a, AD-2)																																																					
		JP#5 (DF-1, DF-2, AD-3a, AD-2)																																																					
2005	EVT-1	JP#6 (DF-1, DF-2, AD-3a, AD-2)																																																					

	2007	VT-1	JP#7 (DF-1, DF-2, AD-3a, AD-2) JP#8 (DF-1) JP#9 (DF-1, DF-2, AD-3a, AD-2) JP#10 (DF-1, DF-2, AD-3a, AD-2) JP#20 (DF-2) Wedge Inspection (JP 11-20) AD-1 (JP 1-20)
	2009	EVT-1	JP#11 (DF-1, DF-2, AD-3a, AD-2) JP#12 (DF-1, DF-2, AD-3a, AD-2) JP#13 (DF-1, DF-2, AD-3a, AD-2) JP#14 (DF-1, DF-2, AD-3a, AD-2) JP#15 (DF-1, DF-2, AD-3a, AD-2)
CRD Guide Tube	2003	VT-3	CRGT-1(30-11, 26-11, 26-27, 26-07, 30-07, 10-15) ARPIN-1(30-11, 26-11, 26-27, 26-07, 30-07, 10-15)
		EVT-1	CRGT-2(30-11, 26-11, 26-27, 26-07, 30-07, 10-15) CRGT-3(30-11, 26-11, 26-27, 26-07, 30-07, 10-15)
	2005	VT-3	CRGT-1(22-27, 22-47, 26-27, 26-47, 30-47, 34-19, 34-35, 34-43, 46-27, 2-31, 18-19, 18-35, 18-47, 22-43) ARPIN-(22-27, 22-47, 26-27, 26-47, 30-47, 34-19, 34-35, 34-43, 46-27, 2-31, 18-19, 18-35, 18-47, 22-43)
		EVT-1	CRGT-2(22-27) CRGT-3(22-27)
	2009	EVT-1	CRGT-2 (10-11, 14-15, 18-07, 22-23, 22-31, 30-23) CRGT-3 (10-11, 14-15, 18-07, 22-23, 22-31)
		VT-3	CRGT-1 (10-11, 14-15, 18-07, 22-23,

			22-31, 30-23) ARPIN (10-11, 18-07, 22-23, 22-31, 30-23, 38-15, 30-31, 34-07, 34-15, 42-11)
CRD Stub Tube	N/A	N/A	N/A
In-Core Housing	N/A	N/A	N/A
Dry Tube	80's to present	VT	In 1987, 6 out of 12 dry tubes were replaced with a new improved design. Visual inspection performed on the remaining 6 old style dry tubes every other refueling outage. No problems have been observed to date.
Instrument Penetrations		VT-1	Visual inspection of the instrument lines and penetrations performed per the IVVI program. No indications observed to date.
Vessel ID Brackets		VT-1	VT-1 inspections of jet pump riser brace, dryer, feedwater sparger, core spray, guide rod bracket and surveillance capsule holder brackets, performed every refueling outage. No problems identified to date. In 2005, one surveillance bracket (empty) was identified as bent, no further action.
LPCI Coupling	N/A	N/A	Not applicable to this plant.
Steam Dryer	2005	VT	Performed OD visual inspection of all accessible welds. Three indications found behind the lifting lugs. Each approximately 1-1/2 inches long. One indication found in the support block guide channel to skirt weld (~0.75 inches long).
	2007	VT	Dryer ID inspection. Found a IGSCC in the weld surrounding a square drain channel access panel. Reinspected OD welds with indications. No reportable change.
	2009	VT-1	Previous Dryer OD Indication:

		VT-3	<p>V3 @ 90°, V10 @ 90°, V10 @ 270°, Jacking Bolt @ 325°, Vertical Guide @ 215°</p> <p>Previous Dryer ID Indication:</p> <p>DC-F Cover Plate @ 0 degrees</p> <p>Steam Dryer Hold Down Brackets @ 35°, 145°, 215°, 325°</p> <p>No changes in previous indications. No new indications.</p>
Dissimilar Metal Welds	2009	None	No BWRVIP-75 dissimilar metal weld exams were performed during the 2009 RFO.

Reactor Internals Inspection History

Plant: **Nine Mile Point Unit #1**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud & Shroud Repairs	4/09	EVT-1/UT	EVT-1 on four ring segment welds V1, V2, V5 and V6. No indications noted. UT on Ten vertical welds with no significant change as compared to previous data.
		EVT-1/VT-3	Performed a detailed inspection on all four tie rods. Addressed lack of contact at tie rod lower spring clevis pin to lower support hook locations.
	3/07	EVT-1	Replaced tie rod upper supports and nuts. Performed EVT-1 of high stress locations. No Indications noted. No shroud inspections performed.
	3/05		No shroud inspections performed.
	3/03	EVT-1	Weld H4 (adjacent to V7) was visually examined to confirm previously identified UT indications. No change noted as compared to UT data for location.
	3/03		Tierod inspection resulted in having to re-position 2 tierods due to wedge movement.
	3/01	EVT-1	V-4 ID only (no indications noted).
	3/01	VT-3 EVT-1	Inspections performed on all 4 tierods and V9 & V10 repair clamps.
	1999	UT	Completed repair of V9 & V10 based on UT results showing crack growth. All vertical welds were located and examined (including ring segments) using UT.
	95-97	EVT and UT	Tie rod repair (for BWRVIP) for horizontal welds H1-H7. EVT on I.D. of certain vert

			weld locations. No indications on vert welds (1995). 1997 (per BWRVIP) re-inspection of 2 vert welds found extensive flaws. Inspection scope expanded to include all accessible vert welds and some horizontal welds. Flaws found at several locations. Structural re-analysis performed (per BWRVIP) shroud expected to be acceptable with tie rod repair.
Shroud Support	4/09		No examinations performed.
	3/07	VT-3	Examined 100% of the accessible weld length on H8 & H9. No indications noted (ASME section XI code inspection).
	3/05	UT	H9 weld ultrasonically examined from the OD utilizing a crawler for a total length of 85".
	3/03	UT	H9 weld ultrasonically examined from the OD utilizing an OD crawler. Approximately 45" was examined to confirm no propagation into low alloy steel. No indications noted in low alloy steel.
	3/01	UT	H8 (conical ring to shroud) 80% of weld completed one sided coverage. 3 indications noted. H9 (conical ring to vessel) 80% of weld completed from ID, one sided coverage. 34 indications noted.
	1999	EVT-1	H8 & H9 100% EVT-1 examined. No change in previous indications.
	95-97	EVT and UT	1996 H8 inspected by EVT and UT, minor indications noted full structural margin. H9 EVT at 4 locations no indication. 1997 H8 re-inspected with increased scope. Previous indications no change. One new indication found by EVT in previously uninspected area. Full structural margin. H9 re-inspected EVT at one location, no indications noted.

Core Spray Piping	4/09	EVT-1	Target welds and 25% sample plan implemented utilizing EVT-1. Relevant indication noted on P6-U3A weld. Dispositioned indication as a scratch and applied BWRVIP-18 evaluation guidance to demonstrate structural integrity for one cycle. UT planned for next outage to confirm a scratch.
		EVT-1	Examined one annulus pipe support bracket attached to the shroud.
	3/07	EVT-1	Target welds and 25% sample plan implemented utilizing EVT-1. No indications noted.
		EVT-1	Examined one annulus pipe support bracket attached to the shroud. A 1.5 inch linear indication was found in the shroud support ring above the pipe support bracket.
		EVT-1	EVT-1 of P4-a access limited to single sided access and limited to less than 10% circumference. Considered a partially hidden weld.
	3/05	EVT-1	Target welds and 25% sample plan implemented utilizing EVT-1. No indications noted.
	3/03	EVT-1	Target welds and 25% sample plan implemented utilizing EVT-1.
	3/03	UT	3 - P8 welds (shroud side only) and both sets of slip joints (P5, 6, & 7) were examined ultrasonically. No indications noted.
	3/01	EVT-1	Re-inspection per BWRVIP-18.
	1980's to present	EVT-1	IEB 80-13 of piping and welds in annulus. No indications noted. EVT per BWRVIP-18 in 1997. No indications noted. 1999 examined target welds and 25 % sample.
Core Spray Sparger	4/09	EVT-1/VT-1	Examined "A through D" Sparger T-box welds, end caps, support brackets, nozzles

			and welds and 3 previously identified indications on "A" sparger nozzles. No change from previous inspections.
	3/07	EVT-1	Examined 3 previously identified indications on "A" sparger nozzles. No change from previous inspections.
	3/05	EVT-1	Examined 100% of spargers and 3 previously identified indications, no change from previous inspections.
	3/03	EVT-1	Examined lower sparger brackets and 3 previously identified indications, no change from previous inspections.
	3/01	EVT-1	No growth noted on 2 previous indications being monitored.
	3/99		1999 examined target welds and 25% sample.
	1980's to present	EVT-1	IEB 80-13 of piping and welds on spargers. Two indications found, analyzed, and re-inspected. No repairs needed. Inspected to BWRVIP-18 in 1997. No new indications found.
Top Guide (Rim, etc.)	4/09	EVT-1	Examined 3 previously identified indications in Top Guide grid beams. No significant change from previous inspection results.
	3/07	EVT-1	Examined 1 previously identified indication in Top Guide Grid Beam #33. No change from previous inspection.
		VT-1	VT-1 of 2 top guide hold downs (upper and lower). No indications noted.
	3/05	UT	A total of 79 non-geometric indications identified, 13 associated with attachment welds adjoining the ribs, 60 indications associated with assembly slots generally < 1/2" and 6 indications on the grid beam bottom mid span sized at <2.5" in length.

	3/03	EVT-1	Examined 8 top guide grid beam cell locations based on SIL-554. One crack identified 1.375" long through beam thickness.
	3/01		No inspections performed.
	1993 to present	VT-1	1999 VT-1 of 2 top guide hold downs. No indications. 1993 VT-1 of selected locations on underside at mid-span locations. No indications noted. VT-1, 1995, from underside to confirm lateral spacers in place.
Core Plate (Rim, etc.)	4/09	VT-3	Inspected 16 core plate bolts from the top surface. No indications noted.
	3/07		No inspections performed.
	3/05		No inspections performed.
	3/01		No inspections performed.
	3/01		No inspections performed.
	1995	VT-1	1995 hold down bolts from top side. No indications.
SLC	4/09	UT	UT of N12 safe-end to nozzle weld and accessible portions of adjacent base metal using PDI qualified technique. No indications found.
	5/99	UT	UT of N12 safe-end to nozzle weld and accessible portions of adjacent base metal using PDI qualified technique. No indications found.
	1995 to present	EVT-2	Enhanced visual in accordance with BWRVIP-27-A.
	1970's to Present	VT-2	Section XI performed each refueling.
CRD Flow Shield	4/09		No examinations performed.

	3/07	EVT-1	Examined the CRD return line flow shield-to-thermal sleeve weld. No indications noted.
Jet Pump Assembly	N/A	N/A	Not applicable to this plant.
Jet Pump Diffuser	N/A	N/A	Not applicable to this plant.
CRD Guide Tube	4/09		No examinations performed, however during control blade change out a loose OFS/CGRT alignment pin was identified during installation of the OFS.
	3/07	EVT-1/VT-3	Examined 2 available locations. No indications noted.
	3/05	EVT-1	2 guide tubes were removed from core plate to facilitate lower plenum inspections, was able to examine both from the OD. No indications noted.
	3/03	EVT-1	Examined 2 available locations. No indications noted.
	3/01	EVT-1	4 guide tubes made accessible for inspection.
	1997	EVT-1	1997 commenced inspection of select guide tube. 3 guide tubes examined. No indications.
CRD Stub Tube	4/09	EVT-1	Examined accessible portions of lower plenum during bottom head drain foreign material inspection. Areas such as the stub tube to RPV weld, CRD housing, CRD housing to stub tube weld, bottom head cladding and ICH (see below) were examined. Indications noted in the stub tube base metal at two core locations.
	3/05	EVT-1 UT	Completed VT-3 / VT-1 on a portion of the lower plenum, no new flaws were identified. 3 stub tube J-weld areas examined. Augmented UT exams performed each outage at different locations in support of roll repair program.

	3/03	UT	2 stub tube J-weld areas examined. Preemptive UT exams performed each outage at different locations.
	3/01	UT	2 stub tube J-weld areas examined. Preemptive UT exams performed each outage at different locations.
	1984-1997	VT-2 and UT	Stub tube leakage found periodically since 1984. Condition corrected by roll repair. UT inspection before and after each repair. Pre-emptive inspection and rolling commenced in 1997 on selected stub tubes.
In-Core Housing	4/09	EVT-1 VT-1/VT-3	Examined accessible portions of incore housing guide tube weld, RPV weld, cap to tube weld, support hardware, clamps and tack welds at 2 core locations. No indications noted.
	3/05	VT-3	Inspections obtained on 2 housing.
Dry Tube	4/09	EVT-1	Examined 3 dry tubes. No indications noted.
	3/07	EVT-1	Examined 9 dry tubes. No indications noted.
	3/05	EVT-1	3 dry tubes examined, no indications noted.
	3/03		No inspections performed.
Instrument Penetrations	4/09	VT-2	Performed VT-2 exam on all instrument penetration nozzles. No leakage noted.
	3/07	VT-2	Performed EVT-2 exam on all instrument penetration nozzles. Inspections performed satisfactorily.
	3/05	VT-2	Performed EVT-2 exam on all instrument penetration nozzles. Inspections performed satisfactorily.
	3/03	VT-2	Performed EVT-2 exam on all instrument penetration nozzles. Inspections performed satisfactorily.
	3/01	VT-2	Performed EVT-2 exam on all instrument penetration nozzles. Inspections performed

	1993	LP or MT	satisfactorily. Section XI performed once per interval. Last inspection was 1993. No indications.
Vessel ID Brackets	4/09		No examinations performed.
	3/07	VT-3	0 and 180 degree Guide Rod brackets to the RPV wall. No indications noted.
		VT-1	Surveillance specimen holder attachment welds (6) to the RPV wall. No indications noted.
	3/05	EVT-1	No inspections performed.
	3/03	EVT-1	Examined 10 attachment welds per BWRVIP requirements. No indications noted.
	3/01	EVT-1	3 of 4 steam dryer brackets completed with no indications noted.
	1988, 1993, and 1997	VT-1 and VT-3	Section XI performed once per interval. Dryer, surveillance capsule holder.
LPCI Coupling	N/A	N/A	Not applicable to this plant.
Steam Dryer	4/09	EVT-1 VT-1/VT-3	Performed examinations to complete the BWRVIP-139 baseline inspection scope. This included the drain channel welds underneath the dryer. New indications were noted on the inner bank vertical seam welds on the vane side and two indications on the 225 degree lifting lug. Examined several existing indications for change, no change noted from previous inspection results.
	3/07	VT-1	VT-1 of 4 hold down assemblies. No indications noted.
		EVT-1/VT-1	Inspected all previous dryer bank repair locations. Inspections included bolted repairs, bank clips, repair clips, lower stiffeners and previous stop holes. Two new indications were noted. Steam Dryer Bank 5,

		VT-3	<p>Clip 6 has a 1.12 inch indication in the weld HAZ and repair area Bank 4, Clip 6 has a hole (weld defect) approximately 1/8 inch in diameter in the existing clip weld. All other repair areas remain unchanged from previous examinations.</p> <p>Performed a VT-3 on all accessible areas (repair areas), hold-down and support lug, lifting eye, horizontal and vertical welds, upper/lower support ring and guides, dryer banks, manway covers and stabilizer bars. No indications noted.</p>
Moisture Separator	4/09	EVT-1/VT-1	<p>Examined retired in place LVI tubing and supports. No indications noted.</p> <p>Examined standpipe #102 and all associated welds, tie bars and support components. Indications noted on all four gusset plates.</p> <p>Examined six shroud head bolts for surface condition change and cracking at the lower shaft to tee head weld. No indications noted.</p>
	3/07	VT-3/ VT-1	<p>Performed a VT-3/VT-1 on all accessible areas, standpipe gussets, SHB-Pin-Sleeve, tie straps and separator internals. Two new indications were noted. One tie strap was found bent between standpipes 43 and 50 and a second gusset was found cracked on standpipe #102. No other indications were noted.</p>
BWRVIP-75-A Dissimilar Metal Welds	4/09	UT	<p>N1A, Category D, Auto Exam: (2) ASME XI IWB-3514-2 acceptable planar flaws in the safe end ID</p> <p>N1B, Category D, Auto Exam: (3) ASME XI IWB-3514-2 acceptable planar flaws in the safe end ID</p> <p>N2D, Category E, Auto Exam: (1) ASME XI IWB-3514-2 unacceptable planar flaw (1.29" L x 0.27" D) recorded at N1R19 (2007) -- re-look performed with no growth</p>

			<p>noted</p> <p>N5A, Category D, Manual Exam: NRI</p>
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Reactor Internals Inspection History

Plant: **Perry Nuclear Power Plant**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Re-inspections
Core Shroud (VIP-76)	1994 (RF4)	VT-3 and EVT-1	In RF4, VT-3 of entire shroud interior and EVT-1 of the H-3 and H-4 weld inside surfaces at 4 appx 1ft long sample locations. No indications.
	1997 (RF6)	EVT-1	In RF6, a Code VT-3 exam was performed on all accessible shroud exterior areas. No indications.
	1999 (RF7)	UT	In RF7, UT examination of the H-3, H-4, H-6A and H-7 welds was performed in accordance with the Category B Plant guidelines of BWRVIP-01. No indications.
	2005 (RF10)	UT	In RF10, UT examinations of the H-3 and H-4 welds with the Tecnatom ID tool and H-6A and H-7 with the GE OD Tracker. H-4 and H-6A were two sided exams and H-3 and H-7 were one-sided exams. Shallow cracking was found in H-7. It was less than 10% of the inspected length of 67% of the weld.
Shroud Support (VIP-38)	1990 (RF2)	VT-3 & VT-1	In RF2, VT-3 of shroud support plate and VT-1 of the shroud support plate access hole cover. No indications.
	1996 (RF5)	VT-3 & VT-1	In RF5, VT-3 of shroud support plate and VT-1 of the shroud support plate access hole cover. No indications.
	1999 (RF7)	EVT-1	In RF7, baseline EVT-1 exams of the H-8 and H-9 were performed in accordance with BWRVIP-38. No Indications.
	2001 (RF8)	VT-1	In RF8, re-seating of jet pump no. 5 provided access to the H-10, H-11 and

	2007 (RF11)	EVT-1 & VT-1	<p>H-12 welds of the shroud support leg at 90 degrees and approximately 10 degrees of the underside of H-8 and H-9 so they were visually examined with at least VT-1 resolution. No indications.</p> <p>In RF10, jet pump no. 6 was removed and re-seated due to excess leakage at the transition piece. While disassembled approximately 10 degrees of the underside of H-8 and H-9 were examined with at least VT-1 resolution. Also, the H-10, H-11 and H-12 welds of the shroud support legs at 90 and 120 degrees were examined with EVT-1 resolution. Coverage was approximately 35-50% for the welds of the 90 degree leg and 25% for the welds of the 120 degree leg.</p>
Core Spray Piping (VIP-18A)	1989-1996 (RF1 thru RF5)	CVT-1	1 mil wire resolution VT-1 (i.e., CVT-1) exams of the core spray internal piping has been performed every outage since startup in accordance with IEB 80-13. No indications.
	1997 (RF6)	EVT-1	In RF6, Baseline BWRVIP-18 EVT-1 examinations were performed on all the core spray piping welds. No indications.
	1999 (RF7) 2001 (RF8) 2003 (RF9)	EVT-1 EVT-1 EVT-1	In RF7, RF8, and RF9 core spray piping weld exams were performed in accordance with the re-inspection requirements of BWRVIP-18. No indications. Note that after a couple outages without having re-clean the welds, all the welds inspected in RF9 were pre-cleaned by hydrolasing
	2005 (RF10)	EVT-1	Examined in accordance with the re-inspection requirements of BWRVIP-18. Exams did find one cracked tack weld on one of the 6-bolt core spray piping shroud flange to shroud connections (P8).
	2007 (RF11)	EVT-1	Examined in accordance with the re-

	2009 (RF12)	EVT-1	<p>inspection requirements of BWRVIP-18. Re-examination of cracked tack weld on one of the 6-bolt core spray piping shroud flange to shroud connections (P8) found in RF10 found no changes.</p> <p>Examined in accordance with the re-inspection requirements of BWRVIP-18. No indications.</p>
Core Spray Sparger (VIP-18-A)	1989-1996 (RF1 thru RF5)	CVT-1	1 mil wire resolution VT-1 (i.e., CVT-1) exams of the core spray spargers has been performed every outage since startup in accordance with IEB 80-13. No indications.
	1997 (RF6)	EVT-1 & CVT-1	In RF6, Baseline BWRVIP-18 EVT-1 & CVT-1 examinations were performed on all the core spray sparger welds. No indications.
	1999 (RF7)	EVT-1 & MVT-1	In RF7 core spray sparger weld exams were performed in accordance with the re-inspection requirements of BWRVIP-18. No indications.
	2001 (RF8)	EVT-1 & VT-1	In RF8 and RF9 core spray sparger weld exams were performed in accordance with the re-inspection requirements of BWRVIP-18. No indications. Note that after a couple outages without having re-clean the welds, all the welds inspected in RF9 were pre-cleaned by hydrolasing
	2003 (RF9)	EVT-1 & VT-1	
	2005 (RF10)	EVT1 & VT-1	Examined in accordance with the re-inspection requirements of BWRVIP-18. No indications.
	2007 (RF11)	EVT-1 & VT-1	Examined in accordance with the re-inspection requirements of BWRVIP-18. No indications.
	2009 (RF12)	EVT-1 & VT-1	Examined in accordance with the re-inspection requirements of BWRVIP-18. No indications.
Top Guide (Rim, etc.)	1989 (RF1)	VT-3	Top Guide periphery, including 90 studs

(VIP-26-A)	1994 (RF4)	VT-3	and tack welds, examined in RF1. No indications.
	1999 (RF7)	VT-1 & VT-3	Top Guide Grid examined in RF4. No indications.
	2005 (RF10)	VT-3	In RF7, performed VT-3 of the Top Guide assembly in accordance with ASME Category B-N-2 and VT-1 of the studs and tack welds in accordance with BWRVIP-26. No indications.
Core Plate (Rim, etc.) (VIP-25; not applicable to BWR/6s)	1989 (RF1)	VT-3	Code B-N-2 exam of accessible portions of Top Guide grid. Due to ID Core Shroud exams, a significant number of the grid cells were vacated and accessible for inspection.
	1994 (RF4)	VT-3	Accessible core plate areas and fuel support castings examined in RF1. No indications.
	1999 (RF7)	VT-3	All of the hold down bolts examined from shroud interior in RF4. No indications.
SLC (VIP-27-A)	N/A	N/A	In RF7, performed VT-3 exam of the core plate areas made accessible by replacement of 5 Control Rod blades in accordance with ASME Category B-N-2. No indications.
Jet Pump Assembly (VIP-41, Rev 1)	1989-1996 (RF1 thru RF5)	VT-1 & VT-3	Not applicable to this plant
	1997 (RF6)	EVT-1 VT-3	Examine jet pump braces, hold down beams, sensing lines, restrainer bracket set screws and mixer assemblies in accordance with various GE SILs/RICSILs. Set screw gaps identified in RF5 and RF6.
	1999 (RF7)	EVT-1 & VT-3	In RF6, baseline EVT-1 exams were performed on all the jet pump riser elbow welds. No crack indications.
			In RF7, the jet pump mixers were removed and cleaned with ultra high

			<p>pressure. Augmented VT-3 examinations were performed on the jet pump mixer throats (pre and post cleaning) and the restrainer bracket set screws. Most of the gaps detected in RF5 and RF6 were eliminated upon re-seating the mixers. The couple that remain are very minor and within the “no fatigue” acceptance criteria.</p>
	2001 (RF8)	EVT-1 & VT-3	<p>With the exception of the IN-1 and IN-2 welds of 6 jet pumps, in RF8, baseline BWRVIP-41 EVT-1 exams were performed on all of the low, medium and high priority exam points of jet pumps 1 through 10,. No indications. Also VT-3 examined all the jet pump set screws for gaps. 11 of the 20 jet pumps had gaps were found to have gaps that were less than 0.0020” in one or more of their set screws. Gaps evaluated as operable for at least one cycle with long term remedy to be determined.</p>
	2003 (RF9)	EVT-1, VT-3 & UT	<p>In RF9, performed EVT-1 exams of the IN-1 and IN-2 welds of jet pumps 1 through 10 not examined in RF8. Additionally, baseline EVT-1 exams of the remaining High priority welds (RS-3 on jet pumps 11 through 20 were also performed). Performed VT-3 exams of the jet pump set screws and wedges. Gaps similar to previous outages were found and evaluated for continued operation. Also performed UT of the jet pump hold-down beam BB-1 and BB-2 locations (Note: PNPP's jet pump beams were replaced with Type 2 beams in RF4). Supplemental EVT-1 exams were performed on the BB-3 areas. With the exception of the set screw gaps, no indications.</p>
	2005 (RF10)	EVT-1 & VT-1	<p>In RF10, performed re-examination (EVT-1) of the riser elbow welds on jet pumps 1 through 10. No indications.</p>

			Also performed VT-1 examination of all 20 jet pump wedge assemblies. Found minor wear on the wedge of JP-15. Expanded scope in accordance with BWRVIP-41 and found no other indications. The wear was evaluated as acceptable for one cycle of operation.
	2007 (RF11)	EVT-1 & VT-1	In RF11, performed examination of the all the high and medium priority welds on the reactor recirculation Loop B jet pumps (i.e., 11 – 20). No indications. Also performed VT-1 examination of all 20 jet pump wedge assemblies. Found the minor wear on wedge of JP-15 that was first identified in RF10 to be unchanged. Also performed VT-3 examinations on the instrument line attachment welds of all 20 jet pumps.
	2009 (RF12)	EVT-1 & VT-1	In RF12, performed examination of mixer inlet areas for crud buildup on jet pumps 3 & 13, RS-3's for jet pumps 1-10, and RS1 & RS2's for jet pumps 11-16. Also performed VT-1 examination of all 20 jet pump wedge assemblies. New wedge wear found on jet pumps 6 and 13. Further expanded scope inspections of jet pumps in accordance with BWRVIP-41 found set screw gaps on jet pumps 5, 13 & 14. Gaps were analyzed and jet pumps 5, 13 & 14 were justified for continued operation. Also performed VT-3 examinations on the instrument line attachment welds of jet pumps 1-10.
Jet Pump Diffuser (VIP-41, Rev 1)	2001 (RF8)	EVT-1	In RF8, baseline BWRVIP-41 EVT-1 exams were performed on all of the diffuser welds of jet pumps 1 through 10. No indications.
	2007 (RF11)	EVT-1	In RF10, baseline BWRVIP-41 EVT-1 exams were performed on all of the diffuser welds of jet pumps 11 through 20. No indications.

CRD Guide Tube (VIP-47-A)	1999 (RF7)	VT-1 & EVT-1	In RF7, performed VT-1 of alignment pins and EVT-1 of the welds of 5 Control Rod Guide Tubes in accordance with BWRVIP-47. No indications.
	2001 (RF8)	VT-1 & EVT-1	In RF8, performed VT-1 of alignment pins and EVT-1 of the welds of an additional 4 Control Rod Guide Tubes in accordance with BWRVIP-47 to meet the 5% completion requirements of BWRVIP-47. No indications.
	2005 (RF10)	VT-1 & EVT-1	In RF10, performed VT-1 of alignment pins and EVT-1 of the welds of an additional 5 Control Rod Guide Tubes in accordance with BWRVIP-47. No indications. The final CRD Guide Tube exams to meet the total of 10% requirement (4 more), are scheduled for RF11.
	2007 (RF11)	VT-1 & EVT-1	In RF11, performed VT-1 of alignment pins and EVT-1 of the welds of an additional 4 Control Rod Guide Tubes in accordance with BWRVIP-47 to meet the ultimate 10% completion (i.e., 18 out of 177) requirements of BWRVIP-47. No indications.
CRD Stub Tube	N/A	N/A	Not applicable to this plant.
In-Core Housings (LPRMs)	2003 (RF9)	VT-3	In RF9, performed VT-3 of a random 10% sample of the IRM's in response to Revision 2 to SIL 409. No indications.
	2005 (RF10)	VT-3	In RF10, performed VT-3 of a random 10% sample of the IRM's in response to Revision 2 to SIL 409. No indications.
	2007 (RF11)	VT-3	In RF11, performed VT-3 of a random 10% sample of the IRM's in response to Revision 2 to SIL 409. No indications.
	2009 (RF12)	VT-3	In RF12, performed VT-3 of a random 10% sample of the IRM's in response to Revision 2 to SIL 409. No indications.

Dry Tubes (IRMs & SRMs)	1989 (RF1) 1990 (RF2) 1994 (RF4) 1999 (RF7)	VT-3 VT-3 VT-3 VT-3	In RF1, RF2, RF4 and RF7, performed VT-3 of upper 2 ft of all IRMs and SRMs in accordance with SIL 409 and RICSIL 73. No indications.
	2001 (RF8) 2003 (RF9) 2005 (RF10) 2007 (RF11) 2009 (RF12)	VT-3 VT-3 VT-3 VT-3 VT-3	In RF8, RF9, RF10, RF11 and RF12 performed VT-3 of upper 2 ft of half the IRM's and SRM's in each outage. No indications.
Instrument Penetrations (VIP-49-A)	1989-2005 (RF1 thru RF10)	VT-2	Undervessel (i.e., through the skirt manway) and inside the bioshield direct visual examination for leakage performed every refueling outage. No indications.
	2005 (RF10)	PT	SIL 571 surface examinations of the socket weld connection and all accessible penetration base metal surfaces for two of the 14 level instrument penetrations. No indications.
	2007-2009 (RF11 & RF12)	VT-2	Undervessel (i.e., through the skirt manway) and inside the bioshield direct visual examination for leakage performed every refueling outage. No indications.
Vessel ID Brackets (VIP-48-A)	1989 (RF1) 1994 (RF4) 1996 (RF5)	VT-1 & VT-3 VT-1 & VT-3 VT-1 & VT-3	Section XI examinations of the jet pump riser brace, feedwater sparger bracket, core spray piping bracket, surveillance specimen capsule bracket, steam dryer, and guide rod vessel attachment welds. Scheduled such that each attachment weld is examined once an interval. The last welds to be examined were the surveillance capsule bracket attachment welds in RF5. No indications.
	1999 (RF7)	MVT-1	In RF7, performed MVT-1 of the Feedwater Sparger brackets in accordance with the normal frequency of ASME Category B-N-2, but utilized the MVT-1 method in accordance with BWRVIP-48. No indications.
	2001 (RF8)	EVT1	In RF8, performed EVT-1 of the Steam

			<p>Dryer support brackets and Jet Pump Riser Brace attachment welds in accordance with the normal frequency of ASME Categories B-N-2, but utilized the EVT-1 method in accordance with BWRVIP-48 and BWRVIP-41. No indications.</p>
	2003 (RF9)	VT-3 & EVT1	In RF09, performed VT-3 of the Feedwater Sparger brackets and EVT-1 of the Core Spray piping brackets. No indications.
	2009 (RF12)	VT-3	In RF12, performed VT-3 of the Guide rod support bracket attachments, surveillance sample holder. Surveillance sample holder at 177° exhibited a bent bail handle, justified for continued operation.
LPCI Coupling (VIP-42-A)	1994 (RF4)	VT-3	The LPCI deflectors (inside the core shroud) were examined in RF4. No indications.
	1997 (RF6)	VT-3	The LPCI internal piping, including the couplings, was examined in RF6. No indications.
	1999 (RF7)	MVT-1	In RF7, performed MVT-1 baseline exams on the welds of all three LPCI couplings in accordance with BWRVIP-42. No indications.
	2003 (RF9)	EVT-1	In RF9, performed EVT-1 exams on the welds of the LPCI A coupling in accordance with BWRVIP-42. No indications.
	2005 (RF10)	VT-3	Although not required by BWRVIP, performed a VT-3 of the Low Pressure Core Injection (LPCI) deflectors and attachment welds from inside the shroud. Performed while the periphery of the inside of the shroud was accessible due to vacating the cells for the Tecnom ID Core Shroud inspection tool. No

	2007 (RF11)	EVT-1	indications. In RF11, performed EVT-1 exams on the welds of the LPCI A coupling in accordance with BWRVIP-42-A. No indications.
RPV Interior (not a BWRVIP scope item)	2003 (RF9)	VT-3	The RPV Interior exam is performed in accordance with ASME Category B-N-1 every other outage and is not usually reported on herein. However, RF9's examination results are noteworthy as the RPV Interior exams identified deposits on the vessel interior walls in the areas adjacent to the Main Steam nozzles. Subsequently in extent of condition exams, similar deposits were found on the Steam Dryer outside shroud surfaces in areas corresponding to the Main Steam nozzles. The deposits are extremely hard (i.e., cannot be scraped or hydrolased off). From a BWRVIP standpoint, the deposits are considered significant as they are a result of the mitigating water chemistry (i.e., Hydrogen Water Chemistry with depleted Zinc and NobelChem).
	2005 (RF10)	VT-3	Re-inspection of the upper vessel interior (steam region) to see if there was any change in the unusual deposits that were found in RF9. The unusual deposits were still there, but they were essentially unchanged from RF9 (i.e., no further deposits noted).
	2007 (RF11)	VT-3	Re-inspection of the upper vessel interior (steam region) to see if there was any change in the unusual deposits that were found in RF9. The unusual deposits were still there, but they were essentially unchanged from RF9 (i.e., no further deposits noted). Also performed the ASME Code Category B-N-1 VT-3 inspections of the accessible interior surfaces. No indications.

	2009 (RF12)	VT-3	Re-inspection of the upper vessel interior (steam region) to see if there was any change in the unusual deposits that were found in RF9. The unusual deposits were still there, but they were essentially unchanged from RF9 (i.e., no further deposits noted).
Steam Dryer (VIP-139)	1990 (RF2)	VT-3	SIL 472 exams of the Steam Dryer drain channels for cracking. No indications.
	2003 (RF9)	VT-3	General exam of Steam Dryer exterior looking for extent of condition of tenacious crud found on the vessel interior. Also used a Video-Ray submersible to examine the Steam Dryer interior. Other than heavy crud build-up on the 90 and 270 degree sides, there were no indications.
	2005 (RF10)	VT-3	General exam of Steam Dryer exterior looking for gross failures. No indications. Detailed BWRVIP-139 Steam Dryer baseline exams scheduled for RF11.
	2007 (RF11)	VT-3	General exam of Steam Dryer exterior at the 90 and 270 degree sides looking for gross failures and for any changes in the tenacious crud found in RFO9. No indications. Detailed BWRVIP-139 Steam Dryer baseline exams that were originally scheduled for RF11 were deferred to RFO12.
	2009 (RF12)	VT-1	Completed base line inspections per BWRVIP-139. Linear indications found in LB3a (145° lifting rod bracket), LA4 (35° lifting lug tack weld), LD4 (325° lifting lug tack weld), a bent lower guide rod guide at 180°, and several small linear, horizontal, vertical, and radial indications in the upper support ring. All indications were analyzed and justified for continued operation. No change in

			stucco crud deposits.
Access Hole Cover (VIP-180)	1996 (RF5)	VT-1	VT-1 examination of the access hole cover welds in accordance with SIL-409.
	2007 (RF11)	EVT-1	EVT-1 examination of the access hole cover welds in accordance with the draft BWRVIP AHC Inspection and Evaluation Guidelines. No indications.
Category C & E Dissimilar Metal (DM) Weld Exams. Perry has 23 Category C DM welds, 2 Category E DM welds (one weld overlay repaired and one just monitoring), and no Category D DM welds.	2007 (RF11)	UT (Supp 10 Exams)	Examined 13 of Perry's 23 Category C dissimilar metal welds (ten N2, two N9 and one N1 Nozzle to SE welds). There were no unacceptable flaw indications. One N1 Nozzle to SE weld was not examined due to extreme hardship to access and dose concerns. Relief Request submitted following the outage to delete exam entirely based on a review of previous examination data that was obtained with non-Supplement 10 procedures but by techniques that were near equivalent to Supplement 10.
	2007 (RF11)	UT (Supp 10 Exam)	Examined Perry's Feedwater (N7) Nozzle to SE Category E dissimilar metal weld that is not weld overlay repaired. The flaw indications were found to be unchanged.
	2009 (RF12)	UT (Supp 10 Exams)	Examined 9 of the remaining 10 Perry Category C dissimilar metal welds (four N4, three N6 and two N5). Subsurface (i.e., fabrication) flaws identified in two of the N6 Nozzle to SE welds prior to RF12 by the required BWRVIP data review, and which required an IWB-3600 evaluation because they exceeded ASME XI Table IWB-3514-1 acceptance criteria, were found to be unchanged. No other unacceptable flaw indications were identified. Note that prior to RFO12, the Relief Request that was submitted for the N1 Nozzle to SE weld that was not examined in RFO11 was approved. Thus, Perry has completed all the required Category C dissimilar metal

	2009 (RF12)	UT (Supp 11 Exam)	weld Supplement 10 examinations. Examined Perry's Feedwater (N7) Nozzle to SE Category E dissimilar metal weld that is weld overlay repaired. The overlay exam found no unacceptable flaw indications.
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Reactor Internals Inspection History

Plant: **Pilgrim**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
CORE SHROUD Shroud head bolts	RFO 7	UT	RFO 7 UT all 48 bolts
	RFO 8	VT	RFO 8 partial VT. No indications
	RFO 10	UT	RFO 10 UT of 100% of bolts, no indications
	RFO 11	Replacement	RFO 11 replaced 50% of bolts (even # bolts replaced per MR 19602446)
	RFO 15	Removal	Removed 50% (24) of SHBs (odd # bolts) per ER 03114806 (MR 04116541)
	RFO 16	VT-3	Examined 25% (6) of shroud head bolts with one relevant indication noted and dispositioned
	RFO 17	VT-3	Examined 25% (6) of shroud head bolts; slight wear at SHB 18.
	RFO 10 (modif. and partial VT), 11 (UT of 134" (25% of total) of vert. welds V17 and V18 from shroud I.D.) 11 (EVT-1 of 14 of 21 ring segment welds)		Shroud captured to limit extent under VT-3 exams of RPV Interior performed each period. No indications. RFO 10 PDC 94-43 VT exams only. RFO 11 VT-3 of 315 degree tie rod and core plate wedges, EVT-1 of 315 degree gusset welds.
	RFO 12	EVT-1	Examined V15, V16, V17, V18, V22 and
Shroud			

			<p>V23. Total of vertical weld examined from both sides by UT in RFO 11 and EVT 1 in RFO 12 is 46 %</p> <p>With partial credit for one sided examinations the total is 51 %. This is the maximum available with current tooling. No indications.</p>
	RFO 13	EVT-1	Examined Ring Segment weld V11 from the OD. (no indications).
	RFO 15	EVT-1	Examined 100% vertical/or radial welds V9, V10, V11, V12, V13, V14 and V22 (all OD side) with no relevant indications noted (NRI's). Examined 70% weld V23 (OD side) (NRI's). There was no OD side access to welds V7, V8, V30 and V31. Also, there was no ID side access to welds V7, V8, V22 and V23. Technical Justification #TJ-076-04, defers UT inspection of several vertical welds to RFO16.
	RFO 16	UT	Examined 100% vertical welds V32 and V33 in shroud support cylinder (all OD side) (NRI's). There was no access to vertical weld V34.
		EVT-1	Examined > 90% belt-line vertical welds V15, V16, V17 & V18 (NRI's)
		EVT-1	Examined 100% vertical welds V7 & V8 (NRI's). There was no OD side access to welds V30 & V31. Also, there was no access to shroud support weld V34. A deviation disposition will address the issue
		EVT-1/VT-1/VT-3	Examined the accessible surfaces, contact points, seating surfaces, locking devices and critical contact areas for the four tie-rods per BWRVIP-76, industry OE's and repair vendor requirements. Replaced the upper supports at tie-rods

Shroud Tie Rods	RFO 17	UT	45° and 225° locations. Plans are to replace in RFO17 the remaining two upper supports at 135° and 315° (NRI's)
		EVT-1	V30 & V31 examined with GE TS ² tool
	RFO 10	EVT-1/VT-1/VT-3	V9, V10, V11, V12, V13, V14 in top guide support ring examined; V22 examined in central mid-ring when 135 tie rod was removed/replaced.
	RFO 16	EVT-1/VT-1/VT-3	Installed 4 tie rods as pre-emptive repair for shroud horizontal welds
	RFO 16	EVT-1/VT-1/VT-3	Replaced upper supports at 45° and 225° tie rods due to Plant Hatch event. Examined the accessible surfaces, contact points, seating surfaces, locking devices and critical contact areas at all 4 tie rods per BWRVIP-76, industry OE's and repair vendor requirements.
	RFO 17	EVT-1/VT-1/VT-3	Replaced entire tie rod at 135° due to stuck nut and upper support only at 315°. Performed re-inspection of 45° and 225° tie rods from RFO16 replacements. Examined the accessible surfaces, contact points, seating surfaces, locking devices and critical contact areas per BWRVIP-76, industry OE's and repair vendor requirements.
SHROUD SUPPORT Access Hole Covers	8 (UT), 9 (VT), 10 (UT radial of 0 degree cover), 10 VT of 180 degree cover)		UT exam in RFO 8 was for circ. Cracking only. No indications. RFO 10 visual indication at 0 degree cover verified non-relevant by UT.
	RFO 14	EVT-1	Examined at 0° and 180° (NRI's)
	RFO 16	VT-1	Examined at 0° and 180° (NRI's)

Shroud Support Plate to RPV (H11) Weld	RFO 10	EVT-1	Enhanced VT-1 RFO 10. No indications.
	RFO 12		Examined 10 % of weld length with no indications.
	RFO 15	EVT-1	Examined 16% of weld length (top side) (NRI's).
		VT-3	Examined 360° of weld length (top side) with NRI's.
Shroud Support Plate Gusset Welds	RFO 17	EVT-1	Examined H10 and H11 between 128°-142° when 135° tie rod was removed/replaced.
	RFO 10	EVT-1/VT-1	Enhanced VT-1 RFO 10 of 4 gussets (modification attach. Points), VT-1 all others (18).
	RFO 11	EVT-1	No indications. RFO 11 EVT-1 of gusset at 315 az.
	RFO 12	EVT-1	Examined gusset welds at 225,135, 45, 15 and 345 degrees with no indications.
	RFO 14	EVT-1	Examined gusset welds at 75, 165,195, 255,and 300 degrees.
	RFO 15	EVT-1	Examined all gusset welds at 30°, 120° and 240° (NRI's).
		VT-3	Examined gusset-to-RPV welds at 30°, 60°, 90°, 105°, 120°, 150°, 210°, 240°, 270°, 285° and 330° (NRI's).
	RFO 16	EVT-1	Examined gusset welds at 45°, 135°, 225° and 315° (NRI's)
	RFO 17	EVT-1	6 gussets at 15°, 60°, 90°, 135°, 270° & 315° examined.
CORE SPRAY PIPING	RFO 6, 7, 8, 9, 10, 11	UT/EVT-1	3" long indications recorded previously in 1980, 81 and 84 on 'B' sparger between T-Box and B-25 nozzle. RFO 7

			and 8 exams show no indications. GE suspected scale as possible source of previous indications. RFO 11 UT revealed six cracked piping welds
	RFO 12	EVT-1 and UT	EVT-1 of welds examined by EVT-1 in RFO 11 revealed no indications. UT of the four P8b welds with indications from RFO 11 revealed the indications to be geometric reflectors. All P9 welds were examined by UT with no indications. UT of 1P5 and 3P5, which had indications in RFO 11, revealed slight growth in the indication in 1P5.
	RFO 13	EVT-1	Examined all target welds excluding those with RFO 12 ultrasonic results (no indications)
	RFO 14	EVT-1	Examined target welds, no indications, one weld at lower, one mil, sensitivity.
	RFO 15	EVT-1	Examined all creviced and tee box-to-pipe welds; and 25% rotating sample of pipe elbow welds (NRI's)
		EVT-1/VT-3	Examined all piping brackets (4 total) support welds (NRI's)
	RFO 16	EVT-1	Examined all creviced and tee box-to-pipe welds; and 25% rotating sample of pipe elbow welds (NRI's)
	RFO 17	UT	Examined 1P5 & 3P5 piping welds with pole-mounted GE CSI UT tool; previous indications from 1999 were determined to be geometry.
		EVT-1	P1A, P2A, 1P3, 1P6, 1P7, 1P8a, 1P8b, 2P3, 2P4a, 2P4b, 2P5, 2P6, 2P7, 2P8a, 2P8b, P1B, P2B, 3P3, 3P4a, 3P4b, 3P6, 3P7, 3P8a, 3P8b, 4P3, 4P5, 4P6, 4P7, 4P8a, 4P8b examined.
CORE SPRAY SPARGER	RFO 13	EVT-1	All S1, S2, and S4 welds.

	RFO 15	VT-1	All SB and 50% of the S3 welds, these were the upper sparger (no indications).
		EVT-1	All S1, S2, and S4 welds.
	RFO 17	VT-1	All SB and 50% of S3a,b welds; these are the lower spargers (NRI's). No S3c (drains) were found.
		EVT-1	All S1, S2, and S4 welds.
		VT-1	S3a & S3b at 'A'(15°) & 'C' (165°) upper spargers examined. No S3c (drains) were found.
		VT-1	SB sparger brackets examined at all 4 spargers
TOP GUIDE (RIM, etc.)	RFO 6, 7, 8, 9		Partial exams each outage. Some scratches, wear marks; no cracking found.
TOP GUIDE ALIGNER ASSEMBLY	RFO 12	VT-1	Examination of assemblies at 0 and 90 degrees revealed no indications
	RFO 16	VT-1	Examined accessible surfaces of grid beams at six cell locations (most at high fluence areas) (NRI's)
CORE PLATE (RIM, etc.)	RFO 16	VT-3	Examined all core plate wedges at 45°, 135°, 225° and 315° (NRI's)
SLC	RFO 13	VT-2	System Leakage Test (no leaks)
	RFO 14	VT-2	System Leakage Test, insulation removed, no indications.
	RFO 15	PT	Examined by PT. Exam was "accepted, no indications noted".
		EVT-2	System Leakage Test, insulation removed, no leaks detected.
	RFO 16	EVT-2	System Leakage Test (no leaks)
JET PUMP ASSEMBLY Jet Pump Riser	RFO 8, 10,		No indications. RFO 10 100% done. Do 50% each RFO per OE item. RFO 11

Braces	11		VT-1 of braces 5 through 14 (50%).
	RFO 12	EVT-1	All Riser Braces were examined at RB-1 and RB-2 except for Jet Pump 3 and 5. No indications were found.
	RFO 13	EVT-1	All RB 1a,b & 2 a, b for Risers A,B,C,D,E,H and J(no indications)
	RFO 14	EVT-1	Riser braces for pumps 1,2,8,9,10,12,13,14,16,17 and 20.No indications
Jet Pump Sensing Lines	RFO 16	EVT-1	Examined RB-1a,b and RB-2a,b welds at JP #17/18 (NRI's)
	RFO 7, 8, 9		No indications.
Jet Pump Beam Assemblies	RFO 17	VT-3/VT-1	JPs 1 thru 10; sensing lines and bracket supports per SIL 420 R1
	Replaced RFO 6, RFO 11 (UT, VT)		RFO 11 (UT of 100%; VT of Jet Pumps 5 through 14)
	RFO 12		All beams examined at BB-1 and BB-2 with no indications
	RFO 16	UT	Examined all twenty beams at BB-1, BB-2 and BB-3 (NRI's)
Jet Pump Adjusting Screws		EVT-1	Examined beam at JP# 7 (NRI's)
	RFO 8, 10, 11	UT	No indications RFO 8. Gaps found RFO 10, minor mech. Damage. Inspection tied to Rise Brace cracking. RFO 11 VT of 100% of screws.
	RFO 12		Gaps were measured for in all pumps except for 5,6,7 and 11
	RFO 13	VT-3	Gaps were measured for on pumps 1,4,6,7,8,9,16, and 17 (no change)
	RFO 16	VT-1/VT-3	Examined the "as found/as left" set

Jet Pump Restrainer Bracket and Swing Gate Assemblies			screw gap measurements for aux wedge installations at JP #01, 02, 8, 9, 11, 17 & 20, including the aux wedge addition (NRI's)
	RFO 17	VT-1/VT-3	Re-inspected aux wedges (WD-1) installed in RFO16 at JPs 01, 02, 8, 9, 11, 17 & 20 (NRI's)
	RFO 11	VT-3	RFO 11 VT-3 of 100% of swing gates, wedges and screws. Found 10 out of 20 swing gates in unlatched position.
	RFO 12		Inspected all Swing Gate assemblies except for 5 and 11
	RFO 13	VT-3	Inspected assemblies for pumps 1,4,6,7,8,9,16,and 17(no indications)
		VT-3	Examined WD-1 on pumps 1 to 10 (no indications)
	RFO 15	VT-1	Examined WD-1 restrainer wedges on jet pumps #1, 2, 4, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 19 and 20, with relevant indications noted only on JP-16 and JP-17. Examined RK-1, RK-2 and RK-3 at jet pumps #16 and #17 (NRI's).
	RFO 16	VT-1	Examined WD-1 restrainer wedges at JP's #3, 5, 11 & 18. Recordable indications were identified on the wedge handle at JP's # 5 & 11. These were satisfactorily dispositioned-Re-inspect in RFO-17
			Examined RK-1, 2 & 3 welds at JP#17 (NRI's)
		VT-3/VT-1	Examined "as found/as left" of existing/replaced swing gates and wedges at JP's #01, 4, 6, 7, 8, 9, 16 & 17 (NRI's)
	RFO 17	VT-3/VT-1	Re-inspected swing gates replaced in RFO16 at JPs 1, 4, 6, 7, 8, 9, 16 & 17

Jet Pump Mechanical Joints	RFO 11	VT-1	(NRI's) Re-inspected wedges (WD-1) replaced in RFO16 at JPs 1, 4, 6, 7, 8, 9, 16 & 17 (NRI's). Also examined wedges (WD-1) and bent wedge handles (re-examined) at JPs 5 & 11.
		VT-1	RFO 11 VT-3 of 50% of Jet Pumps (Jet Pumps 5 through 14) of rams head-to-transition piece and lower slip joint-to-diffuser areas
	RFO 12	VT-3	Inlet mixer to diffuser for 1 to 4 and 15 to 20
	RFO 13	VT-3	Examined rams head to transition piece and lower slip joint to diffuser areas for pumps 1,4,6,7,8,9,16, and 17 (no indications)
Jet Pump Riser Welds	RFO 16	VT-3	Examined slip joint at JP #17 (NRI's)
	RFO 11	EVT-1	All RS-1 and RS-2 examined with no indications
	RFO 12	EVT-1	RS-3 of risers A to E examined with no indications.
	RFO 13	EVT-1	Examined RS-4, RS-5, RS-8 and RS-9 for risers A,B,C,D and E (no indications)
	RFO 14	EVT-1	RS-3 of risers F to K no indications
	RFO 16	EVT-1	Examined the following JP riser welds with NRI's: RS-1, RS-2 and RS-3 at JP's 5/6 RS-4 and RS-5 at JP's 15/16 RS-8 and RS-9 at JP's 13/14 & 15/16
	RFO 17	EVT-1	Examined RS-1, RS-2 & RS-3 welds at JPs 1/2, 3/4, 7/8 & 9/10 Examined RS-4 & RS-5 welds at JPs 11/12, 13/14, 17/18 & 19/20

Jet Pump Diffusers	RFO 13	VT-3	Examined RS-8 & RS-9 welds at JPs 11/12, 17/18 & 19/20. Also examined added scope RS-8 & 9 welds at JPs 5/6 & 15/16 due to Laguna Verde event.
		EVT-1	Examined IN-5 for pumps 1 to 10 (no indications)
		EVT-1 and UT	Examined MX-1 for pumps 1 to 10 (no indications)
	RFO 14	EVT-1	Examined MX-3, DF-1, DF-2, AD-3a, b, AD-1, AD-2 on pumps 13,14,15,16 and 17 by UT and pumps 11, 12, 18, 19 and 20 by EVT-1 (no indications)
	RFO 16	VT-3	Examined AD-2,AD-1,DF-2, and AD-3a,b for pumps 1 to 10, no indications.
		EVT-1	Examined IN-5 at JP #15 & 16 (NRI's)
	RFO 17		Examined MX-1 at JP #15 & 16 (NRI's) Examined MX-3 and DF-1 at JP #5 & 6 (NRI's)
		UT	Examined (JPIT) DF-2, DF-3, AD-1, AD-2, DF-1 & MX-3 welds at JPs 1-20.
		EVT-1	Examined MX-1 at JPs 11-14 & JPs 17-20. Also did MX-1 at JPs 8 & 9 due to 135° tie rod removal/replacement.
		VT-3	Examined IN-5 at JPs 11,12,13,14,17,18,19,20. Also did IN-5 at JPs 8 & 9 due to 135° tie rod removal/replacement.
GUIDE TUBE Handle Attachment	RFO 7		No indications
	RFO 13	N/A	FS/GT –ARPIN-1 at 8 locations
	RFO 14	VT-3/EVT-1	CRGT1, 2 and 3 for 8 tubes, no indications
	RFO 16	VT-3/EVT-1	Examined FS/GT-ARPIN-1, CRGT-1, 2

	RFO 17	EVT-1/VT-3	& 3 at 2 tubes (NRI's) CRGT-1, CRGT-2, CRGT-3 & FS/GT-ARPIN-1 examined at cells 50-27, 50-31, 50-39, 46-39 & 46-31.
CRD STUB TUBE	RFO 7		No indications
	RFO 16	VT-3	Examined accessible surfaces in lower plenum at several locations (NRI's)
IN-CORE HOUSING	RFO 16	VT-3	Examined accessible surfaces in lower plenum at several locations (NRI's)
DRY TUBES	RFO 16	VT-1	Examined 4 (four) dry tubes per SIL-409, Rev 2 requirements (NRI's)
	RFO 17	VT-1/VT-3	Replaced 6 dry tubes; performed PWT as-left exams of new dry tubes at SRM 12-25, IRMs 12-41, 20-25, 28-25, 36-09 & 36-41.
INSTRUMENT PENETRATIONS	RFO 15	EVT-2	System Leakage Test (no leaks detected)
	RFO 16	EVT-2	System Leakage Test (no leaks detected)
VESSEL ID BRACKETS Surveillance Specimen Brackets Attachment Welds Feedwater Bracket Attachment Welds Guide Rod Bracket Attachment Welds	RFO 10		3 locations. No indications
	RFO 15	VT-1/VT-3	Examined attachment welds at all 3 locations (NRI's). Re-engaged the lower end of sample holder at 210° back to the proper location (CR-PNP-2005-02137).
	RFO 17	VT-3	Re-examined surveillance sample holder lower bracket at 210° found dis-lodged in 2005 (NRI).
	RFO 14	VT-3/EVT-1	Code and BWRVIP examination of all attachments
	RFO 10, 11 (180 az guide rod)		No indications
	RFO 15	VT-3	Examined guide rod attachment welds at 0° and 180°. No relevant indications

Steam Dryer Support Bracket	RFO 7, 8, 9, 10, 11		noted.
	RFO 15	VT-3/EVT-1	No Indications
	RFO 10		Examined support bracket attachment welds at all four locations (NRI's).
	RFO 15	VT-3	Located underside of RPV head No indications
Steam Dryer Hold-Down Bracket Welds (on head)	RFO 11	VT-1	Examined hold-down bracket attachment welds at all four locations (NRI's).
	RFO 17	VT-1	Brackets welded to RPV wall at 90 and 150 az received VT-1 in RFO 11
Abandoned Start-up Instrumentation Brackets	RFO 11	VT-1	Bracket at 150° cut back (EDM) to remove interference for future N1B nozzle plug installation.
	RFO 17	VT-1	
STEAM DRYER Steam Dryer Drain Channels	RFO 8, 9, 11		No indications
	RFO 12	VT-3	No indications
	RFO 16	VT-1	No indications
	RFO 7, 8, 9, 10, 11		Cracked tack welds RFO 7; no growth observed in 8, 9 and 10. RFO 11 VT showed increased cracking of tack welds at 35 and 215 degree leveling screws, with 215 az screw loose.
	RFO 12	VT-3	No change from RFO 11
	RFO 13	VT-3	No change from RFO 12
	RFO 14	VT-3	Change in cracks
	RFO 15	VT-1	Examined leveling screws at 35°, 145°, 215° and 325°. There was no change in tack weld cracks at 35° and 215° and NRI's at 145° and 325°
Steam Dryer Leveling Screws	RFO 16	VT-1	Examined leveling screws at 35°, 145°, 215° and 325°. There was no change in tack weld cracks at 35° and 215° and NRI's at 145° and 325°
	RFO 16	VT-1	Examined leveling screws at 35°, 145°, 215° and 325°. There was no change in tack weld cracks at 35° and 215° and NRI's at 145° and 325°

			215° and 325°. There was no noticeable change in tack weld cracks at 35° and 215° and NRI's at 145° and 325°
	RFO 17	VT-1 (89)	Examined leveling screws and lifting lugs at 35°, 145°, 215° and 325°. No noticeable change in tack weld cracks at 35° and 215° and NRI's at 145° and 325°
Steam Dryer Baffle Plate	RFO 7, 11	VT-3	No indications.
Steam Dryer Integrity	RFO 14	VT-1	SIL 644
	RFO 15	VT-1	Examined steam dryer integrity per SIL 644, Rev. 1 guidelines on OD side above dryer supporting ring. Examination included all vertical welds, horizontal welds at end banks and end welds at all ten tie-bars. Relevant indications were noted at an end weld of each tie-bar #3, 4, 5 and 9 (CR-PNP-2005-01608). A total of seven tie-bars were replaced and further examined to establish inspection baseline. These are #1, 2, 3, 4, 5, 9 and 10.
	RFO 16	VT-1/VT-3	Completed steam dryer integrity examinations per requirements of BWRVIP-139 (this included ID and OD side). Examined welds on the original and replaced (RFO 15) tie-bars; guide channels; guide followers; upper support ring; internal Hood A and E horizontal and vertical welds and internal drain channels Relevant indications were found on the ID side of the dryer at vane Bank E weld and in the weld at divider plate anchor #5 between Bank C and D. Indications were satisfactorily dispositioned (Plan to re-inspect again the indication in the divider plate anchor)
			Examined all four lifting rod assemblies and attachment welds (NRI's)

	RFO 17	VT-1 (89)	Examined hood welds HA-6, HA-8 & HA-10 from the ID surface (air bubbles removed) Re-examined linear indication on steam dryer divider plate anchor #5 weld (no change from RFO16)
MOISTURE SEPARATOR	RFO 16	VT-3	Examined all four lifting rod assemblies and guide pins at two locations (NRI's)
	RFO 17	VT-1 (89)	Examined 4 upper and 4 mid-support ring gusset locations (NRI)
		VT-1 (89)	Performed overview of separator tie straps
LPCI COUPLING	N/A	N/A	N/A
FEEDWATER SPARGERS	RFO 6, 7, 8, 9, 10		No indications.
	RFO 14	VT-3/VT-1	All spargers, no indications
FW Sparger End Brackets/pins	RFO 17	VT-1	Examined all 8 brackets and pins (NRI)
BWRVIP-75-A DISSIMILAR METAL WELDS Category E	RFO 17	UT (manual)	RPV-N9A-1 - Existing JPI N9A nozzle safe end weld overlay was re-overlaid in RFO17 to make it inspectable under Supplement 11. Weld had been previously overlaid in 1984 to repair two indications in HAZ of safe end weld. No indications reported in 2009 exam.
		UT (manual)	3-I-1R - Capped N10 CRD return nozzle safe end weld was overlaid in 2003 to repair through-wall leak. No indications reported in 2009 exam.

Reactor Internals Inspection History

Plant: **Quad Cities Unit 1**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud (BWRVIP-76)	04/94	EVT-1 and UT	Inspections per SIL 572, indications in circumferential welds.
	03/96	EVT-1 and UT	Inspections per BWRVIP Guidelines of all Shroud repair design reliant hardware prior to installation of comprehensive repair (4 GE designed tie-rod assemblies). Inspection of shroud consisted of EVT-1 of all ring segment welds (accessible surfaces), EVT-1 of vertical welds between H1 & H2 OD surface 100% (ID not accessible), UT of all 6 beltline vertical welds >30% length/weld, and EVT-1 of vertical welds between H6 & H7 OD surface >25% length/weld (ID not accessible).
	11/98	VT-1	No Reportable Indications.
	10/00	UT	Future inspections to be in accordance with BWRVIP-76; Reinspection of Repaired Core Shrouds. Shroud repair hardware inspected per GE recommendations. No Reportable Indications. Inspected shroud vertical welds V-14 through V-19, inclusive, in accordance with BWRVIP-76. One recordable indication on V-19 was acceptable to EOI under BWRVIP-76.
	11/02	EVT-1	6 vertical welds from the OD per BWRVIP-76. No indications. The steam dam above the shroud flange had impact damage evaluated as acceptable as-is for indefinite

	04/05	EVT-1	continued operation. Examined Ring Segment Welds V1-V4 (Shroud Head RSWs), V8-V13 (Top Guide RSWs), and V20-V25 (Core Plate Support RSWs). NRI, but indications notes in HAZ of shroud horizontal weld H-05-OD near core plate support RSWs. (Horizontal welds structurally replaced by shroud tie rod repair). Examined three shroud vertical welds Inaccessible for UT Inspection to gain additional coverage (V17, V18, V19). NRI
	05/07	EVT-1	Examined 6 vertical welds from the OD (V-05, V-06, V-07, V-26, V-27, V-28). NRI
	05/09	UT	Examined all 11 vertical welds accessible for UT. One weld behind tie rod support not accessible. One IGSCC indication 1.8" long identified in V19 HAZ.
Shroud Repair Hardware (BWRVIP Letters 2006-112 and 2006-220)	05/07	EVT-1, VT-3	EVT-1 of all tie rod upper support vertical faces, VT-3 of high-stressed fasteners and other contact points, and overall VT-3 per BWRVIP Letters 2006-112 and 2006-220. Also, VT-3 of core plate wedges adjacent to repair hardware. No reportable indications.
Shroud Support (BWRVIP-38)	3/96	EVT-1	EVT-1 of H8 and H9 for approx 12" at 4 locations of shroud repair hardware attachment areas. Access hole covers; VT/UT in 1992, circumferential indications observed, permanent repair installed.
	10/00	EVT-1	Inspected H8 and H9 adjacent to AHC at JP# 10 & 11 in accordance with BWRVIP-38. No reportable indications.
	03/05	EVT-1	Inspected H8 and H9 adjacent to JP# 7 & 20 from annulus top side. Also inspected H8 and H9 adjacent to JP# 7 & 20 from bottom side through disassembled jet

			pumps.
	05/07	N/A	No inspections performed.
	05/09	N/A	No inspections performed.
Core Spray Piping (BWRVIP-18)	1980 to 1994	VT-1 (1 mil)	IEB 80-13/NUREG of piping and welds in annulus. Indication previously observed during 1994 on T-box was permanently repaired in 1996. Repair examined 11/98 with no reportable indications.
	04/96	EVT-1	EVT-1 performed to intent of BWRVIP-18 in 1996. Indications observed at two lower elbow welds, full structural margins on non-repaired welds. Future inspections per BWRVIP-18.
	11/98	Auto UT EVT-1	GE CSI-2000 with supplemental EVT-1 for unqualified welds (P8a & P4d). Identified one new flaw at P4d 110° downcomer similar to previously identified flaws at the P4d 260° & 290° downcomers. All flaws were evaluated for at least 48 months of operation with full structural margins without repairs. Previously identified flaws were determined to be of less extent than originally sized.
	10/00	EVT-1	Inspected P8a and P4d welds @ 4 downcomers in accordance with BWRVIP-18. Existing flaws at P4d welds at 110°, 260° and 290° downcomers showed no discernable change from 1998 inspection.
	11/02	UT	BWRVIP-18 UT examination of all accessible welds (32). During the previous outage, indications were observed on welds 2P4D, 3P4D, and 4P4D (2 separate indications) and these were re-inspected this outage. A new indication was also observed on 3P4D that was not observed in the earlier

		EVT-1	<p>outage. All were evaluated as acceptable for at least one cycle.</p> <p>BWRVIP-18 EVT-1 on 12 welds inaccessible to UT. Confirmed indications on welds identified by UT. No other indications. Re-inspected T-Box repair; no indications. The core spray piping bracket clamp at 125° was found loose. This condition was accepted as-is with a recommendation for reexamination.</p>
	03/05	EVT-1	<p>Lower Elbow to Shroud Pipe Welds 1P4d, 2P4d, 3P4d, 4P4d. NRI on 1P4d. No change in indications on 2P4d, 3P4d, 4P4d since last exam in 2002 (R17). Collar Weld to Shroud Pipe Welds 1P8a, 2P8a, 3P8a, 4P8a. NRI. Best effort on 4P8a. Separator lugs and tie rods limited views on lower half. Supplemental visual to disposition UT indication in base metal from R17. NRI</p>
	05/07	VT-1, VT-3	<p>Welds BP1, BP2, BP3, 2P2, 2P3, 3P3 at Tee Box repair (clamp interferes with EVT-1). NRI</p>
		UT	<p>UT Examination of 36 welds (32 welds in target set plus non-demonstrated exams on P8A welds). Sized previous indications on 2P4d, 3P4d and 4P4d with little or no change from previous. New indications on 2P4a and 4P4a that could not be confirmed visually.</p>
		EVT-1	<p>Inspected 16 P4 welds; four P8a welds; 3P6, 2p3 and 3P3, BP1 and BP2 at Tee Box repair; Tee Box repair clamp. Measured indications on 2P4d, 3P4d and 4P4d with no change from previous.</p>
	05/09	EVT-1	<p>Inspected 20 welds: 5 P4 welds with previous indications, 11 for which two-sided UT is not demonstrated (8 P8 and 3P4), and 4 that can only be inspected from one side due to repair clamp</p>

			interferences (BP1, BP2, 2P3, 3P3). No new RI. No change in previous indications.
Core Spray Sparger (BWRVIP-18)	1980 to 1994	VT-1 (1 mil)	IEB 80-13 of welds on sparger. No indications found.
	04/96	EVT-1 or VT-3	EVT-1 performed to intent of BWRVIP-18, on T-box cover plate welds, T-box to sparger welds, end cap welds and bracket welds. VT-3 of spargers and nozzles. Future inspections per BWRVIP-18.
	11/98	EVT-1 MVT-1	End caps, cover plates and tee branch welds were EVT-1 examined. All sparger connections and bracket welds were MVT-1 examined. No reportable indications.
	11/02	EVT-1 of S1,S2, & S4;VT-1 of S3;VT-1 of brackets	Examined all 20 S1, S2, and S4 sparger welds, 50% of the S3a, b & c nozzle welds, and all 12 sparger brackets. Examined for IEB 80-13 and BWRVIP-18. No indications.
	03/05	N/A	No examinations performed.
	05/07	EVT-1	Examined all 20 S1, S2, and S4 sparger welds. No indications.
	05/09	N/A	No examinations performed.
Top Guide (Rim, etc.) (BWRVIP-26, BWRVIP-183)	03/94	VT-1	VT-1 of 4 cells. No indications.
	04/96	VT-1	VT-1 of alignment assemblies. No indications.
	11/98	VT-1	VT-1 of alignment assemblies and adjacent rim welds. No reportable indications.
	10/00	EVT-1	Inspected accessible areas of location 11 in accordance with BWRVIP-26. No reportable indications.

	11/02	VT-3	Examined 9 pin welds (FS/GT-ARPIN-1) per BWRVIP-47. No Indications.
	03/05	EVT-1, VT-1	Alignment pin assemblies at 0° and 270°. NRI. EVT-1 of rim weld. Numerous machined holes identified in the horizontal plate adjacent to the rim weld similar to those found on Unit 2.
	05/07	N/A	No examinations performed.
	05/09	VT-1	Alignment pin assemblies at 90° and 180°. NRI.
		EVT-1	EVT-1 of accessible portions of rim weld. NRI. EVT-1 of 9 top guide grid cells (5%). NRI.
Core Plate (Rim, etc.) (BWRVIP-25)	N/A	N/A	Installed core plate wedges in conjunction with comprehensive shroud repair 1996.
	11/98	VT-1	Wedges inspected in conjunction with shroud repair hardware. No reportable indications.
	05/07	VT-3	Wedges inspected in conjunction with shroud repair hardware. No reportable indications.
Jet Pump Assembly (BWRVIP-41)	03/94	VT-1	Hold down beams, beam bolt keepers, lockplates and retainers; restrainer wedges, stops, and adjusting screws, clamp bolts and keepers; riser brace assemblies, adapter and baffle plate welds, sensing lines and sensing line brackets per various SILS. Latest inspections were in 1994. No reportable indications. Diffuser to baffle plate welds examined. No reportable indications.
	04/96	VT-1	Jet pump riser brace to riser weld at JP 5/6 repaired 1994, repair examined 1996 and 1998, no changes noted. Diffuser to baffle plate welds examined. No

	04/96	UT	<p>reportable indications.</p> <p>One jet pump beam replaced 1986 due to indication. Jet pump beams are UT examined each outage using technique capable of detecting cracking at throat and ears. No subsequent indications.</p>
	11/98	VT-1	<p>Inspected all 20 jet pump assemblies. Identified indication at JP7/8 riser brace to riser weld. Repair installed 4/99.</p>
	11/98	EVT-1	<p>Inspected jet pump riser welds RS-1,-2 &-3. Visually identified 3 indications at JP 19/20 RS-1 weld. Subsequently sized indications with UT. The RS-1 weld was evaluated for at least 24 months of operation with full structural margin without repair.</p>
	10/00	EVT-1	<p>Inspected >50% of high priority welds (DF-2, AD-3a,b, AD-1 &AD-2) in accordance with BWRVIP-41. One recordable indication at JP-16 backing ring adjacent to AD-3a,b oriented axially across backing ring. Expanded sample to include 100% of AD-3a,b welds. Inspected BWR-3 beams at 16 jet pumps with UT (ends and center) in accordance with BWRVIP-41. No reportable indications. The RS-1 weld at JP 19/20 was permanently repaired.</p>
	11/02	EVT-1	<p>EVT-1 of DF-2, AD3-a&b, AD-1, AD-2 for all 20 jet pumps (except DF-2 on JP 11; EVT-1 of RB-1 and RB-2 of pumps 3, 4, 9, 10, 11, and 15-20; EVT-1 of risers on jet pumps 3/4, 9/10, 11/12, 15/16, 17/18, and 19/20; EVT-1 of MX-2, MX-3a&b, and MX-4 on pumps 4, 5, 9, 10, 11, 14/18 and 20; EVT-1 of MX-1 and DF-1 for pumps 6-11, 14-18 and 20; EVT-1 on the risers of pumps 3/ 4, 9/10, 11/12, 15/16, 17/18, and 19/20; VT-1 of AS-1 and AS-2 on pumps 5, 7, 8, and 20, VT-of wedges on jet pumps 16 and 20, VT-1 of</p>

	03/05	EVT-1	<p>clamp at RS-1 on jet pumps 19/10, and VT-3 of existing repair hardware at IN-5 on pumps 6-11, 14-17 and 20.</p> <p>One indication was found on JP 2 at AD-3b and two indications were found on JP 7 at AD-3b.</p> <p>Jet pump sensing line clamps were installed on 8 jet pumps (1, 2, 3, 10, 11, 12, 13, 20).</p> <p>Risers: Six RS-1 welds, five RS-2 welds, and all ten RS-3 welds due to limited exams previously. Examined RS-4 and RS-5 on riser 11/12. Re-examined RB-1b on JP3, RB-2b on JP11 and RB-2a on JP 20. All NRI.</p> <p>Mixers: Examined MX-2 in JP 11 and 14. Examined MX-3a&b on 17 & 18. NRI.</p> <p>Diffuser/Adapter: Examined high priority welds, including 11 AD-1, 12 AD-2, 12 AD-3a,b, and 11 DF-2 (reinspection of JP2, JP7, JP16 known flaws). One additional branch noted on JP16 indication compared to previous exam in 2000. No discernable change in previous indications on JP2 and JP7. No other RI.</p>
	05/07	VT-1, VT-3	Reinspected repair on Jet Pump 19/20 RS-1. NRI
		EVT-1	Re-measured previous indications at AD-3a,b on JP2, JP7 and JP 16. No changes.
		VT-1, VT-3	Inspected all main wedges with no unusual wear noted.
			Inspected one aux wedge and set screw. NRI.
	05/09	EVT-1	71 medium priority components inspected to complete baseline exams. NRI.
		VT-1	Inspected all main wedges with no unusual wear noted. Inspected one aux wedge and set screw. NRI. Replaced one hold down beam on JP05. Installed one

		VT-3	aux wedge on JP05 due to gap discovered during post-installation inspection. Inspected IN-5 bolting. Inspected one JPSL clamp installed in 2007. NRI.
CRD Guide Tube (BWRVIP-47)	11/02	VT-1, VT-3 on CRGT-1; EVT-1 on CRGT-2 & 3	Examined 9 sets of guide tube welds (CRGT-1, CRGT-2, and CRGT-3) and one additional weld (CRGT-2) per BWRVIP-47. No Indications.
	03/05	N/A	No inspections performed.
	05/07	N/A	No inspections performed.
	05/09	VT-3, EVT-1	Examined 9 sets of CRGT-1 and FS/GT-ARPIN (NRI) and 9 CRGT-2/CRGT-3. Metal slivers attached to one CRGT-2 from initial manufacture.
CRD Stub Tube (BWRVIP-47)	N/A	N/A	N/A
In-Core Housing (BWRVIP-47)	N/A	N/A	N/A
IRM/SRM Dry Tubes (SIL 409)	03/94	VT	Replaced 2 dry tubes 1994.
	03/96	VT	Replaced 5 dry tubes in 1996.
	10/00	MVT-1	Inspected original dry tubes at 7 locations. No recordable indications.
	11/02	VT-1	Examined 5 dry tubes. Verified plungers engaged at Top Guide. No Reportable Indications.
	04/05		All remaining original dry tubes (5) replaced.
Standby Liquid Control (BWRVIP 27)	04/05	PT	Nozzle To Safe End, N10-F1. NRI
	05/09	PT	Nozzle To Safe End, N10-F1. NRI
Instrument Penetrations	N/A	N/A	N/A

(BWRVIP-49)			
Vessel ID Brackets (BWRVIP-48)	03/94	VT-1 and VT-3	Section XI inspections of jet pump riser brace, dryer, feedwater sparger, core spray, and surveillance capsule holder brackets, performed once per interval. VT-3, or VT-1 if in beltline region. No indications noted.
	04/05	VT-1, VT-3	Examined two Moisture Separator shroud guide rod support brackets. Minor gouges and bent top pins. No changes since previous inspection in 11/03 (F51).
		VT-3	Examined two steam dryer guide rod support brackets upper and lower (four inspections). NRI
		EVT-1, VT-3	Examined four steam dryer wall support lugs. NRI
		VT-1, VT-3	Examined six upper and six lower surveillance sample bracket attachments to RPV and sample holders. NRI except for one sample holder that was not engaged in the lower bracket. Bracket was re-engaged during the outage.
		EVT-1, VT-3	Examined eight feedwater sparger end-bracket assemblies. Five of eight had less than three protruding threads. Tightened and applied additional tack welds.
		VT-3	Examined eight feedwater sparger lug to vessel attachment welds. NRI.
	05/07	EVT-1, VT-3	Examined four steam dryer wall support lugs (WSL). Rub marks/gouges from dryer lifting noted on cladding at three of the four WSLs. Re-examined one bent Moisture Separator guide rod support bracket. No change since 2003.
	05/09	EVT-1, VT-3	Examined four steam dryer wall support lugs (WSL). Rub marks/gouges from

			dryer lifting noted on cladding at three of the four WSLs. Re-examined one bent Moisture Separator guide rod support bracket. No change since 2003.
RPV Internal Surfaces (Cladding) (ASME B.N.1)	03/96	VT-3	Examined one patch. NRI.
	11/98	VT-3	Examined four patches. NRI.
	11/02	VT-3	Examined all accessible surfaces. NRI
	03/05	VT-3	Examined all accessible surfaces. Minor acceptable indentations.
	05/07	VT-3	Examined all accessible surfaces. Two new acceptable indentations identified.
	05/09	VT-3	Per approved Relief Request, Section XI B-N-1 exam credited to sum of BWRVIP exams
LPCI Coupling	N/A	N/A	Not applicable to this plant.
Steam Dryer (SIL 644, BWRVIP-139)	03/05	Best effort VT-1, VT-3	The steam dryer was originally scheduled to be replaced during Q1R18, but was not ready in time (the dryer was later replaced in May 2005). The following inspections were then performed during Q1R18: Examined exterior surfaces including outer hoods, historical repair areas, tie bars and attachment welds, four lifting assemblies, four hold down assemblies, two man way covers, cover plates, gussets, upper ring welds, vertical guide welds, outlet plenum lower horizontal welds, outlet plenum vertical welds, and perforated plates. Previous indications were identified that had been repaired, stop drilled or dispositioned to use as is in 2003. Additional indications were noted in the perforated plates. Examined interior surfaces including: drain channel welds, supports, vertical and horizontal plates, support ring, horizontal cross beams, and horizontal

			cross beam gussets. Previous indications were identified that had been repaired, stop drilled, or dispositioned to use as is in 2003. New indications were observed in dryer bank vertical welds and vertical struts in the ID. Examined interior and exterior skirt. Indications noted. Dryer was repaired and returned to service prior to replacement in May 2005.
	05/06	Best Effort VT-1, VT-3	Performed baseline inspection of new steam dryer installed in June 2005 per BWRVIP-139 and GE recommendations. NRI
	05/07	Best Effort VT-1, VT-3	Performed inspection steam dryer per BWRVIP-139 and GE recommendations. NRI
	05/09	Best Effort VT-1, VT-3	Repeated inspections on steam dryer per BWRVIP-139 and GE recommendations (same scope as 2006 and 2007). NRI
Feedwater Spargers (NUREG 0619)	1982	Manual UT	UT of all four N4 nozzles and inner radii. NRI
	1986	Manual UT	UT of all four N4 nozzles and inner radii. NRI
	1989	Manual UT	UT of all four N4 nozzles and inner radii. NRI
	1992	Manual UT	UT of all four N4 nozzles and inner radii. NRI
	1996	Manual UT	UT of all four N4 nozzles and inner radii. NRI
	1998	UT (GERIS)	UT of all four N4 nozzles and inner radii. Acceptable.
	2002	UT (GERIS)	UT of all four N4 nozzles and inner radii. Acceptable.
		EVT-1/VT-	Examined all 8 Sparger end brackets per

		3	NUREG-0619 program and BWRVIP-48. No indications.
	04/05	VT-1, VT-3	Visual inspection of sparger flow holes and welds. Slight distortion noted in one flow hole. A small piece of wire found in one flow hole. All FW sparger end bracket stop nuts were run up and tacked welded into place.
	05/07	VT-1, VT-3	Examined all 8 Sparger end brackets. Top of pins are wearing into top side of bracket on 3 end brackets. Performed VT-1 of flow holes. NRI.
	05/09	VT-1, VT-3	Examined all 8 Sparger end brackets. Top of pins are wearing into top side of bracket on 3 end brackets. New (slight) wear identified on two brackets. No change in previous wear on 3 other brackets.
Dissimilar Metal Welds (BWRVIP-75-A Cat. A)	05/09	N/A	Four Category A DM welds examined per ASME Section XI, Appendix VIII, Supplement 10. All of the exams were automated. No flaws were identified and no weld overlays were performed.
Dissimilar Metal Welds (BWRVIP-75-A Cat. B)	05/09	N/A	No Category B DM welds examined
Dissimilar Metal Welds (BWRVIP-75-A Cat. C)	05/09	UT	Examined 5 Category C DM welds per BWRVIP-75 and ASME Section XI, Appendix VIII, Supplement 10 (out of a total of 15 Category C welds that were examined). No flaws were identified and no weld overlays were performed. All of the exams were automated. None of the welds contained Alloy 82/182 butter.

Reactor Internals Inspection History

Plant: Susquehanna Unit #2

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	1993, 1995, 1996, 1997, and 2001 results.		<p>Unit #2 7RIO, circumferential welds H1 through H7 inspected ultrasonically using the GE OD Tracker system. Cracking found in H1 (21⁰), H2 (94⁰), H4 (68⁰), H5 (5⁰), and H6B (121⁰). Structural margins were maintained based on BWRVIP documents GENE-523-113-0894, Rev. 1, and Supplement 1, Rev. 1, and independent calculations.</p> <p>Unit #2 8RIO (Spring 97), no shroud inspections scheduled based on inspection results of Unit #1 Shroud in fall of 1996.</p> <p>Unit 2 9RIO (Spring 1999), Welds H1, H2, H4 and H6B were examined this outage. Each of these welds exhibited cracking in the past. H4 was the worst weld showing 47.6% flawed in the circumferential direction. Analysis showed that 10 years of operation before reinspection was possible while maintaining adequate safety factors. No Recordable Indications for the 5 vertical welds inspected.</p>
	2003	VT-3	Vertical Welds H6B/H7 at 90° and 270° to determine possible sources of interference to develop tooling necessary for future EVT-1
	2005	EVT-1	Three Vertical Shroud Welds, No Recordable Indications
		UT	GE OD Tracker for H3, H5, H6A, and H7. H3 No Recordable Indications, H5,

	2007	EVT-1	H6A, H7 increase in % flawed from 1995 baseline exams. All welds acceptable per BWRVIP-76 flaw analysis.
	2009	EVT-1	Two Vertical Shroud Welds, No Recordable Indications
		UT	Eight vertical shroud welds. No Recordable Indications.
			GE OD Tracker for H1, H2, H3, H4, H6A, H6B. Increase in percent flawed from previous exams for all welds except H6A. All welds acceptable per BWRVIP-76 flaw analysis.
Shroud Support	To date	VT-1, VT-1 enhanced, and UT	VT-1 of 0° to 360° of H8 and H9 during the first interval with no recordable indications.
			Inspect (VT-1) every outage. No Recordable Indications to date.
			VT-3 of all 14 shroud support legs and support leg stub pad to RPV attachment welds per BWRVIP-38. No Recordable Indications.
			VT-1 examinations were performed on shroud weld H8 at 180 deg. to verify a previously noted crack adjacent to the access hole cover. The indication was determined to be non-relevant due to dark grit built up at the weld toe.
H8/H9		EVT-1	Unit #2 7RIO (Fall 95) examined H8 and H9 (enhanced VT-1) for 360°. No Recordable Indications.
		UT	Unit #2 8RIO (Spring 97) UT of H9 from vessel OD and VT-1 enhanced of H8. No Recordable Indications.
	2003	EVT-1 / VT-3	EVT-1 of H8 to satisfy BWRVIP-38 and VT-3 of H8 and H9 underside VT-3

			inspections performed with GE remote firefly inspection vehicle down diffuser inlet mixers removed for modification. No Recordable Indications.
	2009	EVT-1 /VT-3	EVT-1 of H8 to satisfy BWRVIP-38 and VT-3 per ASME XI. No Recordable Indications.
Shroud Support Legs	2003	VT-3	Shroud Support legs inspected during Jet Pump Beam replacements. No Recordable Indications.
Access Hole Covers	2003 / 2007	VT-1	VT-1 of AHC welds at 0 and 180 degrees. No Recordable Indications.
	2009	EVT-1 /VT-3	EVT-1 of 0 and 180 degree AHC to satisfy BWRVIP-180 and VT-3 per ASME XI. No Recordable Indications.
Shroud Head Bolts	2005	UT	UT exam of 43 "Old Style" Shroud Head Bolts per SIL 433. No Recordable Indications.
	2007	VT-3	VT-3 of Shroud Head bolts windows and pins for wear. Window / Pin wear discovered in 30 of 48 bolts. All acceptable one cycle. Two to be replaced next outage.
	2009	UT	UT exam of 41 "Old Style" Creviced" Shroud Head Bolts per SIL 433. No Recordable Indications.
		VT-3	VT-3 of two bolts that exhibited above normal wear in 2007. No change in condition noted. Bolts acceptable.
Core Spray Piping	1980's to 1995	VT-1, VT-3	Piping and welds in annulus. No Recordable Indications.
	1997	VT-1 enhanced	Unit #2 8RIO (Spring 97) Inspect per BWRVIP-18, no recordable indications.
	1999	EVT-1	Inspect per VIP-18, no recordable indications.

	2001	EVT-1 & UT	10 RIO Inspect per VIP-18 Two indications were recorded, one on the P5 weld and one on the P8b weld. Both indications were evaluated to have expected lifetimes of 7.9 and 18.4 years respectively.
	2003	EVT-1	Examined core spray piping welds per BWRVIP-18 that were not inspected previous outage by UT, P4D, 7deg, P8A both loops 7, 170, 187, and 352 degrees. No Recordable Indications. Also EVT-1 of welds with indicated defects by previous UT, welds P5 352 degrees and P8B 187 degrees. No visible defects detected. Since defects are not visible through visual exam they are confirmed as subsurface.
	2005	EVT-1	BWRVIP-18A - EVT-1 of welds that do not have approved UT procedure and containing flaws. Scope similar to 2003 exams. No Recordable Indications. Note: It was determined that the P8B welds contain a site-specific double weld configuration; UT exam is not acceptable for collar to shroud weld. EVT-1 performed for BWRVIP-18A compliance.
		UT	UT exam by CSI 2000 of Core Spray piping welds per BWRVIP-18A. Welds examined both loops, P2, P3, P3, P6, and P7. Rotating sample of one each P4A, P4B, P4C, P4D welds. No Recordable Indications. P5 352 degrees P8B 187 degrees no growth in previously identified flaws.
	2007	EVT-1	BWRVIP-18A of welds that does not have an approved UT technique, P8A, P8B welds and 1 P4C weld and one P5 weld with UT discovered flaw. No Recordable Indications.

	2009	VT-1 EVT-1	All 8 piping brackets and welds, PB. Core Spray piping per BWRVIP-18A. All P2, P3, P5, P6, P7, P8A, and P8B welds. Two each P4A-D. One 2.5" crack in Cover Plate base metal adjacent to base metal gouge, Use As Is. No Recordable Indications in welds.
Core Spray Sparger	1980's 1995	VT-1,VT-3	Unit #2 8RIO (Spring 97) Inspect per BWRVIP-18. Several Shroud Core Spray Support Bracket welds found with cracking on shroud ID. Determined acceptable to Use-as-is.
	1997	VT-1, VT-3	
	2001	EVT-1	Inspect per VIP-18, no recordable indications.
	2003	EVT-1 / VT-1	Examined all four upper and lower spargers, EVT-1 S1 S2 S4 VT-1 S3a, S3b, S3c(lower), and sparger brackets welds (VT-3), per BWRVIP-18. No Recordable Indications. SB-03 reinspection of previous indication. Approximately 3" crack visible next to SB03 in shroud. Crack in shroud adjacent to SB03 evaluated as crack in vertical shroud weld per BWRVIP-76. Structural margins maintained.
	2005	EVT-1 / UT	EVT-1 exams of all 12 Core Spray Spargers Brackets (SBs). SB03 previous indication in shroud side. New indications found in shroud outside of HAZ during inspection of SB-02, SB-04, SB-11. UT performed utilizing GE Tracker tool for sizing of defects in shroud. BWRVIP-76 vertical weld defect acceptance criteria employed. All indications acceptable for multiple cycles.
	2007	EVT-1 / VT-1	Examined all four upper and lower spargers, EVT-1 S1 S2 S4 VT-1 S3a, S3b, S3c(lower), and sparger brackets

	2009	EVT-1 / VT-1	<p>welds (VT-3), per BWRVIP-18A. No Recordable Indications.</p> <p>EVT-1 of four brackets with previous indications on shroud side bracket welds HAZ. Additional cracking discovered in two brackets. VT-1 of eight brackets with no previous indications. Shroud side HAZ cracking observed in three brackets.</p>
Top Guide (Rim, etc.)	To 1995	VT-3	(VT-3) of accessible cells up to percentage of total over the interval (lower surfaces only). Also, inspection of hold-down bolts. Minor misalignment (bowing) of several cross-members of top guide.
		VT-3	<p>Unit #2 7RIO (Fall 95). Eight cells lower surfaces and inspected wedges. No Recordable Indications.</p> <p>Unit #2 8RIO (Spring 97). Ten cells lower surfaces, no recordable indications.</p>
	2003	VT-1	VT-1 of 22 Top Guide locations per BWRVIP-26. No Recordable Indications.
	2007	VT-3	Four VT-3 Code ASME XI exams made accessible during BWRVIP-47 Guide Tube exams. No Recordable Indications.
	2009	EVT-1	Three EVT-1 exams to satisfy BWRVIP-183. Two small, one-quarter inch each, cracks in one beam of one cell. Evaluated as acceptable.
Core Plate (Rim, etc.)	to date	<p>VT-1 of surface welds and bolt tack welds on upper surfaces</p> <p>VT-3 of</p>	Unit #2 6RIO (Spring 94) Inspected once 900 of plate and bolting accessible. No Recordable Indications. Following this inspection and the questionable value added, no further exams performed pending VIP recommendations.

		bolt and upper surface and cross-members	
	2003	VT-3	VT-3 of core support plate welds and core support plate, VT-3 18 of 34 Core Supports bolts from below core plate made accessible through removal of jet pumps for modification. No Recordable Indications.
	2007	VT-3	Four VT-3 Code ASME XI exams made accessible during BWRVIP-47 Guide Tube exams. No Recordable Indications.
	2009	VT-3	Three VT-3 Code ASME XI exams made accessible during BWRVIP-47 Guide Tube exams. No Recordable Indications.
SLC	1992	VT-3	Unit #2 5RIO (Fall 92) One side of the Standby Liquid Control Standpipe was inspected. Disassembly of the jet pumps for a Power Uprate modification made inspection possible. No Recordable Indications were found.
	2003	VT-3	VT-3 of SBLC piping per BWRVIP-027. No Recordable Indications.
	2005 / 2007/2009	Enhanced VT-2	Enhanced VT-2 Per BWRVIP-27A of SLC Nozzle and Safe-End. No Recordable Indications.
Jet Pumps	1993	VT-1, VOL, VT-3	Riser brace welds inspected every other outage. Jet pump beam volumetrics once in ten years. Remaining components (welds (VT-1), set screws (VT-3), wedges (VT-3), sensing line clamps (VT-1 & VT-3), tack welds (VT-1), etc are once per period. Jet pump beams replaced
	1994		Unit #2 6RIO (Spring 94) Beams replaced. One old beam found cracked in leg area. Non-rejectable gaps in

			setscrews reported over several outages.
	1997		Unit #2 6RIO (Spring 94) cracked welds on #13 and #14 instrument lines. Repaired with clamps.
	1999		Unit #2 (Spring 97) Weld #3 baselined. No Recordable Indications.
	2001	VT-1	Inspected per VIP-41, no recordable indications
Riser Brace	2003	EVT-1	Inspected per VIP-41, excessive gaps, wedge wear and slider rod damage on various jet pumps. Auxiliary temporary spring wedges installed on Jet Pumps 03 and 17.
	2005	VT-1	RB 1a, b, c and RB 2 a, b, c, d for Riser D No Recordable Indications.
	2007	EVT-1	VT-1 Expanded Inspection Scope of Riser Brace welds RB-1A, B, C, D and RB-2 A, B, C, D for Jet Pump Riser K due to jet pump wedge wear. BWRVIP-41 expanded scope exam. No Recordable Indication
	2009	EVT-1	RB1a, b, c, d, and RB 2 a, b, c, d for Riser Brace F and H. Expanded scope inspections for Riser brace G due to jet pump set screw gaps. No Recordable Indications.
Riser Pipe	2003	EVT-1	RB1a, b, c, d, and RB 2 a, b, c, d for Riser Brace C and E. No Recordable Indications.
	2005	EVT-1 / VT-1	RS1 RS2 RS3 for risers C,D,E RS6 RS7 RS8 and RS9 for Riser C No Recordable Indications.
			EVT-1 RS-6and RS-7 for Jet Pumps 05 and 06 for BWRVIP-41 baseline credit. BWRVIP-41 expanded scope exam VT-1 of RS-6and RS-7 for JP08, JP12, JP19,

			and JP20 due to wedge wear. No Recordable Indications.
	2007	EVT-1	EVT-1 RS-6 and RS-7 JP20 Risers F and H RS-8 and RS-9 welds. RS1, RS2, RS3 for risers F, H No Recordable Indications.
	2009	EVT-1	RS1, RS2, RS3 for jet pump risers B, D, E, G, H. No Recordable Indications 24 Medium Priority RS6, RS7, RS8, RS9 original scope. Expanded scope RS6, RS7, RS8, RS9 for 18 additional exams due to wedge wear scope expansion. No Recordable Indications
Diffuser	2003	EVT-1	IN-4 and MX2 for jet pumps 07,09,10 DF-1 for jet pumps 07, 09, 10, 13,14, 17, 18 DF2 inspected for jet pump 05, 06, 07, 08, 09, 10 AD-1 and AD-2 welds for all 20 jet pumps, Eight AD-2 welds from ID when inlet mixers removed. No Recordable Indications.
	2007	EVT-1	EVT-1 IN-4 JP11 and JP12 No Recordable Indications.
	2009	EVT-1	46 Medium and High Priority welds, AD1, AD2, DF1, DF2, MX2, IN4. No Recordable Indications.
Adjusting Screws	2003	VT-1	Set screw gap inspection for all 20 jet pumps for pre and post modification inspection. One gap exceeded 10 mils during final inspection, spring wedge installed. Also several cracked set screw tack welds observed, Use-As-Is.
	2005	VT-1	VT-1 of set screws for those jet pumps exhibiting wedge wear or movement, JP08, JP12 (Movement only), JP19, JP20. JP19 excessive gap, auxiliary wedge installed. Two cracked tack welds observed Use-As-Is.
	2007	VT-1	VT-1 of set screws for those pumps with

Assembly	2009	VT-1	<p>previous wedge wear observed in 2005, JP08, JP12, JP19. Cracked tack welds observed, Use-As-Is.</p> <p>AS1 set screw gap inspection for three jet pumps with set screws “digging into” belly band. Four AS2 exams for jet pump with existing cracked tack welds. Six exams for previously installed auxiliary spring wedges. Fourteen additional AS1 and AS2 exams based on jet pump wedge wear scope expansion. Results:</p> <ul style="list-style-type: none"> • Set screw digging into belly band – JP01, JP04 (SS and VS), and JP12. • Additional cracked tack weld: JP13 • Auxiliary Spring Wedge digging into belly band – JP03 SS, JP19 SS, JP20 SS • Excessive set screw gap: JP01 • Auxiliary Spring Wedge past maximum allow travel distance JP03SS • Excessive downward vertical wedge movement: JP12 • New auxiliary spring wedges installed <ul style="list-style-type: none"> ○ JP01 SS and VS GAPS ○ JP12 SS and VS <p>Excessive vertical wedge movement</p> <ul style="list-style-type: none"> ○ JP03SS End of travel
	2003	EVT-1	<p>Labyrinth Seal EDM cutting modification performed on all 20 jet pump inlet mixers. Damaged wedge assemblies replaced. Damaged rods replaced. Restrainer brackets resurfaced. Post modification inspection on inlet mixer, set screw gaps and wedge heights.</p> <p>Post modification inspection revealed 3</p>

			inlet mixers with uneven EDM burn due to non-conductive material in mixer. Use-As-Is.
	2005	VT-1	VT-1 of all 20 Jet Pump wedges, WD-1 exam and replacement hardware installed in 2003, (wedge rods and auxiliary clamp) for 1 cycle inspection for damage from labyrinth seal modification in 2003. Moderate wedge wear in JP19. Slip Joint clamp installed to reduce vibration. Minor wedge damage in JP08, JP19, and movement noted for JP12 wedge. All Use-As-Is. Expanded inspection scope for damage to riser brace and piping for those Jet Pumps with wedge damage or movement. No No Recordable Indications. .
	2007	VT-1	VT-1 of all 20 Jet Pump wedges and rods, WD-1 exam and replacement hardware, one auxiliary spring wedge, installed in 2005. Minor wedge wear on 6 jet pumps. Expanded visual exams revealed large gap at one set screw for two jet pumps. Auxiliary spring wedges for both vessel side and shroud side installed. Minor rod wear observed on 14 rods. Major wear on 2 rods, for one cycle to be replaced next outage. Cracked tack welds and indentations into belly band Use-As-Is Auxiliary spring wedge installed in 2005 at end of travel. New spring wedge installed in place.
	2009	VT-1	VT-1 of all 20 wedges to support EPU and determine if additional wedge wear has occurred. Scope expansion required for two jet pumps due to wear or wedge movement. <ul style="list-style-type: none"> • Additional minor wedge and/or rod wear for 13 jet pumps - JP01, JP02, JP03, JP04, JP07, JP09,

			JP11, JP12, JP13, JP15, JP18, and JP20.
Sensing Line	2003	VT-3	Inspection of two Jet Pump sensing lines welds and supports per BWRVIP-041 and Power Uprate. No Recordable Indications.
	2005	VT-3	VT-3 for sensing lines with clamps installed for power up-rate vibration considerations or defect mitigation. No Recordable Indications.
	2007	VT-3	Inspection of two Jet Pump sensing lines welds and supports per BWRVIP-041 and Power Uprate. No Recordable Indications
	2009	VT-3	VT-3 for sensing line clamps due to Power Uprate vibration consideration or defect mitigation. Crack detected in support to line weld, Lack of Contact between clamp and pipe and evidence of movement.
JP Beams	2005	UT	UT exam for all 20 Jet Pump beams, BB-1, BB-2, BB-3 regions per BWRVIP-41. No Recordable Indications.
CRD Guide Tubes	2003	EVT-1 and VT-3	EVT-1 and VT-3 of CRGT-1, -2, -3 and FS/GT-ARPIN on 9 guide tubes. No Recordable Indications.
	2007	EVT-1 and VT-3	EVT-1 and VT-3 of CRGT-1, -2, -3 and FS/GT-ARPIN on 4 guide tubes. No Recordable Indications
	2009	EVT-1 and VT-3	EVT-1 and VT-3 of CRGT-1, -2, -3 and FS/GT-ARPIN on 4 guide tubes. No Recordable Indications
CRD Guide Tubes OD	2003	VT-3	Inspected 52 CRD Guide Tubes OD in lower plenum periphery made accessible through removal of jet Pumps for modification per BWRVIP-47 guidelines. No Recordable Indications.

			VT-3 of 40 stub tubes and attachment welds to RPV per BWRVIP-47 guidelines. No Recordable Indications.
Dry Tubes	to date, every other outage	VT-1	VT-1 inspections of 3 dry tubes per SIL-409. One tube plunger separated and missing from tube. One tube linear indication in creviced area. Both damaged tubes replaced.
	2003	VT-3	VT-3 examination of remaining 9 dry tubes to determine if plungers still present. No Recordable Indications.
	2005	VT-3	VT-3 examination of remaining 6 dry tubes to determine if plungers still present. No Recordable Indications.
Instrument Penetrations	1986 to present	VT-2	VT-2 Exams during RPV pressure test each outage.
Vessel Brackets	to date	VT-1 and VT-3	<p>1989 Section XI inspections of jet pump riser brace, dryer, feedwater brackets, core spray header brackets, and surveillance capsule holder brackets, performed once per interval.</p> <p>Measurable but acceptable wear</p> <p>VT-3 Examinations were performed on the dryer support brackets and attachment welds located at 4, 94, 184 and 274 degrees. No new indications were observed. Previously recorded wear on support lug "D" at 274 deg. was verified and no additional wear noted.</p> <p>VT-3 (VT-1 beltline) exam of Guide rod Bracket, Steam Dryer Hold down brackets, Surveillance Brackets. EVT-1 of seven sets of Jet Pump Riser Brace to Pad Welds and EVT-1 of all eight Core Spray Brackets to RPV attachment welds. All inspections per BWRVIP-048</p>

	2005	VT-3	VT-3 of one Steam Dryer Hold Down Bracket per ASME XI / BWRVIP-48. No Recordable Indications.
	2007	VT-3	VT-3 of 274 degree dryer support bracket. Bracket wear was never quantified during prior exams. Expanded scope to other dryer support brackets. No Recordable Indications.
	2009	EVT-1 / VT-3	Two Jet pump riser support brackets to vessel. Eight feedwater bracket to vessel welds. No Recordable Indications.
		VT-1 / VT-3	Guide Rod brackets No Recordable Indications.
		EVT-1	EVT-1 of six jet Pump riser support bracket to vessel welds (three pair)
		VT-1/VT-3	Three surveillance specimen brackets. No Recordable Indications.
		VT-3	One each Dryer Hold down bracket and Guide Rod Bracket. Minor rubbing/wear marks on guide rod. All attachment welds, No Recordable Indications.
		EVT-1/VT-3	Dryer Support Brackets (four) Pre and post EDM to support EPU new dryer VT-3 to establish new baseline. EVT-1 post EDM of bracket surface and EVT-1 of bracket to vessel welds. No Recordable Indications.
LPCI Coupling	N/A	N/A	Not applicable to this plant
Steam Dryer	2005	VT-1	VT-1 exam of all steam dryer components per GE SIL 644 Rev. 1 and BWRVIP-139 in anticipation of EPU. Inspections included Hood Panel Welds, Lifting Lugs, Drain Channel Welds, Hood/End Panel Welds, Steam Dam to Hood Joint Welds, Tie Bar Welds, Vane Bundle to Vane Assembly, and all previously identified indications. Minor

	2007	VT-1	<p>growth in existing minor IGSCC cracks some new IGSCC minor cracks in Drain Channel and Hood/End Panel Welds. Existing Vane Bundle Assembly to Seam Dam weld grew in length from 10" in 2003 to 14" in 2005. Entire flaw length repaired through underwater welding.</p> <p>VT-1 of welds with previous indications and those weld types with defects that required weld repair last two outages. Minor growth in lifting lug tack weld. Acceptable. No other growth or defects noted.</p>
	2009	VT-1	VT-1 Baseline post-construction of new steam dryer. No Recordable Indications.
Steam Separator	2007	VT-1	VT-1 of 25% of support ring to gusset welds. Minor IGSCC cracks found in 9 welds. Use-As-Is.
	2007	VT-3	VT-3 of all tie bars. Two severed tie bars found, loose ends cut back to attachment welds.
	2009	VT-1	VT-1 of additional 25% of support ring to gusset welds. Minor IGSCC cracks found in 19 welds. Use-As-Is. Nine re-looks at welds with previous indications, no growth detected.
Feedwater Spargers and Brackets	2007	VT-1 / VT-3	VT-1 of feedwater sparger welds and nozzles. VT-3 of brackets for OE for pin wear into bracket top.
Miscellaneous DM Welds	2009	UT	During the U2-14RIO, fifteen (15) dissimilar metal (DM) IGSCC Category C welds containing Alloy 82/182 weld material and two (2) IGSCC Category C welds containing stainless steel weld material were examined to the requirements of ASME Section XI, Appendix VIII, Supplement 10, using automated ultrasonic equipment or manual ultrasonic examination. No failures were identified. Additionally,

			one IGSCC Category C weld was modified to an IGSCC Category A weld during the outage, decreasing the total Susquehanna Unit 2 IGSCC Category C population from 22 to 21.
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