

BWRVIP BWR Vessel & Internals Project _____ 2002-156

June 10, 2002

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

Attention: C. E. Carpenter

Subject: Project No. 704 – BWR Vessel and Internals Inspection Summaries for Fall 2000
and Spring 2001 Outages

Enclosed are ten (10) copies of each of the following documents:

1. “BWR Vessel and Internals Project, Vessel Internals Inspection Summaries for Fall 2000 Outages, June 2002”
2. “BWR Vessel and Internals Project, Vessel Internals Inspection Summaries for Spring 2001 Outages, June 2002”

The information provided in the enclosed documents 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. This information is being used by the BWRVIP to track the material performance of the associated vessel internal components. The enclosed documents are being provided to the NRC for information only.

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

Representatives of the BWRVIP would be pleased to meet with the NRC staff to discuss any comments or questions related to the enclosed documents. If you have any questions on the enclosed documents or the general subject of inspection results, please call Vaughn Wagoner, BWRVIP Integration Committee Technical Chairman, Carolina Power & Light Company, at 919.546.7959.

Sincerely,



Carl Terry
Constellation Nuclear – Nine Mile Point LLC
Chairman, BWR Vessel and Internals Project

DO 58

BWR Vessel and Internals Project

**Vessel Internals Inspection Summaries
for Fall 2000 Outages**

June 2002

Table of Contents

<u>Plant</u>	<u>Page</u>
1. Dresden Unit 3	3
2. James A. FitzPatrick Nuclear Power Plant	7
3. LaSalle County Station Unit 2	15
4. Oyster Creek Nuclear Generating Station	17
5. Peach Bottom Atomic Power Station, Unit 2	23
6. Quad Cities Unit 1	28

Reactor Internals Inspection History

Plant: **Dresden Unit 3**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	4/94-R13	EVT-1 and UT	Inspections per SIL 572, extensive indications in circumferential welds.
	4/97-R14	EVT-1 and UT	Inspected all shroud repair design reliant structure prior to installation of comprehensive repair (4 GE designed tie-rod assemblies). Inspections consisted of EVT-1 of all ring segment welds (accessible surfaces), UT for minimum ligament of all vertical welds accessible to scanner and EVT-1 for minimum ligament on all accessible surfaces of all vertical welds not accessible to the scanner.
	2/99-R15	VT-1	Examined all four tie-rod assemblies at locations specified by the manufacturer (GE).
	10/00-R16	UT	Examined a 40° segment of H4 to assist in shroud qualification of Core Spray Repair. NRI.
Shroud Support	4/94-R13	UT/VT-1	Access hole cover VT/UT for circ and radial flaws. No indications identified.
	4/97-R14	EVT-1	Examined H8 and H9 for about 12" at 4 locations of shroud repair hardware attachment areas.
	2/99-R15	EVT-1	Per BWRVIP-38: Examined H8 and H9 between Jet Pumps 20 and 1 (312°-357°). NRI. Requirements for this inspection cycle are satisfied.
Core Spray Piping	1980's Through	VT-1 (1MIL)	IEB 80-13 (1 MIL) VT-1 of piping and welds in annulus. Indications observed at

	1994		two lower elbow to pipe welds 2P4c and 4P4c. These welds were repaired using GE designed clamps.
	4/97-R14	UT/EVT-1	UT Baseline inspections per BWRVIP-18 of all piping circ welds in annulus. Repairs removed and not reinstalled. EVT-1 of any piping welds in annulus inaccessible to scanner. Additional flaws identified on 1, 2 and 3P8a welds.
	2/99-R15	EVT-1	EVT-1 examined undemonstrated welds P8a and P4d on all four downcomers. Installed a "bumper" repair on 1P8a at the 80° downcomer.
	9/00-R16	UT/EVT-1	UT of "Target" welds and EVT-1 of all undemonstrated welds. Also EVT-1 of welds made inaccessible from repair installed on the 80° downcomer including 1P7, 1P4c, 1P4d, 1P8a and b. Welds 2P4c and 4P4c exhibited flaw growth as predicted by Flaw Evaluation.
Core Spray Sparger	1980's Through 1994	VT-1(1 mil)	IEB 80-13 (1 MIL) VT-1 of spargers and tee-boxes. NRI.
	4/97-R14	EVT-1, VT-3	EVT-1 of tee-box cover plate welds, tee-box to sparger arms, and sparger end caps; VT-3 of spargers and nozzles. NRI.
	10/00-R16	EVT-1, VT-3	Per BWRVIP-18: EVT-1 of all S1, S2 and S4. VT-1 of 50% of S3. NRI.
Top Guide (Rim, etc.)	4/94-R13	VT-1	VT-1 of 5 cells. No indications.
	4/97-R14	VT-1, EVT-1	VT-1 of all 4 alignment assemblies. EVT-1 of rim to bottom plate weld at 4 locations.
	10/00-R16	EVT-1	Examined 0° and 270° top guide alignment assembly welds and adjacent rim weld 11 per BWRVIP-26. NRI.

Core Plate (Rim, etc.)	4/97-R14	N/A	Install core plate wedges in conjunction with comprehensive shroud repair.
	2/99-R15	VT-1	Examine wedge after one cycle of operation per manufacturer (GE) recommendations. NRI.
SLC	N/A	N/A	N/A.
Jet Pump Assembly	4/94-R13	VT-1	<p>Hold down beams, beam bolt keepers, lockplates and retainers; restrainer wedges, stops, and adjusting screws, clamp bolts and keepers; riser brace assemblies, adapters and baffle plate welds, sensing lines and sensing line brackets per various SILS.</p> <p>Prior to R13, visually inspect 100% of upper areas of each Jet Pump every other outage.</p>
Jet Pump Beams	4/94-R13	UT	Jet pump beams are UT examined each outage using technique capable of detecting cracking at throat and ears. Beams were not replaced with improved heat treatment. All are original BWR3 style beams.
	4/94-R14	UT	Two beams with indications replaced.
	2/99-R15	UT	Inspected 100%. NRI.
	10/00-R16	UT	Two beams with indications replaced with BWR4 beams.
Jet Pump Restrainer Gate Wedges	2/99-R15	VT-1	Per BWRVIP-41: Examined all twenty WD-1 locations. NRI. Inspection requirement for next two inspection cycles satisfied.
Jet Pump Wall Braces	4/94-R13	VT-1	Riser brace arm to yoke welds on 3 upper riser braces found cracked. Unit 3 has a redundant set of riser braces so no repairs required. No other reportable indications.

	2/99-R15	EVT-1	Per BWRVIP-41, all twenty RB-1, 2, RS-8 and RS-9. NRI.
Jet Pump Risers	4/97-R14	EVT-1	All ten RS-1, 2 and 3. NRI.
	2/99-R15	EVT-1	Per BWRVIP-41: Examine all ten RS-4 and RS-5. This cycle complete. NRI.
Jet Pump Mixer	2/99-R15	EVT-1	Per BWRVIP-41: Medium Priority: 50% of MX-1, MX-3 and IN-5 welds. This cycle complete. NRI.
Jet Pump Diffuser	4/94-R13	VT-1	Diffuser to baffle plate welds on all 20 jet pumps. NRI.
	2/99-R15	EVT-1	Per BWRVIP-41: High Priority: 50% of DF-2, AD-1, 2 and 3 meets "next outage" requirement. Medium Priority: 50% of DF-1. This inspection cycle complete. NRI.
CRD Guide Tube	10/00-R16	EVT-1	Per BWRVIP-47: examined CRGT-1, 2 and 3 on D10. NRI.
CRD Stub Tube	4/97-R14	MVT-1	MVT-1 (1mil), CRD H7. NRI.
In-Core Housing	4/97-R14	MVT-1	ICH/RPV-1 and ICHGT/ICH-1, two inspected from cell H7. NRI.
Dry Tube	4/94-R13	VT-1	Identified one cracked dry tube (24-37). Replaced. Examined every other outage to date.
	2/99-R15	N/A	Not Examined. Per Reutter-Stokes recommendation, have not yet reached manufacturer's service life.
Instrument Penetrations	N/A	N/A	N/A
Vessel ID Brackets	4/94-R13	VT-1	Section XI inspections of jet pump riser brace, dryer, feedwater sparger, core spray, and surveillance capsule holder brackets, performed once per interval. NRI.
	10/00-R16	VT-1	ASME Section XI B-N-2, surveillance capsule holder attachments in beltline. All six sets examined. NRI.
LPCI Coupling	N/A	N/A	Not applicable to this plant.

Reactor Internals Inspection History

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

	Fall 2000 (RO-14)	EVT-1	<p>*SV6A OD-There is 1 indication that is measured to be 1" long.</p> <p>*SV6B ID-There is 1 indication in the weld which is measured to be 0.8 inches long.</p> <p>*SH4 Indication-Indication is 3 inches from SV5A ID and is 6 inches long and goes across the SH4 horizontal weld.</p> <p>No relevant indications noted on other vertical welds.</p> <p>Re-inspected per BWRVIP-76 Guidelines (by EVT-1) Vertical Welds SV5A, SV5B, SV6A and SV6B.</p> <p>Relevant indications found in these welds are as follows:</p> <p>*SV5A OD-There are 7 indications total with a combined indication length of 11.7" vertical and 3.3" circ.</p> <p>*SV5B OD-There are 19 indications total with a combined indication length of 50.7" vertical.</p> <p>*SV6A OD-There is one vertical indication that is measured to be 1" long.</p> <p>*SV6B ID-There is one vertical indication in the weld measured to be 1.25" long.</p> <p>*SH4 ID-There are 2 vertical indications across SH4 with total combined length of 6.4". The closest indication is 3" from SV5B. This indication is branching out near the bottom portion.</p>
Shroud Support	1992 to present	UT or EVT-1	<p>92 Outage: Inspected 0 and 180 deg access covers by UT. One planar indication detected at 180 deg, which is believed to be inherent to the fabrication process and is not ID connected.</p> <p>94/95 Outage: Inspected 40" of H9 weld and accessible areas of 10 gusset plates used for tie-rod repair.</p> <p>96 Outage: Inspected access hole cover at 0 deg, and inspected 36" of H9 weld and gusset plate welds at 3 tie-rod locations. No recordable indications.</p>

	Fall 1998	EVT-1 VT-3	<p>Baseline completed per BWRVIP-07 and BWRVIP-38 guidelines for all shroud repaired tie rods and load transfer gusset plate welds.</p> <p>*7 out of 10 tie rod assemblies inspected (by EVT-1/VT-3) in Fall 1998. No relevant indications noted.</p> <p>*All load transfer gusset plate welds and 12 inches of H9 weld each side of the gussets were examined by EVT-1. 7 out of 10 gussets inspected in RO13. No relevant indications noted.</p> <p>Examined by EVT-1 the access hole cover at 180 degrees. No relevant indications noted.</p>
	Fall 2000	-	No inspections during RO14
Core Spray Piping	1987 to present	VT-3, MVT-1 or EVT-1	IEB 80-13 of piping and welds in annulus. One clamp repair in 1988 at cracked weld in "B" loop at 190 deg below upper elbow piping. Welds were brushed and inspected by EVT-1 per BWRVIP-18 in Fall, 1996. No relevant indications found.
	Fall 1998	EVT-1/ MVT-1	<p>Re-inspected 100% of loop "A" and "B" welds per BWRVIP-18 Guidelines (by EVT-1). No relevant indications noted, except for a rub-mark near CSA-10 weld.</p> <p>Support brackets were examined by MVT-1. No recordable indications noted.</p>
	Fall 2000	EVT-1	<p>Re-inspected all Loop "A" and "B" creviced and T-box-to-pipe welds, including repair clamp welds per BWRVIP-18 Guidelines (by EVT-1). A relevant indication was noted on weld CSB-12. No other relevant indications were noted.</p>

Core Spray Sparger	1987 to present	VT-3, MVT-1 or EVT-1	IEB 80-13 of sparger and welds. MVT-1 and EVT-1 inspections per BWRVIP-18 in Fall, 1996. An indication characterized as weld profile deficiency was recorded on spray nozzle D-28. Historical IVVI data was reviewed and the indication was previously noted and dispositioned as acceptable.
	Fall 1998	EVT-1/ MVT-1	Re-inspected 100% of sparger piping "A" and "B" welds per BWRVIP-18 Guidelines (EVT-1/MVT-1) including tee boxes, end caps, drain welds, and support brackets. No relevant indications noted.
	Fall 2000	-	No inspections during RO14
Top Guide (Rim, etc.)	1988, 92 and 94/95	VT-3, EVT-1	2 cells inspected in 1988 and in 1992; 4 cells in 1994. Additional inspections included , alignment wedges , hold down bolts, and rim welds at several locations (EVT-1 at rim welds in 94/95). No relevant indications noted.
	Fall 1998	N/A	No inspections during RO-13
	Fall 2000	VT-1/VT-3	A total of 4 hold down assemblies were examined by VT-1 and 3 alignment pin assemblies by VT-3 per BWRVIP-26 Guidelines. No indications were noted.
Core Plate (Rim, etc.)	1992 and 94	VT-3	Inspection at one core plate in 1992. Inspected approximately 25% of hold down bolting in 1994/95. No reportable indications.
	Fall 1998	VT-3	Inspected 100% of hold down bolting. No recordable indications noted.
	Fall 2000	VT-3	Inspected core plate plugs at 5 core locations. No recordable indications noted.
SLC	Fall 2000	EVT-2	Performed Enhanced VT-2 on SLC nozzle-to-safe end weld during RPV

			System Leakage Test per BWRVIP-27 Guidelines. Test was "Accepted".
Jet Pump Assembly	1987 to1994	VT-1,VT-3 and UT	Inspected all riser brace attachment welds by VT-1. No relevant indications but found debris at some weld locations. Have replaced all jet pump beams in 1992 because one exhibited indications of cracking by UT exam. Also inspected pump assembly, sensing lines , supports and diffuser to shelf welds, all by visual. No recordable indications but found debris at some weld locations. Cracking at a Japanese BWR of a Jet Pump riser weld prompted FitzPatrick to review IVVI tapes from previous refueling outages, including 1996 outage. Viewed accessible areas at two welds by VT-1, and at three welds by VT-3 examination. No cracking was found in the reviewed welds.
	Fall 1998	MVT-1/ VT-3	Inspected by MVT-1 50% of all Jet Pumps (#7 to #16) for component safety priority H (high) and M (medium), per BWRVIP-41 Guidelines. No recordable indications noted. Interferences in the annulus region restricted inspection of AD-1 and AD-3b welds. Inspected by VT-3 sensing lines/brackets at same jet pumps (#7 to #16). No recordable indications noted.
	Fall 2000	-	No inspections during RO14
Jet Pump Diffuser	1992 and 94	VT-3	See above.
	Fall 1998	MVT-1	See Jet Pump Assembly (above).
	Fall 2000	-	No inspections during RO14
CRD Guide Tube	1992	VT-3	Inspected stub tube to vessel and stub tube to housing welds for 9 tubes. No relevant indications.
	Fall 1998	N/A	No inspections during RO-13.

	Fall 2000	VT-3, EVT-1	Inspected accessible surfaces at 3 Guide Tubes per BWRVIP-47 Guidelines (VT-3/EVT-1). Inspected accessible surfaces at 8 Guide Tubes (VT-3). No relevant indications noted.
CRD Stub Tube	1992	VT-3	See above.
	Fall 1998	N/A	No inspections during RO-13.
	Fall 2000	N/A	No inspection requirements per BWRVIP-47 Guidelines.
In-Core Housing	1992	VT-1	No relevant indications.
	Fall 1998	N/A	No inspections during RO-13.
	Fall 2000	N/A	No inspection requirements per BWRVIP-47 Guidelines.
Dry Tube	1994	VT-1	No indications. Replaced all dry tubes in 1987/88.
	Fall 1998	N/A	No inspections during RO-13.
	Fall 2000	VT-1	Inspected 4 IRM/SRM In Core Dry Tubes per GE SIL-409 and GE RICSIL-073 Guidelines (VT-1). No recordable indications noted.
Instrument Penetrations	1992	VT-1	Two inspected in 1992. No recordable indications.
	Fall 1998	N/A	No inspections during RO-13.
	Fall 2000	VT-2	Performed VT-2 ISI System Leakage Exam Test at 6 instrument nozzles (during RPV System Test) per BWRVIP-49 Guidelines. Test was conducted to the extent possible with insulation installed and shield doors closed. Test was "Accepted".
Vessel ID Brackets	1987 to present	VT-1, VT-3, EVT-1 for core spray	Section XI inspections of jet pump riser brace, dryer, feedwater sparger, core spray, and surveillance capsule holder brackets, performed once per interval.

	Fall 1998	MVT-1	Last inspection was Fall, 96 VT3, or VT1 if in beltline region. EVT-1 for core spray. No relevant indications noted.
	Fall 2000	-	Inspected Core Spray Brackets and Jet Pump Riser Brace Attachments per BWRVIP-48 requirements. No recordable indications noted.
			No inspections during RO-14
LPCI Coupling	N/A	N/A	Not applicable to this plant.
Fuel Support Castings	Fall 1998	VT-3	Inspected accessible areas of fuel support castings during in-process control rod blade change-out. No relevant indications noted.
	Fall 2000	VT-3	Inspected accessible areas of fuel support castings during in-process control rod blade change-out per BWRVIP-47 Guidelines. No relevant indications noted
CRD Nozzle NIR	Fall 1998	VT-1	The Control Rod Drive Nozzle Inner Radius was examined. No relevant indications noted.
	Fall 2000	EVT-1	Examined the CRD Nozzle Inner Radius, including adjacent vessel wall area. No relevant indications noted.
Steam Dryer Moisture Separator	Fall 1998	VT-3	Inspected 25% of shroud head bolts at storage pit. No relevant indications noted.
	Fall 2000	VT-3 EVT-1	Re-inspected by VT-3 all areas of the steam dryer support ring and by EVT-1 previously found cracks (1992/1994). A total of 10 indications were noted in 2000 (RO14).
Surveillance Capsule Specimen Holder	Fall 2000	VT-1 VT-3	Inspected at one location, the upper and lower mounting bracket (VT-1) and the condition of the specimen holder (VT-3) No recordable indications noted.
Lower Plenum	Fall 2000	VT-3 VT-1	Inspected by VT-3 accessible areas of lower plenum per BWRVIP-47

			Guidelines. No recordable indications noted. Inspected by VT-1 accessible areas of bottom head drain. After removal of debris the area was re-examined and found acceptable.
--	--	--	--

Reactor Internals Inspection History

Plant: LaSalle County Station Unit 2

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
CRD Guide Tube Alignment Lug Welds	11/17/00	VT-3	Examined 15 alignment lug welds using the VT-3 method per BWRVIP-47. No Indications detected.
Fuel Support Alignment Pin welds.	11/17/00	VT-3	Examined 15 pin to core plate welds using the VT-3 method per BWRVIP-47. No Indications detected.
Core Spray Piping	11/14/00	UT EVT-1	BWRVIP-18 UT examination of all accessible welds (36). One flaw indication detected on weld BP5 on the LP piping. Indication is .86" in length. Performed EVT-1 on 12 welds inaccessible to UT.
Core Spray Spargers	11/19/00	EVT-1	Examined all four upper and lower spargers, T-Boxes, welds, nozzles, nozzle tack welds, and sparger brackets. Examined for IEB 80-13 and BWRVIP-18. No indications found.
Dry Tube	11/16/00	VT-1	Examined 4 IRMs & 1 SRM, No Indications detected. (1 Mil wire)
Feedwater Spargers	11/19/00	VT-1	Examined all six Feedwater Spargers, T-Boxes, welds, nozzles, nozzle welds, and sparger brackets, and accessible areas of nozzle inner radius. Examined NUREG-0619 program. No indications found. (1 Mil wire)
Jet Pump Assembly	11/16/00	VT-3	Visual examination of all 40 Restrainer Bracket Set Screws for gaps. Noted gaps ranging from .014" to .017" in seven screws on seven different pumps. Installed Auxiliary Wedges at all seven gaps. VT-3 examination of all 20 main wedge assemblies per BWRVIP-41. No indications detected.

Jet Pump Diffuser	11/13/00	UT	Performed UT examination of Diffuser Welds per BWRVIP-41 on welds AD-2, DF-3, DF-2, DF-1 and MX-2 on six Jet Pumps (1, 2, 3, 4, 9, & 10). Remaining pumps could not be examined due to schedule constraints and equipment problems. No indications detected.
LPCI Coupling	11/19/00	EVT-1, VT-3, VT-1	BWRVIP-42, visual examination of all three LPCI Couplings. No indications detected.
Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Vessel ID Brackets	11/19/00	VT-1, EVT-1 and VT-3	Section XI inspections of guide rod brackets, steam dryer support lugs, surveillance capsule holder brackets. BWRVIP-38 EVT-1 of H9 attachment weld to RPV at 0 & 180 degrees. No indications noted.
RPV Internal Surfaces (Cladding)	11/19/00	VT-3	VT-3 visual examination for ASME Section XI, B-N-1 of RPV internal surfaces for 360 degrees at Steam Dryer Support Lug elevation, and at 0 and 180 degrees above H9 weld. No indications detected.
Access Hole Covers	11/19/00	VT-1	Augmented visual examination of both access hole covers. No indications detected.
Steam Dryer	11/14/00	VT-3	General Condition Inspection of Dryer. Previously identified cracking re-examined with no significant changes.
Steam Separator	11/15/00	VT-3	General Condition Inspection of Separator. Wear noted on shroud head bolts at aligner locking pins and windows.

Reactor Internals Inspection History

Plant: Oyster Creek Nuclear 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	Fall 2000	EVT-1	V-3, V-4, V-15 and V-16. This was a one sided exam from the OD. No reportable indications.
	Fall 1998	UT EVT-1	<p>V-7, V-8, V-10 and V-12. V-11 I.D. Seven tie rod assemblies baseline inspected.</p> <p>V-10 exhibited minor OD cracking away from the heat-affected zone. This cracking is believed to be associated with handling lugs that were welded during construction and removed after installation. All other inspected vertical welds were found free of indications. With the inspections performed in 16R and 17R, all accessible vertical welds in the shroud core region are complete.</p> <p>The following vertical welds could not be located. V-3, V-4, V-15 and V-16.</p>
	Fall 1996	Visual	<p>Inspected per BWRVIP-07. Three of ten tie rods inspected, no change from installation. EVT-1, OD of V-9 and V-11, (120" total). V-9 exhibited 3 small axial cracks in HAZ on the OD totaling 1.75". The ID of V-9 was free of axial cracks. A number of small transverse cracks were found on the OD and ID of V-9. V-11 was free of any indications. Analysis showed structural margin maintained.</p>

	Fall 1994	Ultrasonic and visual	Inspected per BWRVIP-01 and 03. Cracks were detected in the Shroud welds H2, H4, H6A, and H6B. Lack of fusion was detected in H3 weld and visual cracks on the ID surface. The Tie Rod modification was installed. Base line visual performed of the tie rods.
Shroud Support	Fall 2000	Visual	25% of H-9, cleaning performed and EVT-1 inspection completed. This completes 100% inspection of the H-9 weld. No reportable indications.
	Fall 1998	Visual	25% of H-9, cleaning performed and enhanced VT-1, no findings
	Fall 1996	Visual	25% of H-9, (different area then the 1994 inspection),cleaning performed and enhanced VT-1, no findings.
	Fall 1994	Visual	25% of H-9 cleaning performed and enchanted VT-1, no findings.
Core Spray Piping	Fall 2000	Visual	<p>Accessible portions of the annulus piping welds were cleaned using a nylon brush and visual inspections performed utilizing the EVT-1 technique. All accessible portions of the following piping welds were visually inspected:</p> <ul style="list-style-type: none"> • L3, L3A, L4, L6, L13A, L14, L15 and L20A • U3, U3A, U4, U7, U8 and U15A <p>100% of annulus pipe brackets 15°, 105° 195° and 285°.</p>
	Fall 1998	Visual	<p>All creviced welds in the annulus piping; sample (25%) of the non-creviced welds in the annulus piping:</p> <ul style="list-style-type: none"> • L2, L9, L10, L11, L12, L13, L17, L18, L19 and L20 • U2, U5, U6, U13, U14, U15, U21, U22, U23 and U24 <p>Sample (25%) of pipe brackets 285°,</p>

	Fall 1996	Visual	195° Inspected per BWRVIP- 03. Cleaning of all accessible weld/HAZ surface and performed enhanced VT-1. No findings.
	Fall 1994	Visual and air test	Inspected VT-1, (1 mil wire). No change to pinhole weld defect detected in slip joint in 1992. Note: Pinhole weld defect detected in 1992 in System I. Analysis showed structural margin maintained.
Core Spray Sparger	Fall 2000	Visual and Air Test	All sparger end cap welds were cleaned and EVT-1 inspected. No findings. EVT-1 of all sparger end cap welds. VT-1 of spargers, repair clamps, and nozzles. No findings. No new leaks were identified during the Air Test.
	Fall 1998	Visual and Air Test	All sparger repair clamps, both spargers.
	Fall 1996	Visual and air test	Inspected per BWRVIP-03. Cleaned end cap welds and performed enhanced VT-1. No findings. Tee box welds are clamped and not accessible to clean or visual. Performed VT-1, (1 mil wire), of sparger piping and nozzles. No findings.
	Fall 1994	Visual and Air Test	Performed VT-1, (1 mil wire) of sparger piping and nozzles. No findings.
	1978 - 1980	Visual	(2) Cracks in sparger piping. Repair clamps installed. Note: Cracking found in sparger in 1978; repaired with clamps. Sparger has been inspected and air tested every outage since then; report submitted to NRC for approval for restart every outage.
Top Guide (Rim, etc.)	Fall 2000	Visual	Top guide hold down bolt assembly VT-3 at 33° and 213°. Top guide beam to rim fillet welds VT-1 at 33° and 213°. No recordable indications.

			<p>VT-1 of two existing cracks (#3 and #5) with cleaning. Both cracks measured on both sides. Crack #5 showed approx. 1" growth. Crack #3 showed no measurable growth.</p>
	Fall 1998	None.	Not required for this outage by analysis.
	Fall 1996	Ultrasonic 100% grid beams	12 indications emanating from notches detected at intersections of cross members.. 5 of the 6 cracks on bottom side of member at mid span detected. Removed sample from beam with crack to investigate root case.
	Fall 1994	Visual	[Under side of Top Guide] Three additional vertical cracks were detected at mid span locations. Disposition use as is.
	Fall 1992	Visual	[Under side of Top Guide] Two additional vertical cracks were detected at mid span location. Disposition use as is.
	Fall 1991	Visual	[Under side of Top Guide] A vertical crack was detected at mid span location. Disposition use as is.
Core Plate (Rim, etc.)	Fall 2000	Visual	Visually inspected all 8 wedges to verify integrity after first cycle of operation. All wedges found as-installed.
	Fall 1998		Wedges installed. No further exams of core plate were performed.
	Fall 1996	Visual	Inspected top portion only of 18 hold down bolt that were not inspected in fall 1994 and top periphery section at bolt locations. No findings.
	Fall 1994	Visual	Inspected 18 hold down bolt tops only and top periphery at bolt locations inspected. No findings.

SLC	Fall 2000	VT-2 pressure test	Inspected insulated nozzle from drywell. No leakage observed.
	Fall 1998	VT-2 during Code pressure test.	Not made accessible for direct exam.
	Fall 1996	No inspection Performed.	Not made accessible.
	Fall 1994	"	"
Jet Pump Assembly	NA	NA	NA
Jet Pump Diffuser	NA	NA	NA
CRD Guide Tube	Fall 2000	VT-1, VT-3	2 guide tubes. No findings.
	Fall 1998	VT-3	15, no findings.
	Fall 1996	No inspection Performed.	Not made accessible.
	Fall 1994	"	"
CRD Stub Tube	Fall 2000	VT-1 VT-2 pressure test	None made accessible. 2 stub tubes found leaking at bottom head (42-43 and 46-39). Performed UT of CRD housing to stub tube welds (J weld) and area of housing to be rolled. No reportable indications. Roll repaired both leaking housings.
	Fall 1998 Fall 1996	No inspection Performed.	Not made accessible.
	Fall 1994	"	"
In-Core Housing	Fall 2000 Fall 1998	No inspection	Not made accessible.

	Fall 1996 Fall 1994	performed.	
Dry Tube	Fall 2000	Visual	VT-1 five dry tubes. One found slightly bent – use as is. No findings on others.
	Fall 1998	Visual	VT-1 one dry tube, no findings
	Fall 1996	Visual	VT-1 one dry tube, no findings.
	Fall 1994	Visual	VT-1 four dry tubes, no findings.
Instrument Penetrations	Fall 2000 Fall 1998 Fall 1996 Fall 1994	No inspection performed.	Not made accessible.
Vessel ID Brackets	Fall 2000	EVT-1	All 4 dryer support brackets. Observed wear indications on brackets. No indications on attachment welds. All feedwater attachment brackets inspected. No indications on attachment welds. Cracks observed on feedwater sparger to end bracket welds (non-safety related component) on 2 ends.
	Fall 1998 Fall 1996 Fall 1994	VT-1	VT-1 of accessible portions of weld on guide rod brackets, steam dryer brackets, surveillance sample brackets. All attachment welds; no findings.
LPCI Coupling	NA	NA	NA
Fuel Support Casting	Fall 2000	Visual	VT-3 (2) support casting. No findings.
	Fall 1998	Visual	VT-3 (24) support castings. No findings.
	Fall 1996	Visual	VT-3 (25) support castings. No findings.
	Fall 1994	Visual	VT-3 (17) support castings. No findings.

Note: All indications left "as is" were analyzed and structural margins were acceptable for continued service.

Reactor Internals Inspection History

Plant: **Peach Bottom Atomic Power 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	1994	UT & VT	<p>Comprehensive UT Baseline of some Category "C" circumferential welds (H-2,H-3, H-4, and H-5) per BWRVIP-01, Rev. 0.</p> <p>Partial UT baseline of welds H-1, H-6, and H-7, w/ partial Enhanced VT-1 of H-6 OD.</p> <p>Exams per BWR-VIP Core Shroud NDE Uncertainty and Procedure Standard, dated November 21, 1994.</p> <p>Indications identified on ID of H-1, H-3, H-4, and H-6, and OD of H-4 and H-5.</p> <p>Full structural margins calculated using two cycles of crack growth for comprehensively examined welds, one cycle for welds with limited exams.</p> <p>No indications identified on H-2 and H-7.</p>
	1996	UT	<p>Comprehensive UT of welds H-1,H-6 and H-7 per BWRVIP-01, Rev. 1.</p> <p>Exams per BWRVIP-03.</p> <p>Indications identified on ID of welds H-1, H-6 and H-7, on OD of weld H-1.</p> <p>Full structural margins calculated using two cycles of crack growth.</p>
Shroud Support	1992	VT-3	<p>VT-3 examination of support leg stub welds.</p> <p>No indications identified.</p> <p>VT-3 examination of welds H-7, H-8, and shroud support cylinder.</p> <p>No indications identified.</p>
	1994	VT-3	<p>VT-3 of accessible portions of H-8 weld between Jet Pump #1 and #10.</p> <p>No indications identified.</p>

	1998	VT-1	VT-1 examination around perimeter of 0 deg. access hole cover. No indications identified.
		UT	UT examination of both access hole covers. No indications identified.
		EVT-1	EVT-1 examination of both AHCs., No indications identified. EVT-1 of 10% of shroud support weld H-8, top side, no indications identified. EVT-1 of 10% of shroud support weld H-9, top side, no indications identified.
	2000	EVT-1 VT-3	EVT-1 examination of both AHCs., No indications identified. VT-3 of accessible portions of H-9 weld between 0° and 180° Azimuth. No indications identified.
Core Spray Piping	1980 to 1996	VT-1 (1 mil)	Enhanced VT-1 (1 mil resolution) performed on piping and welds each refueling outage per IEB 80-13, No indications identified.
	1996	VT-1 (1/2 mil)	EVT-1 (1/2 mil resolution) performed on annulus piping welds per BWRVIP-18. Cracking identified in "B" Header tee-box cover plate weld (P2B). UT performed to characterize indication. Evaluation demonstrated structural margin for one operating cycle.
	1998	EVT-1 & UT	Reinspection per BWRVIP-18, using UT technique. EVT-1 used to supplement UT. No new indications identified. P2B weld reexamination yielded additional margin.
	2000	EVT-1	EVT-1 of nine (9) piping welds not previously UT'd, and of six (6) pipe brackets and attachment welds. No indications identified.

Core Spray Sparger	1980 to 1994	VT-1 (1 mil)	Enhanced VT-1 (1 mil resolution) performed on piping and welds each refueling outage per IEB 80-13, Cracking discovered at tee-box to sparger pipe weld ("B" Sparger, 1982), bolted repair clamp installed. No other indications identified.
	1998	VT-3 & MVT-1	Reinspections per BWRVIP-18, no indications identified.
	2000	EVT-1	EVT-1 of selected sparger welds per BWRVIP-18. No indications identified.
		VT-1	VT-1 of sparger tee-box repair clamp, and approx. 50% of sparger "C" and "D" nozzles and drains. VT-1 of eleven (11) sparger brackets and welds. No indications identified.
Top Guide (Rim, etc.)	1987	UT	UT examination performed of specific cells. No indications identified.
	1994	VT-3	Visual (VT-3) examination of 4 cells (48-41, 08-25, 24-17, and 24-25), per SIL 554. No indications identified.
	1996	VT-3	Visual (VT-3) of 2 aligner pins (0 deg. And 270 deg.), per SIL 588. No indications identified.
	1976 to 1994	VT-3	VT-3 exam every other refueling outage per Section XI. No indications identified.
Core Plate (Rim, etc.)	1996	VT-3	VT-3 examination of all accessible hold down bolts (cell 16-57, and area at 0 and 270 deg. Azimuth. No indications identified.
SLC	1992	PT	Surface (PT) examination of nozzle to safe end weld per Section XI. No indications identified.
	1998	PT & UT	PT and UT of N10 nozzle to safe-end, no indications identified.

Jet Pump Assembly	1976 to 1996	VT-3	Visual VT-3 of all jet pump components performed every other refueling outage.
	1994		Restrainer bracket wedge misalignment and wear identified on several wedges. Evaluations found condition acceptable without repair. One restrainer bracket set screw tack weld found cracked. Evaluations found condition acceptable without repair.
	1996		Restrainer bracket wedge conditions and set screw tack welds remain unchanged, condition acceptable without repair.
	1981	VT & UT	VT and UT examination performed on all 20 hold down beams. No indications identified,
	1998	MVT-1 UT	MVT-1 of: RS-1 weld on all 10 risers, RS-2 & RS-3 welds on 6 of 10 risers. No indications identified. UT of all 20 hold down beams. No indications identified.
	2000	EVT-1	EVT-1 of adjusting screw tack weld (jet pump 7) and RS-2 & RS-3 on 5 of 10 risers. No indications identified.
Jet Pump Diffuser	1998	MVT-1	MVT-1 of: AD-1 & AD-2 welds on 12 of 20 pumps, AD-3A & B welds on 11 of 20 pumps, and DF-2 weld on 10 of 20 pumps. No indications identified.
	2000	EVT-1	EVT-1 of AD-1, -2, -3a, -3b, and DF-2 on jet pumps 1 through 10. No indications identified.
CRD Guide Tube	1992	VT-3	VT-3 examination of housings accessible from fuel cells 26-31 and 30-27. No indications identified.
CRD Stub Tube	1992	VT-3	VT-3 examination of stub tube welds accessible from fuel cells 26-31 and 30-27.

			No indications identified.
In-Core Housing	1992	VT-3	VT-3 examination of housings accessible from fuel cells 26-31 and 30-27. No indications identified.
Dry Tube	1994	VT-1	All Dry Tubes replaced in 1984 VT-1 examination of IRM Dry Tube 2D, at core location 37-32.
Instrument Penetrations	1976 to present	PT	PT examination performed on all instrument nozzle to safe end welds once per interval, per Section XI. No indications identified.
Vessel ID Brackets	1976 to present 2000	VT-1 or VT-3 EVT-1	VT-1 and VT-3 of all ID bracket welds performed once per interval per ASME Section XI. No indications identified. EVT-1 of six (6) Core Spray piping brackets. No indications identified.
LPCI Coupling			N/A to this plant

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	4/94	EVT-1 and UT	Inspections per SIL 572, indications in circumferential welds.
	3/96	EVT-1 and UT	<p>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).</p> <p>No Reportable Indications.</p> <p>Future inspections to be in accordance with BWRVIP-76; Reinspection of Repaired Core Shrouds.</p>
	11/98	VT-1	Shroud repair hardware inspected per GE recommendations. No Reportable Indications.
	10/00	UT	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.
Shroud Support	3/96	EVT-1	EVT-1 of H8 and H9 for approx 12" at 4 locations of shroud repair hardware attachment areas.

	10/00	EVT-1	<p>Access hole covers; VT/UT in 1992, circumferential indications observed, permanent repair installed.</p> <p>Inspected H8 and H9 adjacent to AHC at JP# 10 & 11 in accordance with BWRVIP-38. No reportable indications.</p>
Core Spray Piping	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.
	4/96	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.
Core Spray Sparger	1980 to 1994	VT-1 (1 mil)	IEB 80-13 of welds on sparger. No indications found.
	4/96	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

	11/98	EVT-1 MVT-1	<p>welds. VT-3 of spargers and nozzles.</p> <p>Future inspections per BWRVIP-18.</p> <p>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.</p>
Top Guide (Rim, etc.)	3/94	VT-1	VT-1 of 4 cells. No indications.
	4/96	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.
Core Plate (Rim, etc.)	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.
Jet Pump Assembly	3/94	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. Inspect 100% every other outage.
	4/96	VT-1	Jet pump riser brace to riser weld at JP 5/6 repaired 1994, repair examined 1996 and 1998, no changes noted.
	4/96	UT	One jet pump beam replaced 1986 due to

	11/98	VT-1	<p>indication. Jet pump beams are UT examined each outage using technique capable of detecting cracking at throat and ears. No subsequent indications.</p> <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>
Jet Pump Diffuser	3/94	VT-1 (1 mil)	Diffuser to baffle plate welds examined. No reportable indications.
	11/98	VT-1 (1 mil)	Diffuser to baffle plate welds examined. No reportable indications.
	10/00	EVT-1	See details above.
CRD Guide Tube	N/A	N/A	N/A
CRD Stub Tube	N/A	N/A	N/A
In-Core Housing	N/A	N/A	N/A
IRM/SRM Dry Tubes	3/94	VT	Replaced 3 dry tubes 1994.
	3/96	VT	Replaced 2 dry tubes in 1996.

	10/00	MVT-1	Inspected original dry tubes at 7 locations. No recordable indications.
Instrument Penetrations	N/A	N/A	N/A
Vessel ID Brackets	3/94	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.
LPCI Coupling	N/A	N/A	Not applicable to this plant.

BWR Vessel and Internals Project

**Vessel Internals Inspection Summaries
for Spring 2001 Outages**

June 2002

Table of Contents

<u>Plant</u>	<u>Page</u>
1. Browns Ferry Nuclear Plant: Unit 2	3
2. Brunswick Unit 2	7
3. Columbia Generating Station	12
4. Grand Gulf Nuclear Station Unit 1	15
5. Nine Mile Point Unit 1	18
6. Perry Nuclear Power Plant	20
7. Pilgrim Nuclear Power Station	24
8. Vermont Yankee	29

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	1994-1996	UT	Baseline (1994) per GE SIL No. 572 for circumferential seam welds - indications found in several welds (H-2, H-3, H-5). Reinspection (1996) per GE SIL No. 572 - indications found in H-1, H-6, and H-7 welds along with previous indications. Full structural margins on flawed welds for at least one additional operating cycle. Vertical welds not inspected. Reinspection (1997) H-1, H-2, H-3, H-5, H-6, & H-7 inspected with UT per BWRVIP I&E guideline. Six new indications were 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.
Shroud Support	1996	UT	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 were recorded on either cover. Reinspection (1999) EVT-1 of H-8 and H-9 welds at 0 and 180 degree locations. No Reportable indications. Shroud Manway covers at 0 and 180 degree's no reportable indications.
Core Spray Piping	1996	EVT-1 and VT-1	IEB 80-13/GE SIL No. 289 R1S2 of piping and welds in annulus. No reportable indications. Reinspection (1997) Inspected all accessible welds with UT and inaccessible welds with VT. No reportable indications found. (1999)

			Inspected welds per BWRVIP-18 (EVT-1) no reportable indications found. (2001) Reinspected welds per BWRVIP-18 (UT) and EVT-1 no reportable indications found.
Core Spray Sparger	1996	VT-1	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. Reinspection (1997) No reportable indications found. Inspected welds per BWRVIP-18 (EVT-1) no reportable indications found. (2001) Reinspected welds per BWRVIP-18 (EVT-1) no reportable indications.
Top Guide (Rim, etc.)	1996	VT-3/EVT-1	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. Reinspected (1997) no indications found. Inspected (1997) Top Guide Alignment Pins & Bolts per SIL 588 no indications found. Inspected (1999) Inspected Rim Welds (EVT-1) and Aligner Pins (VT-1) at 2 locations per BWRVIP-26. No reportable indications found. (2001) Reinspected (EVT-1) per VIP-26 no reportable indications.
Core Plate (Rim, etc.)	1996	VT-1/VT-3	The core plate bolts were visually inspected in accordance with GE SIL No. 588. No indications were recorded. Rinspected (1997) Per BWRVIP-25 no indications found. (1999) inspected core plate bolts (VT-3) at accessible locations per BWRVIP-25 no reportable indications. (2001) Reinspected (VT-3) at accessible locations per VIP-25 no reportable indications.
SLC		LP	Nozzle is leak checked every outage and volumetric exams are conducted per code requirement. No indications noted to date.

Jet Pump Assembly	1996	VT-1 and 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 and 12 - build-up found in inlet mixer that will require internal cleaning during next refueling outage. Riser braces for Jet Pumps 11-20 inspected per GE SIL No. 551 - no indications were recorded. Jet pump adjusting screws inspected per GE SIL No. 574 - minor indications on set screw tack welds for Jet Pumps 1, 11, and 12 that were evaluated and determined to be irrelevant due to their small size. Jet pump beams replaced with beams manufactured from a modified heat treatment material during the Cycle 5 Outage (prior to 1991). No inspection has been performed since the replacement. Reinspected (1997). Jet Pumps 1 thru 20, Adjusting Screws, Riser Elbow Welds, & Sensing Lines. Jet Pumps 1 thru 10 Riser Braces SIL 574, 551, 605, 420, & RICSIL 078 used as guidance. (1999) Jet Pump Pipe, Diffuser Welds, and beams inspected on 20 jet pumps per BWRVIP-41 no reportable indications. (2001) Reinspected Riser Brace welds per VIP-41. No reportable indications.
Jet Pump Diffuser	N/A	N/A	N/A
CRD Guide Tube	N/A	N/A	N/A
CRD Stub Tube	N/A	N/A	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.
In-Core Housing	N/A	N/A	N/A
Dry Tube	1994	VT	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. No inspections performed since.
Instrument Penetrations		LP	Visual leak check is performed during each refueling outage. No reportable indications reported to date..
Vessel ID Brackets	1996	VT-1 and VT-3	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.
LPCI Coupling	N/A	N/A	Not applicable to this plant

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, Reinspections
Core Shroud	1994	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.
	1996	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 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.

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.
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.
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.
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.
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.
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.
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

	1997	VT-1 and VT-3	pump beams. 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.
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.
CRD Guide Tube	2001	VT-3 EVT-1/ VT-3	Access has not become available. 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.
CRD Stub Tube		VT-3	Access has not become available.
In-Core Housing		VT-3	Access has not become available.
Dry Tube		N/A	Replaced in 1987. Scheduled for inspection in 2001.

	2001	N/A	BWRVIP does not require inspection of dry tubes.
Instrument Penetrations	1988 and 1996	LP	Inspections of external piping performed once per interval in accordance with ASME Section XI. No indications noted.
Vessel ID Brackets	to present	VT-1 in beltline area and VT-3 in other areas	Section XI inspections of dryer, feedwater sparger, core spray, and surveillance capsule holder brackets performed once per interval. Last 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
LPCI Coupling		N/A	Not applicable to Brunswick.

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.
Shroud Support	1994	VT-1	ASME Section XI includes access hole covers. No indications
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 BWRVIP-18	No indications of cracking
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
Top Guide (Rim, etc.)	1994	VT-1, VT-3	ASME Section XI . No indications
Core Plate (Rim, etc.)	NA	NA	NA

SLC	NA	NA	SLC routed through HPCS system
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 RB-1, RB-2, RS-8, RS-9, RS-3 (JP 1-10)	Found five pumps with small gaps between screw and inlet mixer. 2 wedges had wear. No indications on welds.
Jet Pump Diffuser	NA	NA	NA
CRD Guide Tube	NA	NA	NA
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
Instrument Penetrations	1994	VT-2	ASME Section XI. No indications

Vessel ID Brackets	1994	VT-1	ASME Section XI. No indications
	2001	EVT-1 BWRVIP-48	FW brackets. No indications
LPCI Coupling	1994	VT-1	ASME Section XI. No indications

Reactor Internals Inspection History

Plant: **Grand Gulf Nuclear Station Unit I**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	Spring 1998	UT	All accessible areas of H3, H4, H6A, H7. No cracks
	Spring 1995	UT	Baseline per BWRVIP-01. All accessible areas of H3,H4,H6A and H7. No cracks.
	Spring 1995	VT-3	Shroud and general area. No failures. (Sil572)
	Spring 1992	VT-1	Shroud shelf weld No failures (Sil572)
Shroud Support	Spring 1998	UT	10.7% of total circumference of H8 (shroud support plate to shroud weld) and 15.4% of H9 (shroud support plate to vessel weld). No cracks.
	Fall 1996	VT-1 Above core plate.	Sect XI. Period 3 of 10yr interval. RF05/6 Attachment weld to vessel and shroud plate to shroud weld. No failures.
	Spring 1995	VT-3	Access hole cover. No failures. (Sil462)
Core Spray Piping	Spring 2001	EVT-1	All accessible P2, P2a, P3a, P5. 25% of remaining piping locations. No failures.
	Fall 1999	EVT-1	All accessible P2, P2a, P3a, P5. 25% of remaining piping locations. No failures.
	Spring, 1998	EVT-1	All accessible piping locations. No failures.
	Fall 1996	VT-3	Augmented exam per IE 80-13. No failures.
	\Fall 1996	VT-1	Core spray bracket welds. No failures.
Core Spray Sparger	Fall 1999	VT-1/VT-3	Upper Sparger- Accessible areas of spargers, spray nozzles, tee boxes, brackets and supports. No failures.

	Spring 1998	EVT-1/ CS-VT-1	Accessible areas of spargers, spray nozzles, tee boxes, brackets and supports. No failures.
	Fall 1996	VT-3	Augmented exam per IE 80-13. No failures.
Top Guide (Rim, etc.)	Spring 2001	VT-3	Accessible surfaces and fasteners. No failures
	Fall 1996	VT-3	Accessible surfaces and fasteners. No failures.
Core Plate (Rim, etc.)	Fall 1996	VT-3	Sect. XI, under core plate. Where access was provided in RF08, camera work was performed . No failures.
SLC	N/A	N/A	N/A
Jet Pump Assembly	Spring 2001	EVT-1	Accessible areas of RS-1 and RS-2 welds on JP01/02. No failures.
	Fall 1999	EVT-1	Accessible areas of RS-3 welds on JP07/08, JP09/10 and JP11/12.
	Spring 1998	MVT-1/ VT-3	Accessible areas of RS-3 welds on JP01/02, JP03/04 and JP05/06. VT-3 on flow restriction on JP09, 10,11 and 24. No failures.
	Fall 1996	UT	UT exam of beams. Two beams cracked in RF06, and all were replaced with Unit 2 spares. No UT exam done in RF07. In RF08 all beams were changed out with the new GE design and heat treat spec. components.
	Fall 1996	VT-3	Riser brace welds (Si1551) 50% each outage. Adjusting screws. 100 % each outage. No failures.
CRD Guide Tube	Spring 2001	VT-3	12 guide tubes. 12 FS/GT-Arpin-1 and CRGT-1. Accessible portions of CRGT-2 (2 places).
	Spring 1998	VT-3	34 CRGT-1 exams completed with no failures.

	Fall 1996	VT-3	8 guide tubes. When accessibility permits. No failures.
CRD Stub Tube	n/a	n/a	n/a
In-Core Housing	n/a	n/a	n/a
Dry Tube	Spring 1998	VT-3	11 guide tubes. As accessible. No failures.
Instrument Penetrations	Fall 1996	VT-3	No failures.
Vessel ID Brackets	Fall 1996	VT-1/VT-3	Sect.XI every 10 years on Attachment welds. Other parts of brackets on general VT-3 exam. No failures.
LPCI Coupling	Spring 2001	VT-3/VT-1	VT-1 on LPCI-C @ Az. 141 due to a previous loose parts impact concern. No failures.
	Fall 1999	VT-1	VT-1 on LPCI-C @ Az. 141 due to a previous loose parts impact concern. No failures
	Spring 1998	EVT-1	All chosen welds on LPCI couplings @ Az 41 and 141. No failures
	Spring 1996	VT-1	VT-1 on LPCI-C @ Az. 141 due to a previous loose parts impact concern. No failures

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	3/01	EVT-1	V-4 ID only
Shroud Support	3/01	UT	H8, conical ring to shroud, 80% of weld completed one sided coverage. 3 indications noted. H-9, conical ring to vessel, 80% of weld completed one sided coverage. 34 indications noted. Phased array UT was used for examination
Core Spray Piping	3/01	EVT-1	No new indications Re-inspection per BWRVIP-18
Core Spray Sparger	3/01	EVT-1	No growth noted on 2 previous indications being monitored. 1 is on "face" of sparger (identified 4/88) the other is in the HAZ of a sparger nozzle (identified 2/95). No new indications
Top Guide (Rim, etc.)			No inspections performed
Core Plate (Rim, etc.)			No inspections performed
SLC	3/01	VT-2 SIL-571	VT-2 (static) performed at beginning of outage and at vessel pressure.
Jet Pump Assembly	N/A	N/A	N/A
Level control reference leg nozzles	3/01	EVT-1	Similar flaking on nozzle radius as seen by Monticello
CRD Guide Tube	3/01	EVT-1	4 guide tubes were made accessible,

		VT-3	visual examinations performed on these tubes only. No indications noted
CRD Stub Tube	3/01	UT	Examined 2 stub tube J-welds, no indications found. VT-2 on remaining.
In-Core Housing			
Dry Tube	3/01	EVT-1	Completed 2 dry tube inspections. No indications noted.
Instrument Penetrations	3/01	VT-2	All instrument nozzles
Vessel ID Brackets	3/01	EVT-1	3 of 4 Steam Dryer brackets completed with no indications.
Shroud Repair Tierods & Clamps	3/01	Visual	VT-3 & EVT-1 exams performed on all four tierods. Also examined V9 & V10 repair clamps.

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, Reinspections
Core Shroud	94 (RF4) 97 (RF6) 99 (RF7)	VT-3 and EVT-1 UT	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. In RF6, a Code VT-3 exam was performed on all accessible shroud exterior areas. No indications. 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.
Shroud Support	90 (RF2) 96 (RF5) 99 (RF7) 01 (RF8)	VT-3 & VT-1 VT-3 & VT-1 EVT-1 VT-1	In RF5, VT-3 of shroud support plate in RF2 and VT-1 of the shroud support plate access hole cover. No indications. In RF7, baseline EVT-1 exams of the H-8 and H-9 were performed in accordance with BWRVIP-38. No Indications. In RF8, re-seating of jet pump no. 5 provided access to one shroud support leg 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.
Core Spray Piping	89-96 (RF1 thru RF5) 97 (RF6) 99 (RF7) 01 (RF8)	CVT-1 EVT-1 EVT-1 EVT-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. In RF6, Baseline BWRVIP-18 EVT-1 examinations were performed on all the core spray piping welds. No indications. In RF7 and RF8, core spray piping weld exams were performed in accordance with the re-inspection requirements of BWRVIP-18. No indications.
Core Spray Sparger	89-96 (RF1 thru RF5)	CVT-1	1 mil wire resolution VT-1 (i.e., CVT-1) exams of the core spray spargers has been

	97 (RF6) 99 (RF7) 01 (RF8)	EVT-1 & CVT-1 EVT-1 & MVT-1 EVT-1 & VT-1	performed every outage since startup in accordance with IEB 80-13. In RF6, Baseline BWRVIP-18 EVT-1 examinations were performed on all the core spray sparger welds. No indications. In RF7 and RF8, core spray sparger weld exams were performed in accordance with the re-inspection requirements of BWRVIP-18. No indications.
Top Guide (Rim, etc.)	89 (RF1) 94 (RF4) 99 (RF7)	VT-3 VT-3 VT-1 & VT-3	Top Guide periphery, including 90 studs and tack welds, examined in RF1. Top Guide Grid examined in RF4. No indications. 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.)	89 (RF1) 94 (RF4) 99 (RF7)	VT-3 VT-3 VT-3	Accessible core plate areas and fuel support castings examined in RF1. All of the hold down bolts examined from shroud interior in RF4. No indications. 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.
SLC	N/A	N/A	Not applicable to this plant
Jet Pump Assembly	89-96 (RF1 thru RF5) 97 (RF6) 99 (RF7) 01 (RF8)	VT-1 & VT-3 EVT-1 VT-3 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. 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 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

			<p>criteria. 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> <p>Notes: 1) Jet pump beams were replaced in RF4.</p>
Jet Pump Diffuser	01 (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.
CRD Guide Tube	99 (RF7) 01 (RF8)	VT-1 & EVT-1 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. 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.
CRD Stub Tube	N/A	N/A	Not applicable to this plant.
In-Core Housing	None to date	N/A	N/A
Dry Tube	89 (RF1) 90 (RF2) 94 (RF4) 99 (RF7) 01 (RF8)	VT-3 VT-3 VT-3 VT-3 VT-3	VT-3 of upper 2 ft in accordance with SIL 409 and RICSIL 73. No indications. In RF8, 4 IRM's and 2 SRM's. No indications.
Instrument Penetrations	89-99 (RF1 thru RF8)	VT-2	Undervessel (i.e., through the skirt manway) visual examination for leakage performed every refueling outage. No indications.
Vessel ID Brackets	89 (RF1) 94 (RF4) 96 (RF5) 99 (RF7) 01 (RF8)	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

		MVT-1 EVT1	is examined once an interval. The last welds to be examined were the surveillance capsule bracket attachment welds in RF5. No indications. 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. In RF8, performed EVT-1 of the Steam 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.
LPCI Coupling	94 (RF4) 96 (RF6) 99 (RF7)	VT-3	The LPCI internal piping, including the couplings, was examined in RF5. The LPCI deflectors (inside the core shroud) were examined in RF4. No indications. In RF7, performed MVT-1 baseline exams on the welds of all three LPCI couplings in accordance with BWRVIP-42. No indications.

Reactor Internals Inspection History

Plant: **Pilgrim Nuclear Power Station**

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 shroud	7 (UT), 8 (VT), 10 (UT)		RFO 7 UT all 48 bolts; RFO 8 partial VT. No indications. RFO 10 UT of 100% of bolts, no indications. RFO 11 replaced 50% of bolts.
	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. H4 weld 4 ft. crack reported bounded by modification. 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 V23. Total of vertical weld examined from both sides by UT in RFO 11 and EVT 1 in RFO 12 is 46 % With partial credit for one sided examinations the total is 51 %. This is the maximum available with current tooling. No indications.
	RFO 13	EVT-1	Examined Ring Segment weld V 11 from the OD. (no indications)
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.
Shroud support plate to RPV (H11) weld	10	EVT-1	Enhanced VT-1 RFO 10. No indications.

Shroud support plate gusset welds	RFO 12		Examined 10 % of weld length with no indications
	10, 11 (1 gusset)		Enhanced VT-1 RFO 10 of 4 gussets (modification attach. points), VT-1 all others (18).
	RFO 12	EVT-1	No indications. RFO 11 EVT-1 of gusset at 315 az. Examined gusset welds at 225,135, 45, 15 and 345 degrees with no indications.
CORE SPRAY PIPING	6, 7, 8, 9, 10, 11 (UT and EVT-1 of piping welds)		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)
CORE SPRAY SPARGER	RFO 13	EVT-1/ VT-1	EVT-1 of all S1,S2,and S4 welds. VT-1 of all SB and 50% of the S3 welds, these were the upper sparger.(no indications)
TOP GUIDE (RIM, ETC.)	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
CORE PLATE (RIM, ETC.)			
SLC	RFO 13	VT-2	System Leakage Test (no leaks)

JET PUMP ASSEMBLY			
Jet Pump Riser Braces	8, 10, 11		No indications. RFO 10 100% done. Do 50% each RFO per OE item. RFO 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)
Jet Pump Sensing Lines	7, 8, 9		No indications.
Jet Pump Beam Assemblies	Replaced RFO 6, RFO 11 (UT, VT)		RFO 11 (UT of 100%; VT of Jet Pumps 5 through 14)
	RFO-12	UT	All beams examined at BB-1 and BB-2 with no indications
Jet Pump Adjusting Screws	8, 10, 11		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	VT-3	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)
Jet Pump Restrainer Bracket and Swing Gate Assemblies	11		RFO 11 VT-3 of 100% of swing gates, wedges and screws. Found 10 out of 20 swing gates in unlatched position.
	RFO-12	VT-3	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-1	Examined WD-1 on pumps 1 to 10 (no indications)
Jet Pump Mechanical Joints	11		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-

Jet Pump Riser Welds	RFO-12	VT-3	diffuser areas 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)
	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)
JET PUMP DIFFUSER	RFO-13	VT-3	Examined IN-5 for pumps 1 to 10 (no indications)
		EVT-1	Examined MX-1 for pumps 1 to 10 (no indications)
		EVT-1 and UT	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)
CRD GUIDE TUBE Handle Attachment	7		No indications
CRD STUB TUBE	7		No indications
IN-CORE HOUSING			
DRY TUBE	RFO 13	NA	FS/GT –ARPIN-1 at 8 locations
INSTRUMENT PENETRATIONS			
VESSEL ID BRACKETS Surveillance specimen brackets attachment welds	10		3 locations No indications

Guide rod bracket attachment welds	10, 11 (180 az guide rod)		No indications
Abandoned start-up instrumentation brackets	11		Brackets welded to RPV wall at 90 and 150 az received VT-1 in RFO 11
Steam Dryer Drain Channels	8, 9, 11		No indications
	RFO-12	VT-3	No indications
Steam Dryer Leveling Screws	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
Steam Dryer Baffle Plate	7, 11	VT-3	No Indications.
Steam Dryer Support Bracket	7, 8, 9, 10, 11		No Indications
Steam dryer hold-down bracket welds (on head)	10		Located underside of RPV head No indications
LPCI COUPLING			
FEEDWATER SPARGERS	6, 7, 8, 9, 10		No indications

Reactor Internals Inspection History

Plant: **Vermont Yankee**

Components in BWRVIP Scope	Date or Frequency of Inspection	Inspection Method Used	Summarize the Following Information: Inspection Results, Repairs, Replacements, Reinspections
Core Shroud	'95	UT	Seven circumferential welds. Significant indications found in H5 and H6, less extensive in H4. Very minor indications in H1, H2, and H3.
	'96	UT, ET	Six vertical welds (all welds between H3 and H7). No indications.
		EVT-1	Two vertical welds (both welds between H1 and H2) – OD only. No indications.
		UT, ET	Six ring segment welds (all three at top guide and all three at core plate). No indications.
		VT-3	Four tie-rods (repair) installed. Baseline inspection performed.
	'98	VT-3	Retorqued, reinspected all four tie-rods.
	'99	VT-3	Reinspected all four tie-rods.
Core Shroud Support	'01	N/A	No shroud inspections.
	'95	VT-1	Both access hole covers. No indications.
	'96	UT, ET	H8 (25%) & H9 (22%). No indications.
		VT-1	Both access hole covers. No indications.
	'98	MVT-1	Both access hole covers. No indications.
	'99	EVT-1	Both access hole covers. No indications.
Core Spray Piping	'01	N/A	No shroud support inspections.
	'95	CSV-1	All piping and brackets. No indications.

	'96	UT	39 circumferential welds. Two collar-to-shroud welds (P8b) with indications.
		EVT-1	Five circumferential welds not accessible for UT. No indications.
		CSV-T-1	All brackets. No indications.
	'98	EVT-1	Reinspected eleven circumferential welds: two with previous indications, nine that were inaccessible for full UT in '96. No indications.
		'99	EVT-1
	'01	VT-3	All brackets. No indications.
EVT-1		Reinspected 32 circumferential target welds. No indications.	
UT		Four P9 welds. Indications in three of four welds. Max. indication length – 54°. Confirmed UT indications in two P8b welds.	
Core Spray Sparger	'95	CSV-T-1	100% IEB 80-13 inspections performed. No indications.
		VT-3	Repair clamp over tee-box plug (cracked weld) installed in 1980. No indications.
	'96	CSV-T-1	100% IEB 80-13 inspections performed. No indications.
		VT-3	Sparger tee-box repair. No indications.
	'98	MVT-1	17 of 20 large (tee-box to header, tee-box cover plate, and header to end cap) circumferential welds (3 inaccessible). No indications.
		VT-3	Sparger nozzles. No indications.
		VT-3	All brackets. No indications.

		VT-3	Sparger Tee-box repair. No indications.
	'99	VT-3	Sparger Tee-box repair. No indications.
	'01	EVT-1	17 of 20 large circumferential welds (3 inaccessible). No indications.
		VT-1	50% of nozzles. No indications.
Feedwater Spargers	'95	MVT-1	Tee-box welds and end bracket attachment welds. No indications.
	'96	N/A	No FW sparger inspections performed.
	'98	VT-3	Piping and brackets. No indications.
		MVT-1	Tee-box welds and end bracket attachment welds. No indications.
	'99	N/A	No FW sparger inspections performed.
	'01	VT-3	Piping and brackets. No indications.
		VT-1	Tee-box welds and end bracket attachment welds. No indications.
Top Guide	'95	VT-1	Ten locations in top guide grid IAW SIL-554. No indications.
	'96	VT-1	Seven locations in top guide grid IAW SIL-554. No indications.
	'98	MVT-1	Four locations in top guide grid IAW SIL-554. No indications.
	'99	VT-1	Two aligner assemblies. No indications.
		VT-1	Two hold-down assemblies. No indications.
		VT-1	Four locations in top guide grid. No indications.
	'01	VT-3	25% of rim and cover sheet bolts (NNS).
Core Plate	'95	VT-3	10 fuel support castings. No indications.

	'96	VT-3	Seven fuel support castings. No indications.
		VT-3	All 30 rim hold-down bolts from above. No indications.
	'98	VT-3	Four fuel support castings. No indications.
	'99	VT-3	16 rim hold-down bolts from above. No indications.
	'01	VT-3	15 rim hold-down bolts from above. No indications.
SLC	'95	N/A	No SLC BWRVIP inspections.
	'96	N/A	No SLC BWRVIP inspections.
	'98	EVT-2	Nozzle-to-safe-end weld. No indications.
	'99	EVT-2	Nozzle-to-safe-end weld. No indications.
	'01	EVT-2	Nozzle-to-safe-end weld. No indications.
Jet Pump Assembly	'95	VT-3	Restrainer wedges and set screws, inlet bolted connections, sensing lines on five assemblies (50%). No indications.
		VT-1	Welds on five riser braces (50%). No indications.
	'96	VT-3	Restrainer wedges and set screws, inlet bolted connections, sensing lines on five assemblies (50%). No indications.
		VT-1	Welds on five riser braces (50%). No indications.
	'98	UT	26 of 30 Riser RS-1, RS-2, RS-3, circumferential welds. Four welds with indications – maximum approx. 3".
		EVT-1	Remaining four riser RS-1 circumferential welds. No indications.

		MVT-1	Riser-to-restrainer RS-4, RS-5 welds on five assemblies (50%). No indications.
		MVT-1	Welds on five riser braces (50%). No indications.
		VT-1	Restrainer wedges on five assemblies (50%). No indications.
		VT-3	Restrainer set screws, inlet bolted connections, sensing lines on five assemblies (50%). No indications.
		UT	20 hold-down beams. One beam with UT indication on bolt hole replaced.
	'99	UT	160 mixer, diffuser, and adapter circumferential welds. Indications found on four diffuser welds, all less than 2".
	'01	EVT-1	20 mixer (MX-1) welds. No indications.
		UT	Ten hold-down beams. No indications.
		UT	Four RS-1 welds with indications from 1998. Two 1998 indications determined to be lift-off. No growth on others.
		VT-1	Restrainer wedges on five assemblies (one loop). No indications.
		VT-3	Restrainer set screws, sensing lines on five assemblies (50%). No indications.
CRD Guide Tube	'95	N/A	No CRD guide tube inspections.
	'96	N/A	No CRD guide tube inspections.
	'98	N/A	No CRD guide tube inspections.
	'99	N/A	No CRD guide tube inspections.
	'01	EVT-1	Circumferential welds (CRGT-2 and CRGT-3) on four of 89 guide tubes. No indications.

		VT-3	Lugs and pin assemblies on four guide tubes. No indications.
CRD Stub Tube	'83	VT-3	2 of 89. No indications.
In-Core Housing	'83	VT-3	2 of 89. No indications.
Dry Tube	'95	VT-1, -3	Four dry tubes. No indications. (Dry tubes replaced in 1986 due to cracking.)
	'96	N/A	No dry tubes inspected.
	'98	N/A	No dry tubes inspected.
	'99	VT-1, -3	Two dry tubes. No indications.
	'01	N/A	No dry tubes inspected.
Instrument Penetrations	N/A	N/A	N/A
Vessel ID Brackets	'95	VT-3	Reinspected one dryer support bracket with indication from 1992. No change.
	'96	UT	Reinspected same dryer support bracket from vessel OD. No change.
	'98	VT-3	Reinspected same dryer support bracket. No change.
	'99	N/A	No vessel brackets inspected.
	'01	VT-3, UT	Reinspected same dryer support bracket. No change.
LPCI Coupling	N/A	N/A	N/A
Steam Dryer and Separator	'95	UT	All shroud head hold-down bolts. Nine bolts with indications.
	'96	N/A	Replaced all steam separator / shroud head hold-down bolts.
	'98	VT-3	Steam dryer and separator. Indications on five tack welds on three jacking bolt (lifting eye) assemblies on the steam dryer.
	'99	VT-3	Reinspected cracked tack welds on steam

			dryer. No change.
	'01	N/A	No steam dryer or separator inspections.