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10 CFR 50.55a

RBG-47913

November 30, 2018

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

Subject: Request for Alternative in Accordance with 10 CFR 50.55a(g)(5)(iii) Proposed Alternative to CFR 50.55a Examination Requirements for Third Interval Volumetric Exams (RBS-ISI-021)

River Bend Station, Unit 1
NRC Docket No. 50-458
Facility Operating License No. NPF-47

Dear Sir or Madam:

In accordance with Title 10 of the Code of Federal Regulations (CFR) 50.55a, "Codes and Standards," paragraph (g)(5)(iii), Entergy Operations, Inc. (Entergy) requests relief from certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPV), Section XI requirements pertaining to volumetric examinations at River Bend Station, Unit 1 (RBS). In several locations, the required coverage cannot be obtained due to impracticality, based on interference or geometry.

As required by 10 CFR 50.55a(g)(5)(iii), the basis for the determination of impracticality is being submitted to the NRC within 12 months after the expiration of the 120-month ISI interval. The third 10-year ISI interval ended on November 30, 2017.

In accordance with 10 CFR 50.55a(g)(6)(i), the proposed relief to the referenced requirements may be approved by the NRC giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Entergy believes full compliance with the ASME Code, Section XI requirements is not practical.

The specific details of the requested relief are provided in the Enclosure and associated Attachment.

- The Attachment to the Enclosure provides the tables and figures that are used to depict the limitations and calculations for obtained coverage, materials and product forms, with ultrasonic examination angles and wave forms used, and the examination results for the welds associated with this relief request, including any applicable previous examination history.

The NRC previously granted relief for these examinations in the Safety Evaluations listed in Section 8 (i.e., "Precedents") of the Enclosure.

There are no regulatory commitments contained in this submittal. If you require additional information, please contact Mr. Tim Schenk at 225-381-4177 or tschenk@Entergy.com.

Sincerely,

A handwritten signature in cursive script that reads "Mandy K. Halter".

Mandy K. Halter

MKH/baj

Enclosure: Third 10-Year Interval Inservice Inspection Program Request For Relief
10 CFR 50.55a(g)(5)(iii) Inservice Inspection Impracticality (RBS-ISI-021)

Attachment: Tables and Figures

cc: NRC Regional Administrator – Region IV
NRC Project Manager – River Bend Station
NRC Senior Resident Inspector – River Bend Station
Louisiana Department of Environmental Quality, Office of Environmental Compliance,
Radiological Emergency Planning and Response Section
Public Utility Commission of Texas

ENCLOSURE

RBG-47913

**Third 10-Year Interval Inservice Inspection Program Request For Relief
10 CFR 50.55a(g)(5)(iii) Inservice Inspection Impracticality (RBS-ISI-021)**

Attachment: Tables and Figures

1. American Society of Mechanical Engineers (ASME) Code Component(s) Affected

The River Bend Station, Unit 1 (RBS) Class 1 welds with limited Inservice Inspection (ISI) examinations are included in this relief request and are listed in Table 1 of the Attachment. The content of this relief request includes the insights gained from guidance provided in Reference (1) and the following Code Classes, Examination Categories, and Item Numbers apply.

Code Classes:	1
Examination Categories:	B-A, B-G-1 and R-A
Item Numbers:	B1.30, B1.40, B6.40 and R1.20

2. Applicable Code Edition and Addenda

The applicable ASME Boiler and Pressure Vessel Code of Record (hereafter referred to as the "Code") edition and addenda is ASME Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*, 2001 Edition through 2003 Addenda, Reference (2) used for the Third 10-Year ISI Interval (May 31, 2008 to November 30, 2017) at RBS as modified by 10 CFR 50.55a where applicable. The Appendix VIII requirements and use of the Performance Demonstration Initiative (PDI) requirements at RBS are in accordance with the 2001 Edition of Section XI, Reference (3) as conditioned by 10 CFR 50.55a(b)(2)(xv) and 10 CFR 50.55a(b)(2)(xxiv).

As an alternative to the requirements above for ASME Section XI Examination Category B-F, B-J, C-F-1 and C-F-2 welds, Entergy Operations, Inc. (Entergy) received NRC authorization for RBS on June 30, 2010 to use a Risk-Informed Safety Based Inservice Inspection (RIS_B) program, Reference (4). The duration of this alternative to Section XI is for the remainder of the Third 10-Year ISI Interval. This RIS_B program is based in part on using ASME Code Case N-716, Reference (5) as guidance and from its authorization date forward Examination Category B-F, B-J, C-F-1, and C-F-2 welds were all included under Examination Category R-A of the new RISI_B program.

3. Applicable Code Requirements

As previously defined in 10 CFR 50.55a(g)(6)(ii)(A)(2) now removed, and ASME Code Case N-460, Reference (6), as approved in Regulatory Guide 1.147, the Code Case states that essentially 100% means more than 90% of the examination volume or required surface area of each weld where the reduction in coverage is due to interference by another component or part geometry. Additional guidance in NRC Information Notice 98-42, Reference (7), has also been applied at RBS on how ASME Section XI should meet examination coverage criteria in Code Case N-460. These requirements have been applied at RBS for all welds contained in this relief request and below are the descriptions of the applicable code requirements used to conduct examinations associated with the 8 welds that have demonstrated examination limitations.

Class 1 Welds and Areas Examined for ISI

Table IWB-2500-1, Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," Item No. B1.30 requires the examination volumes for the Shell-to-Flange Weld and Item No. B1.40 the Head-to-Flange Weld. These welds have been chosen to be examined to meet the Third 10-Year ISI Interval requirements at RBS and the required examination volume is as defined by the applicable Figures IWB-2500-4 and IWB-2500-5, respectively. However, limited examinations have been determined to exist based on the demonstrated limitations experienced when attempting to comply with the code requirements as documented in the Attachment when performing examinations of these 2 welds.

ASME Code Case N-716, Table 1, Examination Category R-A, Item No. R1.20, "Elements Not Subject to a Degradation Mechanism," requires selected welds to have a volumetric examination performed in accordance with the volume required in Figures IWB-2500-8(c), IWB-2500-9, 10, 11 as applicable. However, limited examinations have been determined to exist based on the demonstrated limitations experienced when attempting to comply with the code requirements as documented in the Attachment when performing the examination of 8 of these welds.

Table IWB-2500-1, Examination Category B-G-1, "Pressure Retaining Bolting Greater Than 2 in. In Diameter", Item No. B6.40 requires examination of the threads in the reactor vessel flange stud holes as depicted by Figure IWB-2500-12. These areas are required to be examined to meet the Third 10-Year ISI Interval Requirements at RBS. As permitted by Table IWB-2500-1, Item No. B6.40 these examinations were deferred to and performed in the third period. These examinations are performed in accordance with ASME Section V, Article 4 as supplemented by ASME Section XI, Appendix I, Table I-2000-1. However, due to the configuration of the RPV Flange surface, the examinations were performed without obtaining essentially 100% coverage of the Code required volume. The description of the limitation and obtained coverage is documented in the Attachment.

Exam Cat.	Item No.	ISI Examination Requirements
B-A	B1.30 B1.40	Essentially 100% examination of the Reactor Vessel Shell-to-Flange and Head-to-Flange Welds. (2 Welds)
B-G-1	B6.40	Essentially 100% examination of the Reactor Vessel Flange Stud Hole Threads
R-A	R1.20	Essentially 100% examination of the selected welds per the requirements of ASME Code Case N-716, Table 1. (6 Welds)

4. Reason for Request

Impracticality of Compliance

10 CFR 50.55a(g)(5)(iii), states in part, that licensees may determine that conformance with certain code requirements is impractical and that the licensee shall notify the U.S. Nuclear Regulatory Commission (NRC or Commission) and submit information in support of the determination. Determination of impracticality in accordance with this section must

be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought. Pursuant to 10 CFR 50.55a(g)(5)(iii) described above, the required submittal of this relief request is due on or before November 30, 2018 for RBS, because Entergy has determined that compliance with the code requirements of achieving essentially 100% coverage of the welds listed in this relief request is impractical for RBS. This relief request is based on actual demonstrated limitations experienced when attempting to comply with the code requirements in the performance of the examinations listed in this relief request.

The construction permit for RBS was issued on March 25, 1977 and it falls under the provisions of 10 CFR 50.55a(g)(3), which were applied to provide design and access to perform preservice and inservice examinations of Class 1, 2 and 3 components and their supports using the preservice requirements of Section III Editions and Addenda or preservice and inservice examination requirements of Section XI Editions or Addenda applicable at that time in conjunction with those national standards referenced by these codes. Therefore, although the design of the plant has provided access for examinations, component design configurations with conditions resulting in examination limitations such as geometric configurations of welds may not allow full required examination volume coverage and thus this relief request addresses those conditions. A typical example of such a condition is a valve-to-pipe weld where essentially 100% of the code required volume cannot be examined from the valve side of the weld and where a plant modification would be needed to provide this coverage. Details for all examination restrictions and reductions in required examination coverage are provided in the Attachment.

When examined, the welds listed in the Attachment of this relief request did not receive the required code volume coverage due to their component design configurations. These conditions resulted in scanning limitations that prohibited obtaining essentially 100% examination coverage of the required examination volume, but when this situation occurred 100% of the accessible volume of the welds and items were covered.

Burden Caused by Compliance

To comply with the code required examination volumes for obtaining essentially 100% coverage for the welds listed in this relief request, the welds and their associated components would have to be physically modified and/or disassembled beyond their current design. Overall, components and fittings associated with the welds listed in this relief request are constructed of standard design items meeting typical national standards that specify required configurations and dimensions. To replace these items with items of alternate configurations to enhance examination coverage would require unique redesign and fabrication. Because these items are in the Class 1 boundary and form a part of the reactor coolant pressure boundary, their redesign and fabrication would be an extensive effort based on the limitations that exist.

Specifically, for the Class 1 Category B-A Flange-to-Vessel and Head-to-Flange Welds of the Reactor Vessel the design configurations of these welds do not allow the required examination coverage to be obtained without a design modification of the components. For the Class 1 Category B-G-1 RPV Flange stud hole threads, the configuration of the sealing surface prevents complete access to the area around each stud hole. To improve examination coverage would require a design modification of the RPV shell flange and head flange seating surfaces.

For the Class 1 Category R-A Welds listed in this relief request they are typically limited by their design configurations also. The configurations of these welds such as Pipe-to-Valve, Pipe-to-Tee, or Elbow-to-Tee Welds only allow ultrasonic examination coverage from one side of the weld or limited coverage from a specific area or areas of one side of the weld and thus they would also require a design modification to obtain the required examination coverage.

Overall it is not possible to obtain ultrasonic interrogation of greater than 90% of the required code examination volume for the welds and threads in this relief request without extensive weld or area design modifications. Examinations have been performed to the maximum extent possible and radiography is impractical due to the amount of work being performed in the areas on a 24-hour basis when the welds are available for examination. This would result in numerous work-related stoppages and increased exposure due to the shutdown and startup of other work in the areas. The water must be drained from systems or components where radiography is performed, which increases the radiation dose rates over a much broader area than the weld being examined. Therefore, there is significant impracticality associated with the performance of weld or area modifications or the use of radiography in order to increase the examination coverage.

The ultrasonic examination techniques used for each weld in this relief request were reviewed to determine if additional coverage could be achieved by improving those techniques and none could be identified and the examinations have been performed to the maximum extent possible. Therefore, RBS has determined that obtaining essentially 100% coverage is not feasible and is impractical without adding additional burden consisting of significant redesign work, increased radiation exposure, and/or potential damage to the plant or the component itself.

5. Proposed Alternative and Basis for Use

Proposed Alternative

- 1) Periodic system pressure tests and VT-2 visual examinations will continue to be performed in accordance with ASME Section XI, Examination Category B-P, for Class 1 pressure retaining welds and items each refueling outage in accordance with Table IWB-2500-1.
- 2) Conduct ultrasonic examinations to the maximum extent possible when required by ASME Section XI or the RIS_B Program.

Basis for Use

RBS has performed ISI examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 2001 Edition through the 2003 Addenda, of the ASME Boiler and Pressure Vessel Code, Section XI including Appendix VIII requirements in accordance with the 2001 Edition of Section XI and applicable PDI requirements along with the requirements of the RIS_B Program. When a component is found to have condition(s), which limited the required examination volume or surface area, RBS is required to submit this information to the enforcement and regulatory authorities having jurisdiction at the plant site. This relief request has been written to address areas where these types of conditions exist and where the required amount of coverage was reduced below the minimum acceptable.

10 CFR 50.55a(g)(4) recognizes that throughout the service life of a nuclear power facility, components which are classified as ASME Code Class 1, Class 2 and Class 3 must meet the requirements set forth in the ASME Code to the extent practical within the limitations of design, geometry and materials of construction of the welds and items as those described in the Attachment.

RBS performed the weld examinations listed in this relief request to the maximum extent possible for each of the welds identified with limitations in the Attachment. Plant-specific, or industry operating experience regarding potential degradation specific to welds in this relief request has been taken into account with the identification of potential degradation mechanisms within the scope of the applied RIS_B Program. The welds in this relief request were ultrasonically examined with manual techniques.

All the Class 1 Examination Category B-A and R-A welds with limited examinations included in the Attachment of this relief request are located inside the drywell at RBS. The following RCS leakage detection equipment and requirements help to ensure the early identification of any leakage of these welds during Reactor Coolant System (RCS) operation. Even though the limitations associated with the examinations identified in this relief request did not meet the essentially 100% code required volume coverage requirement there is instrumentation in place to assure that early detection of any RCS pressure boundary leakage is identified. This is accomplished by the leakage monitoring systems inside the drywell at RBS where the RCS leakage detection systems are required to be operable in accordance with RBS Technical Specification (TS) Limiting Condition for Operation (LCO) 3.4.7, "RCS Leakage Detection Instrumentation." The system's instrumentation consists of the drywell or pedestal floor drain sump monitoring system, the drywell atmospheric monitoring system or atmospheric gaseous monitoring system, and the drywell air cooler flow rate monitoring system. These systems are used to quantify any unidentified leakage from the RCS and to meet RBS TS LCO 3.4.5, "RCS Operational Leakage." RCS Surveillance Requirements (SRs) 3.4.7.1, 3.4.7.2, 3.4.7.3, and 3.4.5.1 ensure operability of the RCS leakage detection systems, and compliance with TS LCO 3.4.5, which states: "RCS Operational Leakage shall be limited to (a) No pressure boundary leakage; (b) ≤ 5 gallons per minute (gpm) unidentified leakage; (c) ≤ 30 gpm total leakage averaged over the previous 24 hour period; and (d) ≤ 2 gpm increase in unidentified leakage with the previous 24 hour period in MODE 1.

Based upon the extent of the ultrasonic examination volume achieved for each of the welds within this relief request and any alternate scans performed, coupled with applicable leakage monitoring, and required system pressure tests with VT-2 visual examinations, no further action can be taken by Entergy at this time to improve these examinations without applying impractical options. Therefore, the proposed alternatives in this relief request will provide assurance of an acceptable level of quality and safety by providing reasonable assurance of structural integrity.

6. Conclusion

10 CFR 50.55a(g)(5)(iii) states:

ISI program update: *Notification of impractical ISI Code requirements*. If the licensee has determined that conformance with a code requirement is impractical for its facility the licensee must notify the NRC and submit, as specified in § 50.4, information to support the determinations. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought.

EOI believes that the requirements above have been satisfied by the contents in this relief request. The RBS Third 10-Year ISI Interval ended on November 30, 2017 and all the limited examinations contained in this relief request are required to be submitted to the NRC on or before 12 months after this date, which would be November 30, 2018. The first Fourth 10-Year ISI Interval examinations are scheduled to commence on March 30, 2019.

7. Duration of Proposed Alternative

This relief request covers the limited examinations that have been identified for the entire Third 10-Year ISI Interval that started on May 31, 2008 and ended on November 30, 2017.

8. Precedents

Note: Industry requests for relief due to impracticality associated with limited examinations are common and are typically filed by all licensees. Some of the more recent NRC approvals of requested relief that are aligned with Reference (1) are:

- (1) NRC Safety Evaluation Report (SER) for Dresden Nuclear Power Station, Units 2 and 3 - Request 14R-17 Relief From The Requirements Of The ASME Code (CAC NOS. MF3352 AND MF3353), Dated: October 30, 2015, [ADAMS Accession No. ML15265A164]
- (2) NRC Safety Evaluation Report (SER) for Salem Nuclear Generating Station, Unit No. 2 – Relief from the Requirements of the ASME Code (TAC No. MF4591), Dated July 28, 2015, [Adams Accession No. ML15195A495]
- (3) NRC Safety Evaluation Report (SER) for St. Lucie Plant, Unit No. 2 – Relief Request No. 17 – Request for Relief from Performing Inservice Inspection Volumetric Examinations of ASME Category B-A Welds (TAC NO. MF4339), Dated: April 17, 2015, [ADAMS Accession No. ML15029A583]

9. References

- (1) NRC presentation "Coverage Relief Requests", Industry/NRC NDE Technical Information Exchange Public Meeting January 13-15, 2015, [ADAMS Accession No. ML15013A266].
- (2) ASME Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*, 2001 Edition through 2003 Addenda.
- (3) ASME Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*, 2001 Edition, Appendix VIII, Performance Demonstration for Ultrasonic Examination Systems.
- (4) NRC Safety Evaluation Report (SER) for River Bend Station, Unit 1 – Request for Alternative RBS-ISI-013, Request to Use ASME Code Case N-716 (TAC NO. ME1507), Dated: June 30, 2010, [ADAMS Accession No. ML101730157].
- (5) ASME Code Case N-716, Alternative Piping Classification and Examination Requirements Section XI, Division 1.
- (6) ASME Code Case N-460, Alternative Examination Coverage for Class 1 and Class 2 Welds Section XI, Division 1.
- (7) NRC Information Notice 98-42, Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements, Dated: December 1, 1998.

ENCLOSURE, ATTACHMENT

RBG-47913

Tables and Figures

Introduction

This attachment contains tables and figures as applicable that are used to depict the limitations and calculations for obtained coverage, materials and product forms, with ultrasonic examination angles and wave forms used, and the examination results for the welds associated with this relief request, including any applicable previous examination history.

Table 1 – RBS ISI Examinations with Limited Coverage

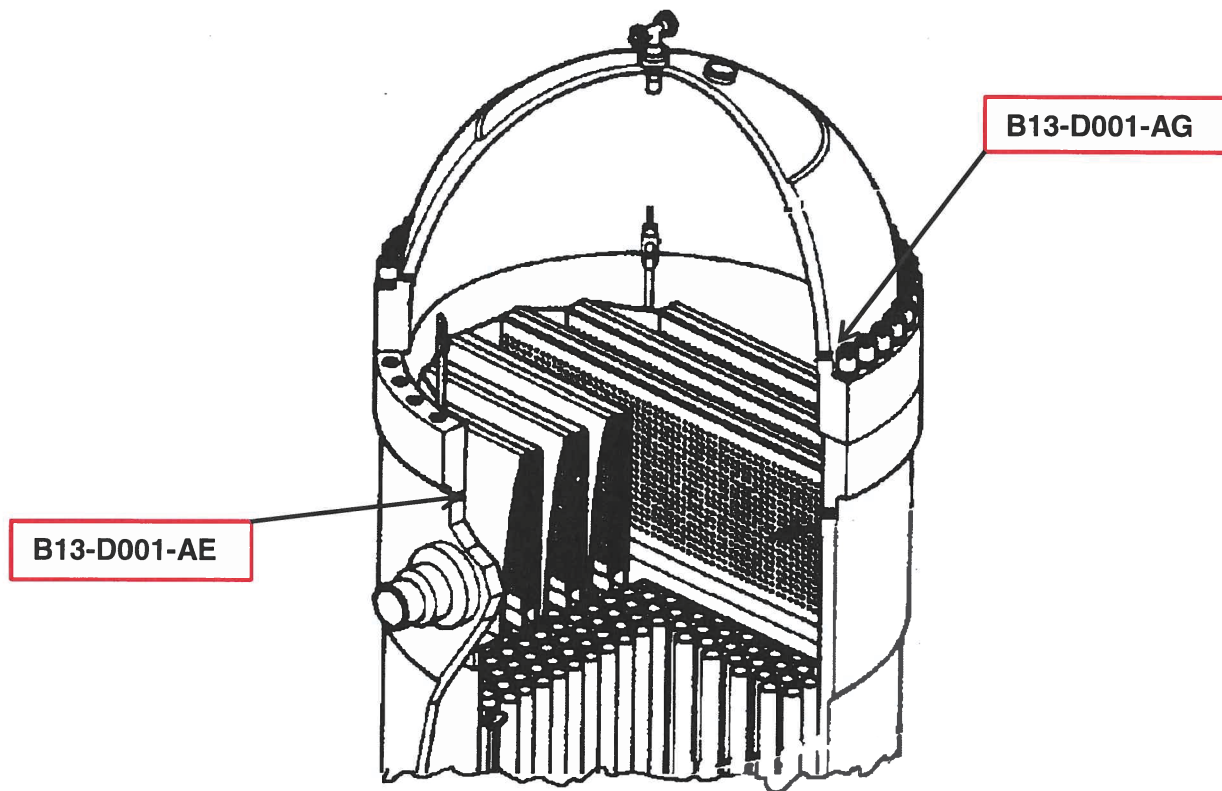
Cat	Item No.	Comp ID	Item Description	Material 1 and Product Form	Material 2 and Product Form	Examination Code Coverage Obtained	Examination Limitations and Results
B-A	B1.30	B13-D001-AE	Reactor Vessel Shell-to-Flange Weld	Shell: SA-533	Flange: SA-508	UT = 74.8%	Geometric Flange Design Configuration Limitation Scans from Shell Side Only. No Recordable Indications.
B-A	B1.40	B13-D001-AG	Reactor Vessel Shell-to-Flange Weld	Shell: SA-533	Flange: SA-508	UT = 74.7%	Geometric Flange Design Configuration Limitation Scans from Head Side Only. No Recordable Indications.
B-G-1	B6.40	B13-D001-LG (64 Stud Holes)	RPV Flange Stud Hole Threads	SA-540	N/A	UT = 80%	Flange Raised Seating Surface. No Recordable Indications
R-A	R1.20	WCS-003A-XI-FW003 / WCS-003-CD-A	Pipe-to-Valve	Pipe: SA-312 TP316L	Valve: SA-182 F316L	UT = 50%	Geometric Design Configuration Limitation No Scans From Valve Side of Weld. No Recordable Indications
R-A	R1.20	WCS-003A-XI-FW004 / WCS-003-CD-A	Valve-to-Pipe	Valve: SA-182, F316L,	Pipe: SA-312 TP316L	UT = 50%	Geometric Design Configuration Limitation No Scans From Valve Side of Weld. No Recordable Indications
R-A	R1.20	WCS-006B2-XI-FW011 / WCS-006-CD-B2	Pipe-to-Valve	Pipe: SA-312 TP316L	Valve: SA-182 F316L	UT = 50%	Geometric Design Configuration Limitation No Scans From Valve Side of Weld. No Recordable Indications
R-A	R1.20	WCS-006B2-XI-FW013 / WCS-006-CD-B2	Bent Pipe-to-Reducer	Pipe: SA-312 TP316L	Reducer: SA-403 WP316L	UT = 50%	Geometric Design Configuration Limitation No Scans From Reducer Side of Weld. No Recordable Indications
R-A	R1.20	WCS-006B2-XI-SW001 / WCS-006-CD-B2	Bent Pipe-to-Tee	Pipe: SA-312 TP316L	Tee: SA-403 WP316L	UT = 50%	Geometric Design Configuration Limitation No Scans From Tee Side of Weld. No Recordable Indications

R-A	R1.2 0	WCS-006B2- XI-SW004 / WCS-006-CD- B2	Tee-to-Pipe	Tee: SA-403 WP316L	Pipe: SA-312 TP316L	UT = 50%	Geometric Design Configuration Limitation No Scans From Tee Side of Weld. No Recordable Indications
R-A	R1.2 0	SLS-042B- FW001 / SLS- 042-CD-B	2" Tee-To- 90° Elbow	Tee: SA-403 WP304L	Elbow: SA- 403 WP304L	UT = 85.9%	Geometric Design Configuration Limitation. No Recordable Indications
R-A	R1.2 0	SLS-042B- FW015/SLS- 042-CD-B	2" Tee-to- Pipe	Tee: SA-312 TP304L	Pipe: SA-403 WP304L	UT = 85.9%	Geometric Design Configuration Limitation. No Recordable Indications

General Weld and Component ISI Examination Locations

The following figure identifies the general location of the Reactor Vessel Shell-to-Flange Weld B13-D001-AE and the Reactor Vessel Head-to-Flange Weld B13-D001-AG listed in Table 1. These two welds were found to have limited examination coverage of 90% or less during the RBS Third 10-Year ISI Interval by actual examination performance. Examination details for each of these welds and all the other welds listed in Table 1 are provided in the specific paragraphs below.

Figure A
Upper Reactor Vessel Section and Top Head



Weld B13-D001-AE – Reactor Vessel – Shell-to-Flange Weld

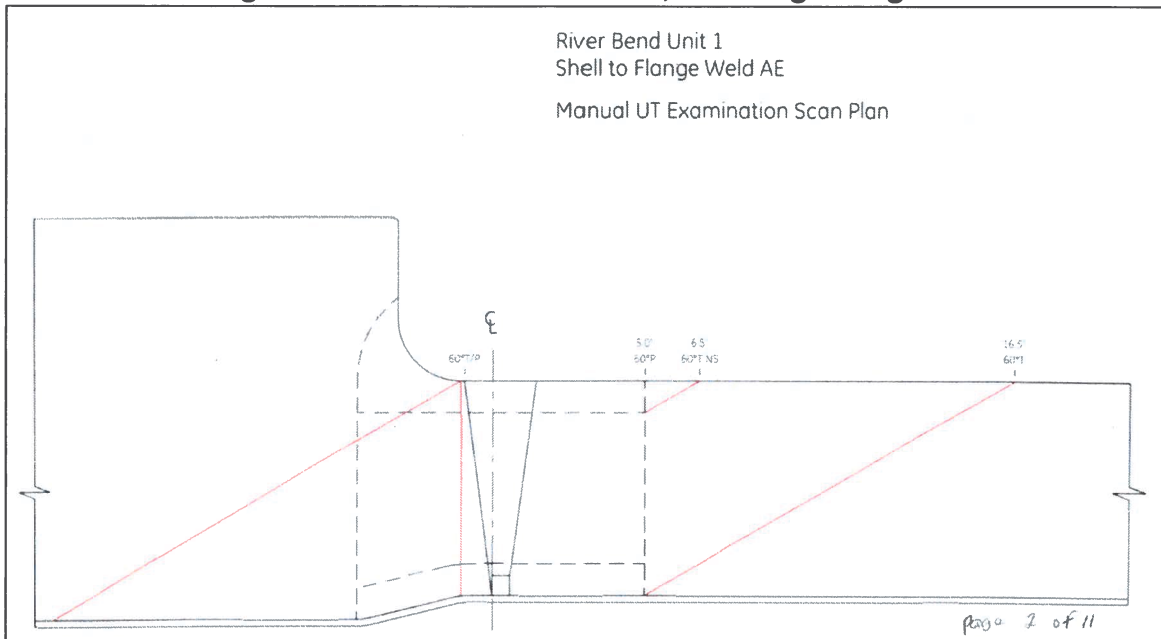
This weld was examined for ISI in Inspection Period 1 during RF16 in 2011. The Code Required Volume (CRV) was determined based on Section XI, Figure IWB-2500-4 and the corresponding required exam volume as shown on the Figure is A-B-C-D. This weld was last examined in 1999 and the current UT data sheet states that no change was found during the current examination.

Table 2 – Weld B13-D001-AE, Reference Coverage Calculation Sheet

Reactor Pressure Vessel Coverage Calculation Sheet						
River Bend Unit 1 / RBS-RF-16 Shell 4 - Flg - AE Spring / 2011						
Weld Length = 735. Exam Volume = 65.3	CODE CROSS-SECTIONAL AREA			TOTAL CODE COVERAGE		
	Required Exam Area Sq. In.	Area Scanned Manual	Percent of Area Manual	Weld Length Manual	Percent Manual	
60° T-Scan (S4 UC)	A	9.2	9.2	14.1%	735	7.0%
60° T-Scan (S6 FV)	A	43.9	43.2	66.2%	735	33.1%
60° T-Scan (S6 NS)	A	12.2	6.6	10.1%	735	5.1%
60° P-Scan (S4 UC)	A	9.2	5.8	8.9%	735	4.4%
60° P-Scan (S6 FV)	A	43.9	27.2	41.7%	735	20.8%
60° P-Scan (S6 NS)	A	12.2	5.7	8.7%	735	4.4%
60° T-Scan (S4 UC)						
60° T-Scan (S6 FV)						
60° T-Scan (S6 NS)						
60° P-Scan (S4 UC)						
60° P-Scan (S6 FV)						
60° P-Scan (S6 NS)						
60° T-Scan (S4 UC)						
60° T-Scan (S6 FV)						
60° T-Scan (S6 NS)						
60° P-Scan (S4 UC)						
60° P-Scan (S6 FV)						
60° P-Scan (S6 NS)						
% Total Composite Coverage =					74.8%	
Comments A - Exam restricted due to the shell flange configuration. Rev. 0 9/23/06						
Note - Rounding methods may affect calculated values. UC-Underclad, FV-Full volume, NS-Near Surface. Weld length in inches or degrees						

NOTE: Information has been used from the following Reactor Pressure Vessel Calculation Coverage Sheet to obtain the complete coverage for this weld, which is 74.8% and the examination was limited to the shell side of the weld.

Figure B – Weld B13-D001-AE, Coverage Diagram



Weld B13-D001-AG – Reactor Vessel – Head-to-Flange Weld

This weld was examined for ISI in Inspection Period 1 during RF16 in 2011. The Code Required Volume (CRV) was determined based on Section XI, Figure IWB-2500-5 and the corresponding required exam volume as shown on the Figure is A-B-C-D and includes a required Surface Exam Area of B-E. This weld was last examined in 1999 and the current UT data sheet states that no change was found during the current examination.

Table 3 – Weld B13-D001-AG, Reference Coverage Calculation Sheet

Reactor Pressure Vessel Coverage Calculation Sheet						
River Bend Unit 1 / RBS-RF-16 Top Hd - Flg - AG Spring / 2011						
Weld Length = 695. Exam Volume = 29.1	CODE CROSS-SECTIONAL AREA			TOTAL CODE COVERAGE		
	Required Exam Area Sq. In.	Area Scanned Manual	Percent of Area Manual	Weld Length Manual	Percent Manual	
60° T-Scan (S4 UC)						
60° T-Scan (S6 FV)	A	21.1	21.1	72.5%	695	36.3%
60° T-Scan (S6 NS)	A	8	5.8	19.9%	695	10.0%
60° P-Scan (S4 UC)						
60° P-Scan (S6 FV)	A	21.1	12.8	44.0%	695	22.0%
60° P-Scan (S6 NS)	A	8	3.8	13.1%	695	6.5%
60° T-Scan (S4 UC)						
60° T-Scan (S6 FV)						
60° T-Scan (S6 NS)						
60° P-Scan (S4 UC)						
60° P-Scan (S6 FV)						
60° P-Scan (S6 NS)						
60° T-Scan (S4 UC)						
60° T-Scan (S6 FV)						
60° T-Scan (S6 NS)						
60° P-Scan (S4 UC)						
60° P-Scan (S6 FV)						
60° P-Scan (S6 NS)						
% Total Composite Coverage =						74.7%

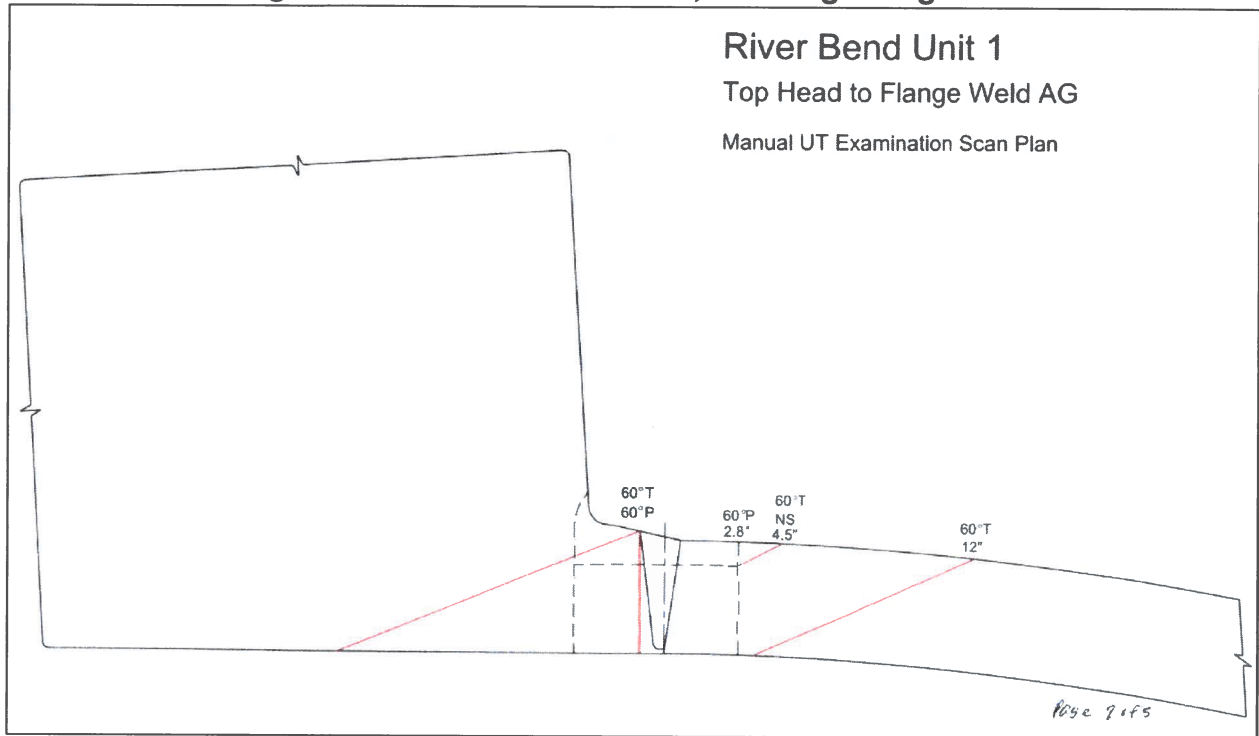
Rev. 0 9/23/05

Comments: A - Exam restricted due to the proximity of the top hd flange.

Note - Rounding methods may affect calculated values. UC-Underclad, FV-Full volume, NS-Near Surface. Weld length in inches or degrees.

NOTE: Information has been used from the following Reactor Pressure Vessel Calculation Coverage Sheet to obtain the complete coverage for this weld, which is 74.7% and the examination was limited to the head side of the weld.

Figure C – Weld B13-D001-AG, Coverage Diagram



B13-D001-LG - RPV Flange Stud Hole Threads

There are 64 total RPV Flange Stud Holes. As permitted by Table IWB-2500-1 for Examination Category B-G-1, Item Number B6.40, all 64 examinations were deferred and completed in the Third Period. For all 64 stud hole examinations 80% of the code required examination was achieved with no recordable indications.

Figure D – RPV flange Stud Hole Thread Coverage

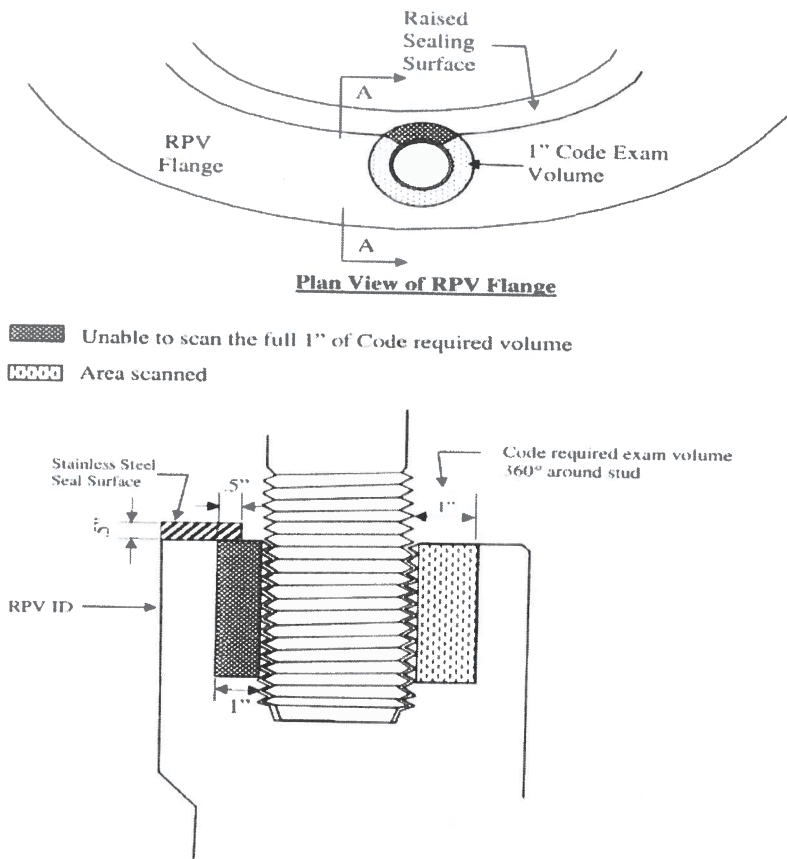
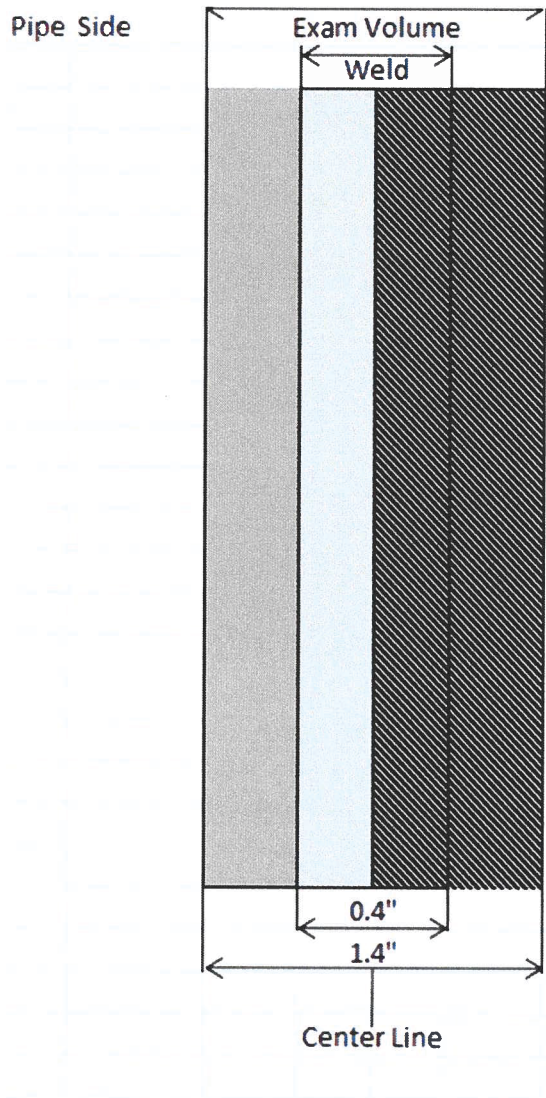


Figure E- Weld WCS-003A-XI-FW003 Coverage (Pipe-to-Valve Weld)

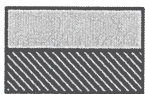


NO coverage achieved on the Valve side due to component configuration. Additional scans were performed per procedure requirements as a best effort.

"Actual Required total Coverage"
 UP Stream AX Scan = 100% obtained.
 UP Stream Circ Scan = 100% obtained.
 Dn. Stream AX Scan = 0% obtained.
 Dn. Stream Circ Scan = 0% obtained.
 $(0+0+100+100) / 4 = \underline{50 \% \text{ CRV achieved}}$

3"

ID # WCS-003A-XI-FW003



: Non Limited
 : Limited Area

Figure F - Weld WCS-003A-XI-FW004 Coverage (Valve-to-Pipe Weld)

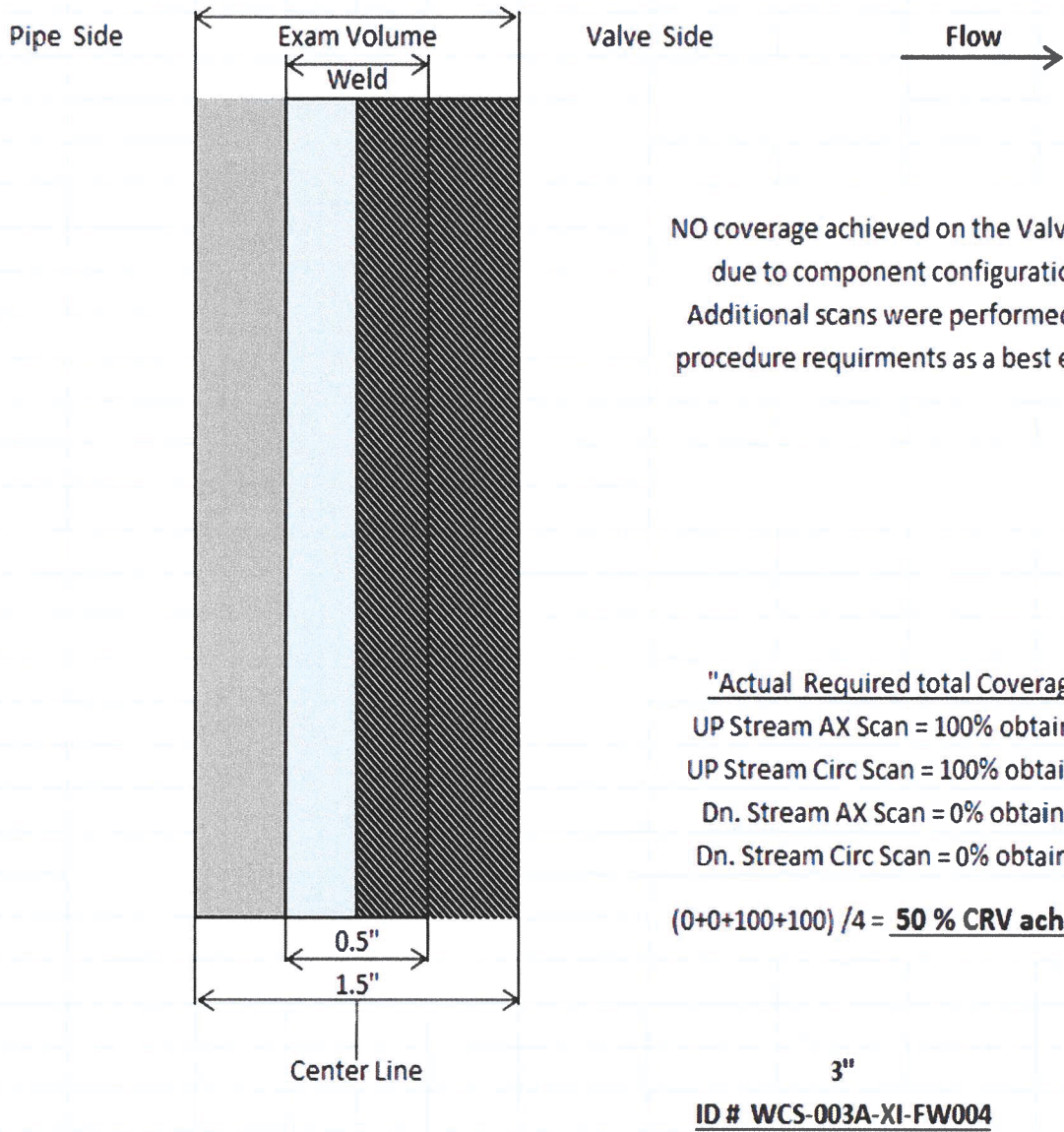
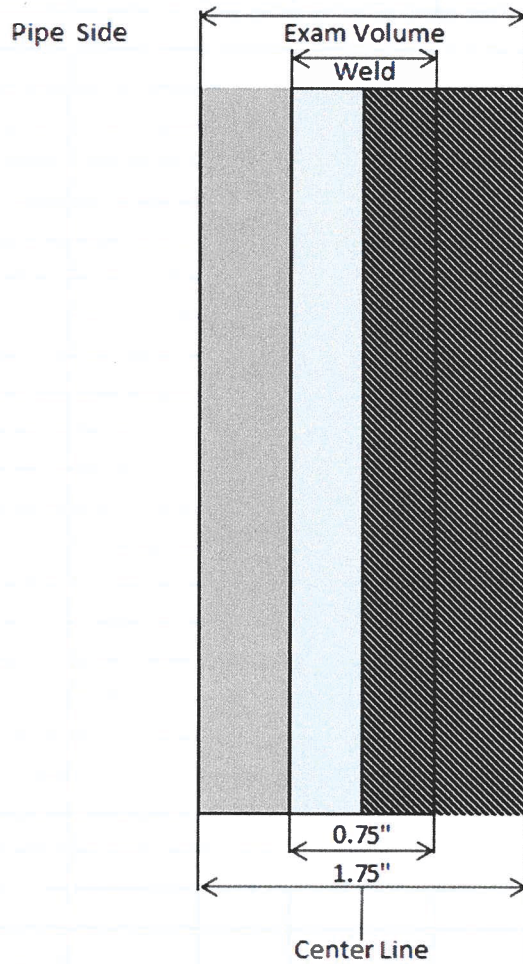


Figure G- Weld WCS-006B2-XI-FW011 Coverage (Pipe-to-Valve Weld)



NO coverage achieved on the Valve side due to component configuration. Additional scans were performed per procedure requirements as a best effort.

"Actual Required total Coverage"

Pipe Side AX Scan = 100% obtained.

Pipe Side Circ Scan = 100% obtained.

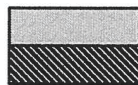
Valve Side AX Scan = 0% obtained.

Valve Side Circ Scan = 0% obtained.

$(0+0+100+100) / 4 = \underline{50\% \text{ CRV achieved}}$

3"

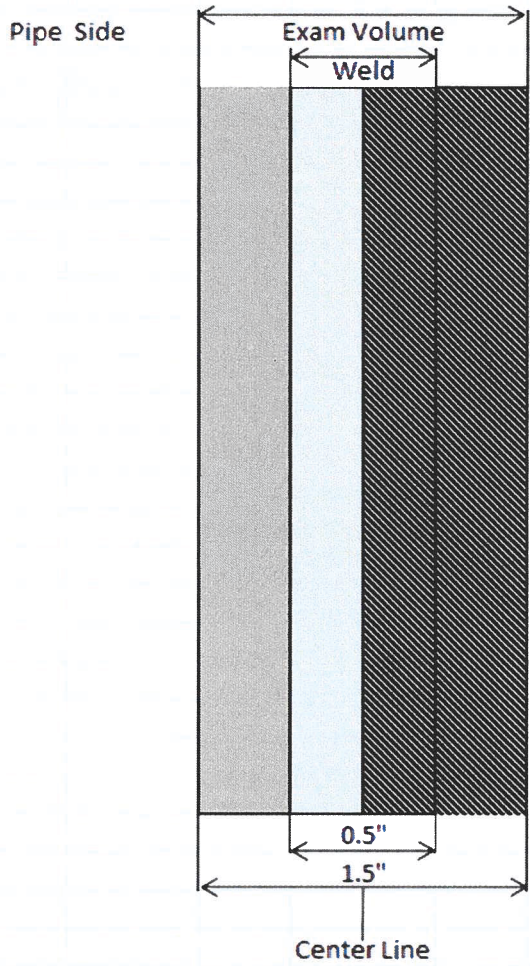
ID # WCS-006B2-XI-FW011



: Non Limited

: Limited Area

Figure H- Weld WCS-006B2-XI-FW013 Coverage (Pipe-to-Reducer Weld)



Reducer Side

NO coverage achieved on the Reducer side due to component configuration. Additional scans were performed per procedure requirements as a best effort.

"Actual Required total Coverage"
 Pipe Side AX Scan = 100% obtained.
 Pipe Side Circ Scan = 100% obtained.
 Reducer Side AX Scan = 0% obtained.
 Reducer Side Circ Scan = 0% obtained.
 (0+0+100+100) / 4 = **50 % CRV achieved**

3"

ID # WCS-006B2-XI-FW013



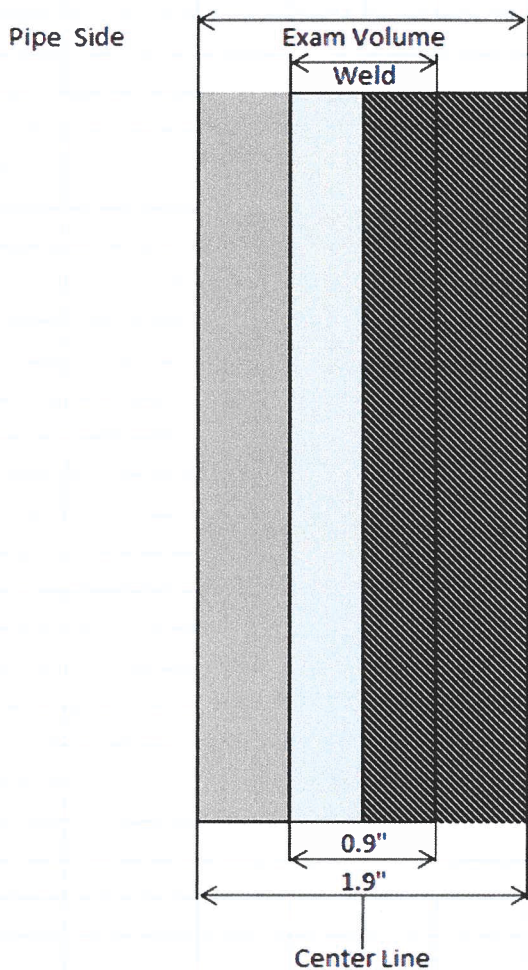
 : Non Limited
 : Limited Area

Figure I- Weld WCS-006B2-XI-SW001 Coverage (Bent Pipe-to-Tee Weld)



Tee Side

NO coverage achieved on the Tee side due to component configuration. Additional scans were performed per procedure requirements as a best effort.

"Actual Required total Coverage"

Pipe Side AX Scan = 100% obtained.

Pipe Side Circ Scan = 100% obtained.

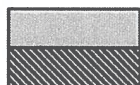
Tee Side AX Scan = 0% obtained.

Tee Side Circ Scan = 0% obtained.

$(0+0+100+100) / 4 = \underline{\underline{50 \% CRV achieved}}$

3"

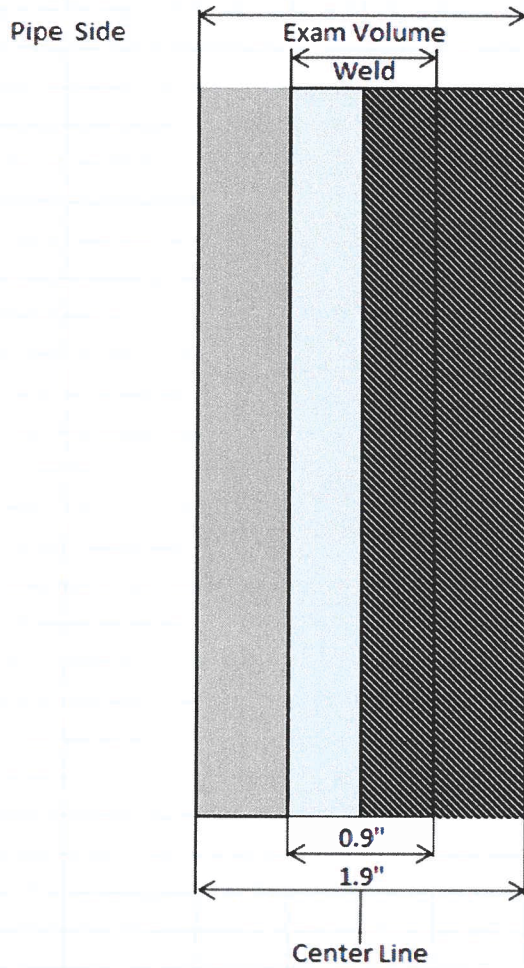
ID # WCS-006B2-XI-SW001



: Non Limited

: Limited Area

Figure J- Weld WCS-006B2-XI-SW004 Coverage (Tee-to-Pipe Weld)



NO coverage achieved on the Tee side due to component configuration. Additional scans were performed per procedure requirements as a best effort.

"Actual Required total Coverage"

Pipe Side AX Scan = 100% obtained.

Pipe Side Circ Scan = 100% obtained.

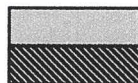
Tee Side AX Scan = 0% obtained.

Tee Side Circ Scan = 0% obtained.

$(0+0+100+100) / 4 = \underline{\underline{50 \% CRV achieved}}$

3"

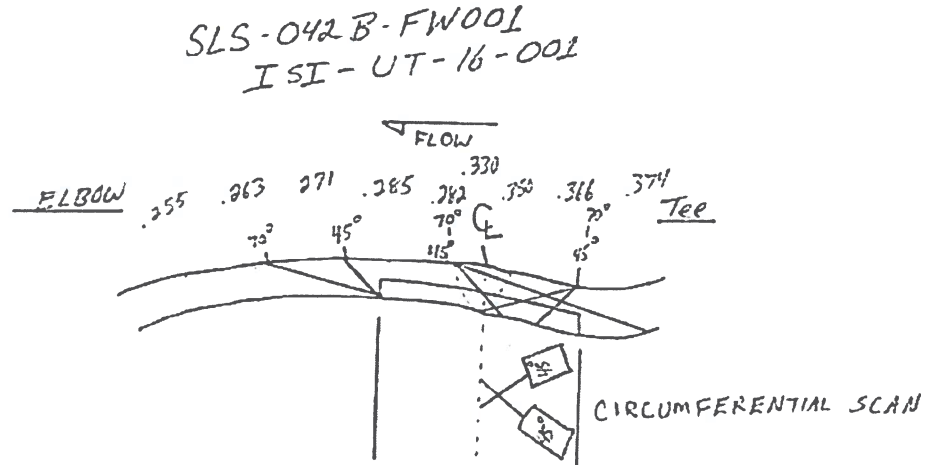
ID # WCS-006B2-XI-SW004



: Non Limited

: Limited Area

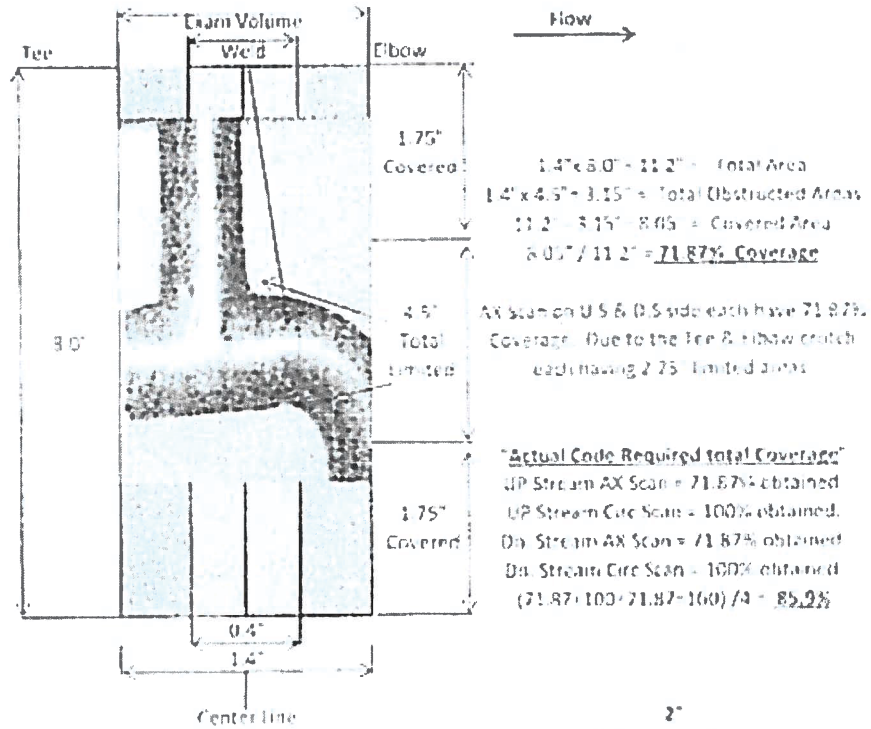
Figure K- Weld SLS-042B-FW001 Coverage (Tee-to-90° Elbow Weld)



NOTE: Profile taken @ Extrados of ELBOW
Weld Crown WIDTH .4"
Weld Length 8.0"

NOTE: Scan Limitations Noted on
Additional Attachment

Figure L- Weld SLS-042B-FW001 Calculation



$1.47 \times 8.0" = 11.2" = \text{Total Area}$
 $1.4" \times 4.5" = 3.15" = \text{Total Obstructed Area}$
 $11.2" - 3.15" = 8.05" = \text{Covered Area}$
 $8.05" / 11.2" = 71.87\% \text{ Coverage}$

AX Scan on U.S. & D.S. side each have 71.87% Coverage. Due to the Tee & Elbow crutch each having 2.75" limited areas.

"Actual Code Required total Coverage"
 UP Stream AX Scan = 71.87% obtained
 UP Stream Circ Scan = 100% obtained
 DN Stream AX Scan = 71.87% obtained
 DN Stream Circ Scan = 100% obtained
 $(71.87 + 100 + 71.87 + 100) / 4 = 85.9\%$

2"
 "SLS-042-FW001"
 Weld area coverage

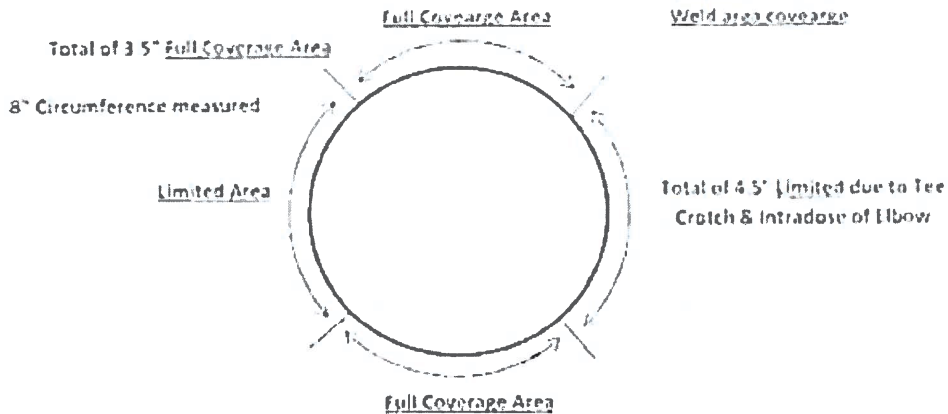


Figure M- Weld SLS-042B-FW015 Coverage (Pipe-To-Tee Weld)

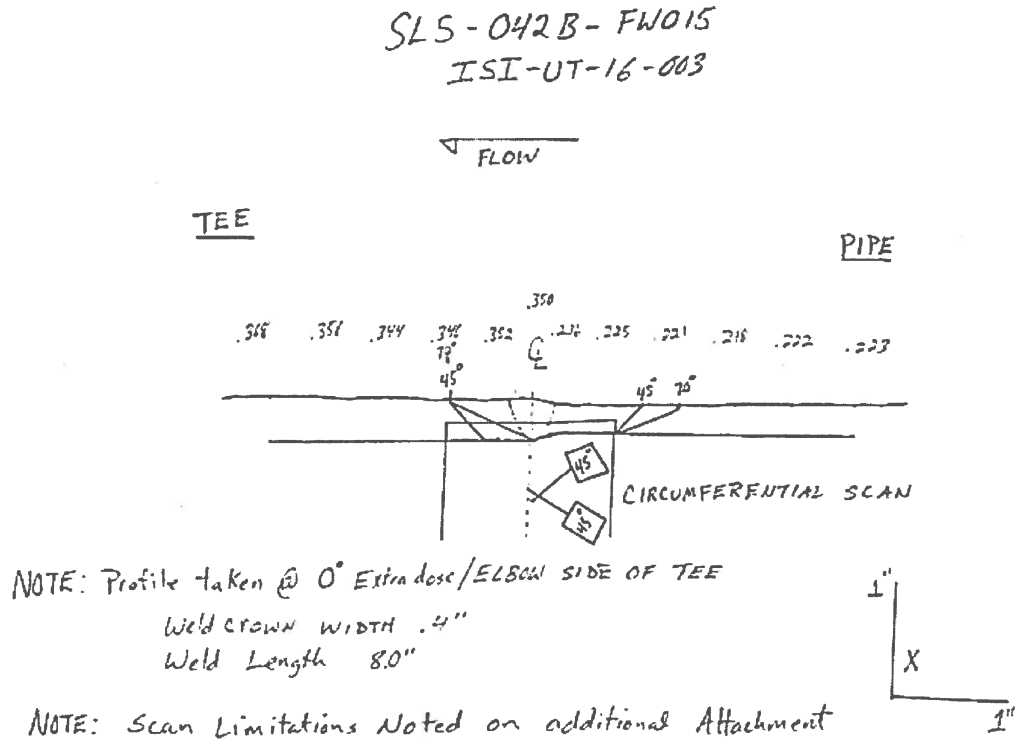


Figure N- Weld SLS-042B-FW015 Calculation

