Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-17-091

July 14, 2017

10 CFR 50.55a

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Response to Request for Additional Information Regarding Watts Bar Nuclear Plant, Unit 2 Request for Approval of a Relief from the American Society of Mechanical Engineers (ASME) Section XI Coverage Examinations for Preservice Inspection (PSI) - Number WBN-2/PSI-1, Revision 1, and Submittal of the WBN Unit 2 PSI Program Plan, Revision 11 (CAC No. MF8515)**

Reference:
1. TVA Letter to NRC, CNL-16-135, "Watts Bar Nuclear Plant (WBN) Unit 2 - Request for Approval of a Relief from the American Society of Mechanical Engineers (ASME) Section XI Coverage Examinations for Preservice Inspection (PSI) - Number WBN-2/PSI-1, Revision 1, and Submittal of the WBN Unit 2 PSI Program Plan, Revision 11," dated October 5, 2016 (ML16293A334)
2. NRC Electronic Mail to TVA, "Watts Bar, Unit 2 - Final Request for Additional Information Concerning Request for Relief From ASME Requirements (CAC No. MF8515)," dated April 20, 2017 (ML17112A045)

In Reference 1, Tennessee Valley Authority (TVA) submitted a request for relief from the American Society of Mechanical Engineers (ASME) Section XI coverage examinations for preservice inspection (PSI) (WBN-2/PSI-1 Revision 1). In Reference 2, the Nuclear Regulatory Commission (NRC) submitted a request for additional information (RAI) and requested that TVA respond to the RAI by July 14, 2017. Enclosure 1 to this letter provides the TVA response to the RAI.

There are no new regulatory commitments contained in this submittal. Please address any questions regarding this submittal to Mr. Edward D. Schrull at (423) 751-3850.

Respectfully,

J. W. Shea
Vice President, Nuclear Regulatory Affairs and Support Services

Enclosures:

1. Response to Request for Additional Information Regarding Watts Bar Nuclear Plant, Unit 2 Request for Approval of a Relief from the American Society of Mechanical Engineers (ASME) Section XI Coverage Examinations for Preservice Inspection (PSI) - Number WBN-2/PSI-1, Revision 1, and Submittal of the Watts Bar Nuclear Plant (WBN) Unit 2 PSI Program Plan, Revision 11 (CAC No. MF8515)
2. Amended PSI Reports for W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA
3. Scan Directions Reports for W08-09, WP-11, WP-12, WP-13, WP-14, WP-15
4. Revised Coverage Report for BIT-2 (drawing R-P2183)
5. Revised Coverage Report for SWIFLTR-62-96 (drawing R-P2373)
6. Drawing ISI-2001-E-01, Revision 3
7. Drawing ISI-2068-W-01, Revision 6
8. Procedure N-UT-33
9. Procedure ISwT-PDI-AUT11
10. Procedure N-UT-64

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRR Project Manager - Watts Bar Nuclear Plant

Enclosure 1

Response to Request for Additional Information Regarding Watts Bar Nuclear Plant, Unit 2 Request for Approval of a Relief from the American Society of Mechanical Engineers (ASME) Section XI Coverage Examinations for Preservice Inspection (PSI) - Number WBN-2/PSI-1, Revision 1, and Submittal of the Watts Bar Nuclear Plant (WBN) Unit 2 PSI Program Plan, Revision 11 (CAC No. MF8515))

Nuclear Regulatory Commission (NRC) Introduction

"By letter dated October 5, 2016, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16293A334) the Tennessee Valley Authority (the licensee), submitted relief request WBN-2/PSI-1, Revision 1, requesting relief from the "essentially" 100 percent volumetric coverage requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components for the preservice inspections due to access limitations at the Watts Bar Nuclear Plant Unit 2.

Specifically, pursuant to Title 10 of the Code of Federal Regulations (10 CFR) 50.55a(g)(5)(iii), the licensee requested relief from the "essentially 100 percent" volumetric coverage requirements of ASME Code Section XI for the subject welds on the basis that the code requirement is impractical. The NRC has determined that the following additional information is necessary to complete its review and make a regulatory decision."

TVA Introduction

During the development of this request for additional information (RAI) response, TVA determined that the reported coverage in the referenced letter for component identifications (IDs) W08-09, WP-11, WP-12, WP-15, SWIFLTR-62-96, and CCPH-2B-B-IA contained errors as noted in the below RAI responses. These errors were entered into the TVA corrective action program and the cause of the errors will be evaluated. The revised PSI reports are included in the enclosures to this RAI response and discussed in further detail in the specific RAI responses. TVA has implemented procedure controls regarding consistency on how coverage is calculated from previous examinations.

NRC RAI 1

"Regarding component IDs W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA please provide examination sheets detailing scan diagrams, including the coverage obtained, coverage calculations and obstructions inhibiting further examination."

TVA Response:

The coverage reports for the components noted in the RAI have been amended to include the requested information and are provided in Enclosure 2.

As previously noted, the reported coverage for CCPH-2B-B-IA was recalculated and has been changed from 75 percent (%) to 82.6%. Additional information on this component is provided below.

Component ID CCPH-2B-B-IA is four welds that are installed at the four points to the pump case (assembly) (i.e., one weld at each of the four points) and are welded to the entire perimeter. The pump assembly is bolted to the pump pedestal at these same locations. The intersection of the pump assembly to the pump pedestal does not allow accessibility to

perform examination of the bottom horizontal six inches (in.) of the weld per mounting point (24 in. total) due to opening restrictions of approximately 0.625 to 2.5 in. Gaining access to the weld at this location would require pump assembly removal and subsequent reinstallation of the pump assembly. Therefore, conducting the non-destructive exam (NDE) in place would not provide meaningful results. The quality of a meaningful examination would not be significantly increased if the weld was examined in place without removal of the pump as described above. Enclosure 2 contains a sketch of the exam coverage for CCPH-2B-B-IA.

NRC RAI 2

"Regarding component IDs W08-09, WP-11, WP-12, WP-13, WP-14, WP-15, please define the directions in items 6 through 9 (e.g. axial out, axial in, transverse clockwise (CW) and counterclockwise (CCW)). Also, please resubmit these figures highlighting the specific examination volume for which coverage was obtained with each scan.

Additionally, for the components listed below:

- *W08-09 – Notes that "scan #3 limitation is due to flange and scan #4 limitation is due to lifting lugs" however the scan directions are never defined with numbers. Please confirm which directions are associated with these scans. Also, please show graphically where these lifting lugs prevent examination.*
- *WP-11 – With two different angles scanning in the same direction with the same geometric obstructions, please explain how the same coverage was obtained for item 7 (direction 2) in both the 60 and 45 degree exams considering the transducers have two different angles but seem to have the same examination limitations. Also, for item 9 (direction 4) of the 0 degree exams, explain what prevented this scan from achieving the same weld length as the other three scans.*
- *WP-12 – The 60 degree scan should obtain greater coverage scanning in towards the nozzle than the 45 degree scan. On the other hand, the 45 degree scan should obtain greater coverage than the 60 degree scan when scanning outward away from the nozzle. Therefore, assuming that direction 1 is axial in and direction 2 is axial out for both degree scans, please explain how greater coverage was obtained for the 60 degree scans than for the 45 degree scans in both directions, for items 6 and 7 (directions 1 and 2).*
- *WP-15 - Please explain how the same coverage was obtained for item 6 (directions 1) in both the 60 and 45 degree exams considering the transducers have two different angles but seem to have the same examination limitations.*

TVA Response

The requested information for each of the welds addressed in the RAI is provided below:

Weld W08-09

The following scan directions are defined for W08-09:

- Scan 1 is axial from the flange surface.
- Scan 2 is axial from the RPV head surface.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Additionally, the RAI requests TVA to confirm which directions are associated with these scans and to show graphically where these lifting lugs prevent examination. The directions of the scans are as noted above and in the scan direction figure for W08-09 (R-P1014) in Enclosure 3. R-P1014 also shows graphically where these lifting lugs prevent examination.

As previously noted, the reported coverage for W08-09 was recalculated to reflect the addition of the zero degree coverage and the lifting lug obstructions associated with the 45 and 60 degree scan directions 3 (item 8) and 4 (item 9) (see pages 7, 8, and 9 of RP1014 in Enclosure 3). The initial reported coverage of 75.3% has been changed to 69.3%. The notes the on coverage calculation sheets in Enclosure 3 were changed to reflect the correct values applicable to each examination angle.

Weld WP-11

The following scan directions are defined for WP-11:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

The scan direction figure for WP-11 (R-P1283) is provided in Enclosure 3.

The calculated coverage for item 7 of the WP-11 coverage report in the referenced letter for the 45 and 60 degree scans performed away from the nozzle was incorrect. Using the scan coverage depicted on page 7 of 15 of the coverage report for R-P1283 in Enclosure 3, the following values were calculated:

- 60 degree, item 7, exam volume achieved is 7.7 in^2, which changes the total value achieved to 305.7 in^3 (page 13 of 15 of the coverage report).
- 45 degree, item 7, exam volume achieved is 4.4 in^2, which changes the total value achieved to 174.7 in^3 (page 12 of 15 of the coverage report).
- The final obtained coverage was revised from 68.73% to 65.72%.
- The value of 37.7 in. for the zero degree, item 9, exam volume on page 10 of 10 for R-P1283 in the referenced letter was a typographical error. The value was corrected to 39.7 in. The report presents no description of any scan limitation or obstruction specific to the item 9 scan direction.

The revised coverage report R-P1283 is provided in Enclosure 3.

Weld WP-12

The following scan directions are defined for WP-12:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

The scan direction figure for WP-12 (R-P1282) is provided in Enclosure 3.

Additionally, the RAI requests TVA to explain how greater coverage was obtained for the 60 degree scans than for the 45 degree scans in both directions, for items 6 and 7 (directions 1 and 2). Items 6 and 7 for the 45 degree scans and item 6 of the 60 degree scan were calculated corrected correctly. However, the calculated coverage for item 7 for the 60 degree scan performed away from the nozzle was incorrect in page 8 of 10 of the coverage report for R-P1282 in the referenced letter. Using the scan coverage depicted on page 7 of 14 for the revised coverage report for R-P1282 in Enclosure 3, the following values were calculated:

- 60 degree, item 7, exam volume achieved is 1.575 in^2 and the total value achieved is 73.55 in^3 (page 12 of 14 of the coverage report).
- The final obtained coverage was revised from 60.65% to 55.64%.

Weld WP-13

The following scan directions are defined for WP-13:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

The scan direction figure for WP-13 (R-P1284) is provided in Enclosure 3.

Weld WP-14

The following scan directions are defined for WP-14:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

The scan direction figure for WP-14 (R-P1281) is provided in Enclosure 3.

Weld WP-15

The following scan directions are defined for WP-15:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.

- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

The scan direction figure for WP-15 (R-P1280) is provided in Enclosure 3.

Additionally, the RAI requests TVA to explain how the same coverage was obtained for item 6 (directions 1) in both the 45 and 60 degree exams considering the transducers have two different angles, but seem to have the same examination limitations. Item 6 for the 60 degree scan was correct. However, the calculated coverage for the 45 degree scan performed toward the nozzle was incorrect for item 6 in page 8 of 10 of the coverage report for R-P1280 in the referenced letter. Using the scan coverage depicted on page 8 of 15 for the revised coverage report for R-P1280 in Enclosure 3, the following values were calculated:

- 45 degree, item 6, exam volume achieved is 10.35 in^2 and the total value achieved is 483.34 in^3.
- The final obtained coverage was revised from 61.22% to 60.4%

Report R-P1280 has been corrected to reflect the adjusted values and obtained coverage.

NRC RAI-3

"Regarding component ID BIT-2, the rectangle labeled 1 on page 8 of 12 of R-P2183 lies between the 3.25 inch and 2.25 inch measurements corresponding to a width of 1 inch. Additionally, this would correspond to a width of 0.65 inches from the centerline to the near edge of this rectangle. On page 9 of 12, the rectangle labeled 2, which corresponds to rectangle 1 on the previous page, shows a width of 0.5 inches and the width between the rectangle and the weld centerline as 1.15 inches. Lastly, in accordance with figure IWC-2500-1 of ASME Code Section XI, the required examination volume extends half an inch from the end of the weld which would be in line with the measurements on page 9 of 12. Please verify that rectangle 1 on page 8 of 12 is in fact 0.5 inches in width and that the width labeled as 2.25 inches is actually 2.75 inches.

Regarding component ID SWIFLTR-62-96, the figure and associated calculations on page 7 of 9 of R-P2373 depict 50% coverage of the ASME code required examination area. The final calculations on that page report 77.75% exam coverage and that is what was reported in Table 1 of the licensee's submittal. Please confirm if 50% of the required exam coverage was examined using a qualified procedure and if the reported 77.75% coverage refers to additional exam coverage obtained but cannot be credited due to the qualification of the examinations."

TVA Response

Rectangle 1 on page 8 of 12 of R-P2183 in the referenced letter is 0.5 in. in width. The 2.25 in. dimension on page 8 of 12 of R-P2183 in the referenced letter should have been 2.75 in., which is reflected in the coverage calculations shown on page 8 of 12 of R-P2183 in the referenced letter. A review of these calculations indicated that the correct value (i.e., 2.75 in.) was used. Enclosure 4 contains the revised coverage for component BIT-2 (drawing R-P2183) to reflect the correct dimension of 2.75 in.

Regarding component ID SWIFLTR-62-96, the 50% value shown on page 7 of 9 of R-P2373 in the referenced letter represents the circumferential examination coverage obtained during

the examination. This examination was conducted in accordance with ASME Section XI, 2007 Edition/2008 Addenda, Mandatory Appendix III. The calculated coverage was in error and should have been 75%. The calculations resulting in the obtained coverage of 75% are obtained as follows:

- Using 100% calculated examination volume for scan in the axial directions (i.e., 10.298 in^3):
    - Coverage obtained through the use of bi-directional coverage using the 1/2 Vee and full Vee sound paths in accordance with ASME Section XI, 2007 Edition/2008 Addenda, Mandatory Appendix III, III-4420 (reference page 8 of 9 of R-P2373 in the referenced letter for axial coverage).
- Taking 50% calculated examination volume coverage for scan in the circumferential directions (i.e., 5.15 in^3):
    - One-half of the required examination volume obtained in the clockwise and counterclockwise directions.

Enclosure 5 contains the revised coverage for component SWIFLTR-62-96 (drawing R-P2373) to reflect the corrected values and for clarification of the circumferential and axial scans depictions.

RAI 4

"Regarding component IDs BIT-5-IA, BIT-6-IA, BIT-7-IA, BIT-8-IA and CCPH-2B-B-IA, "No Recordable Indications" was not included in the additional information section. Please confirm whether any recordable indications were identified and if so, provide the details of the dimensions and location."

TVA Response

There were no recordable indications for the components listed in the RAI.

RAI 5

"Provide the weld metals used in the Category B-F, Inspection Item B5.70 Welds."

TVA Response

The physical component configuration as described in the ASME Section XI Code Table IWB-2500-1, Category B-F, Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles, Inspection Item B5.70 Welds, is steam generator (SG) NPS 4 (DN 100) or larger nozzle-to-safe end butt welds. The configuration of the WBN Unit 2 steam generator (SG) nozzle-to-safe end butt weld joints are not true safe-end welds as described per ASME Section XI Table IWB-2500-1. They are not dissimilar welds, rather, the butt weld joints are stainless-to-stainless made with E308 and ER308 filler metal.

Per Westinghouse drawing 1100J81 (sheets 1 and 2), the SG primary nozzles (item 1, Detail A) are ASME SA-216 Gr. WCC buttered with TY308L stainless steel ends welded by Westinghouse. Westinghouse drawing 717J362 (sheets 1 and 2, Detail B) reflect the fabrication of the SG primary side chamber and nozzle. There is also a non-wetted Inconel

ring welded by Westinghouse at the stainless steel buttering to carbon steel nozzle transition shown on these Westinghouse drawings.

The TVA field weld is ASME SA-351 Gr. CF8A base material joined to the SG nozzle. TVA welding procedure (DWP) GT-SM88-0-2 was utilized to produce the original field welds. The field weld joints are reflected on TVA drawing SK304-2 series weld maps.

The original construction PSI Program for WBN Unit 1 (TI-50A, ASME Section XI Preservice Inspection Program) had the same ASME Category B-F, and TVA component configuration and description (i.e., same Westinghouse Model D3 original SG prior to their replacement in 2006) as WBN Unit 2 currently has installed.

RAI 6

"Welds RCF-E1-2-SE, RCF-E2-2-SE, and RCF-E4-2-SE are described as Nozzle to-safe-end welds in Table 1, but are described as Elbow-to-safe-end welds in the respective report numbers R-P2440, R-P2442, and R-P2437. Please clarify the apparent discrepancy, considering all aspects of these welds that are addressed in the submission, including the coverage maps and materials of construction."

TVA Response

Each of the weld joints are part of the SG primary nozzle to the reactor pressure vessel (RPV) piping. This configuration is detailed on ISI reference drawing ISI-2001-E-01, Revision 3 (Enclosure 6), which depicts the joint configuration in Detail A and shows the joint consists of the piping elbow segment welded to a buttered safe end that is integral to the primary nozzle. Detail A further states "THE PIPE TO SAFE END WELD AND SAFE END TO NOZZLE WELD IS IDENTIFIED AS ONE WELD. . ." There is no safe end transition segment. The descriptions given in the report can be attributed to the ISI Program descriptor (i.e., RCF-EX-2-SE) and the field configuration (i.e., elbow to nozzle). This configuration is reported by the examiner based upon their field observation.

The joint material consists of:

- primary nozzle with buttering material (safe end described in ISI-2001-E-01, Detail A)
- weld filler material ER-308
- piping material SA-351 CF-8A

ISI reference drawing ISI-2068-W-01, Revision 4 contained a reference note (i.e., Note 3) for the safe-end weld detail. This Note incorrectly referenced drawing ISI-2068C-03; the Note should have referenced drawing ISI-2001-E-01. Therefore, ISI reference drawing ISI-2068-W-01 has been revised (i.e., Revision 6, see Enclosure 7) to correct this error and has been further enhanced to provide direction to the referenced note.

RAI 7

"Several piping welds have a cast stainless steel component, specifically welds RCF-E1-2-SE, RCF-G1-1-SE, RCF-E2-2-SE, RCF-G2-1-SE, RCF-E3-2-SE, RCF-G3-1-SE, RCF-E4-2-SE, RCF-G4-1-SE, RCF-C2-2, RCF-C3-2, RCF-C4-1, RCF-C3-1, RCF-C2-1, RCF-Cl-1, RCF-Cl-2, RCF-C4-2, RCS-1-6, RCS-2-6, RCS-3-6, RCS-4-6, and RCW-02. For these welds:

a. *Were the scans on cast stainless steel components encoded?*

b. *What frequencies were used for the inspections of cast stainless steel components?"*

TVA Response

The below table provides the requested information.

Component ID/ Report Number	Encoded or Non-Encoded (see Notes for information)	Frequency (4)
RCF-E1-2-SE / R-P2440	Non-Encoded (1)	1 mHz/RL
RCF-G1-1-SE / R-P2439	Non-Encoded (1)	1 mHz/RL
RCF-E2-2-SE / R-P2442	Non-Encoded (1)	1 mHz/RL
RCF-G2-1-SE / R-P2441	Non-Encoded (1)	1 mHz/RL
RCF-E3-2-SE / R-P2443	Non-Encoded (1)	1 mHz/RL
RCF-G3-1-SE / R-P2438	Non-Encoded (1)	1 mHz/RL
RCF-E4-2-SE / R-P2437	Non-Encoded (1)	1 mHz/RL
RCF-G4-1-SE / R-P2444	Non-Encoded (1)	1 mHz/RL
RCF-C2-2 / R-P0147	Non-Encoded (1)	1 mHz/RL
RCF-C3-2 / R-P0149	Non-Encoded (1)	1 mHz/RL
RCF-C4-1 / R-P1788	Encoded (2)	1.5 mHz/RL
RCF-C3-1 / R-P1789	Encoded (2)	1.5 mHz/RL
RCF-C2-1 / R-P1792	Encoded (2)	1.5 mHz/RL
RCF-C1-2 / R-P1469	Non-Encoded (1)	1 mHz/RL
RCF-C1-1 / R-P1793	Encoded (2)	1.5 mHz
RCF-C4-2 / P-R1367	Non-Encoded (1)	1 mHz/RL
RCS-1-6 / R-P0101	Non-Encoded (1)	1 mHz/RL
RCS-2-6 / R-P0105	Non-Encoded (1)	1 mHz/RL
RCS-3-6 / R-P0106	Non-Encoded (1)	1 mHz/RL
RCF-4-6 / R-P1349	Non-Encoded (1)	1 mHz/RL
RCW-02 / P-R0108	Non-Encoded (3)	2 mHz/RL-2.25mHz shear

Notes:

(1) Procedure N-UT-33, "Manual Ultrasonic Examination of Static and Centrifugally Cast Stainless Steel Piping Welds," using manual (i.e., non-encoded) examination technique (see Enclosure 8).

(2) Procedure ISwT-PDI-AUT11, "Automated Inside Surface Ultrasonic Examination of Piping Welds Using Phased Array," using automated (i.e., encoded) examination technique (see Enclosure 9).

(3) Procedure N-UT-64, "Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds," using PDI manual (i.e. non-encoded) examination technique (see Enclosure 10).

(4) RL= Refracted Longitudinal sound wave, shear= Transverse sound wave.

Reference

TVA Letter to NRC, CNL-16-135, "Watts Bar Nuclear Plant (WBN) Unit 2 - Request for Approval of a Relief from the American Society of Mechanical Engineers (ASME) Section XI Coverage Examinations for Preservice Inspection (PSI) - Number WBN-2/PSI-1, Revision 1, and Submittal of the WBN Unit 2 PSI Program Plan, Revision 11," dated October 5, 2016 (ML16293A334)

Enclosure 2

Amended PSI Reports for W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA

Amended PSI Report W02-03

R-P1755

IHI Southwest Technologies Examination Summary Record

Utility: TVA	Site: Watts Bar Nuclear Plant Unit 2 Outage: PSI	Summary Sheet No. 000400
System: Reactor Pressure Vessel	Line Subassembly: Bottom Head to Lower Shell	Identification: W02-03

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT5/1/0/1	Probe 1	1100045	3 - 8	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 2	1100046	3 - 8	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 3	1100047	3 - 8	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 4	1100048	3 - 8	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 1	1100025	15 - 20b	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 2	1100026	15 - 20b	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 3	1100027	15 - 20b	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 4	1100028	15 - 20b	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 1	1100001	20c, d	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 2	1100002	20c, d	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 3	1100003	20c, d	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 4	1100004	20c, d	X	-	

Examination Summary:

This weld was examined from the inside surface using AIRIS-21 and Dynaray examination equipment.
No recordable indications were detected during this examination.
Examination Angles for each probe included: PA60°-80°L, PA40°-50°S, PA30°-60°L, & PA0°L.
Examination #'s 3 - 8 were divided into sections a - c.
Examination #'s 15 - 20 were divided into sections a - d.
This examination was limited due to the proximity of the core support lugs. The examination coverage was 88%.

Prepared By: Steven J. Todd
Signature: Steven J. Todd Date: 8/31/11
ISwT Project Manager

Reviewed By:
Signature: Date: 10/24/11
Tennessee Valley Authority

Reviewed By: Daniel R Williams
Signature: Date: 12/08/11
ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-3a
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @0°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: J. A. Gatica / II		26-Aug-11	**Start** 0414	**End** 0421	**Start** 78 **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.00	Lower Limit	520.89	521.31	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	354.62	Upper Limit	535.89	536.31	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	1100045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	1100046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	1100047
N/A	N/A	N/A	N/A	N/A	1100048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	354.30	521.28	535.38

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: J. Delph III FOR CMB III 26 AUG 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-3b
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @0°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos Barberino / 1T		26-Aug-11	**Start** 0427	**End** 0433	**Start** 78 **End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis/Device**	**Planned**	**Actual**	**Scan Axis/Arm**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	534.99	535.00	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	354.80	Upper Limit	549.99	550.00	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	1100045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	1100046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	1100047
N/A	N/A	N/A	N/A	N/A	1100048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	354.30	534.97	549.99

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: A Berlyn III / FOR CMB 26 AUG 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-3c
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @0°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos Barberino / 1T		26-Aug-11	**Start** 0440	**End** 0500	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	**Planned**	**Actual**
Lower Limit	339.32	339.32
Upper Limit	354.62	354.60
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	**Planned**	**Actual**
Lower Limit	5.18	5.18
Upper Limit	18.18	18.18
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Cw/Up/Ccw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (180)

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	1100045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	1100046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	1100047
N/A	N/A	N/A	N/A	N/A	1100048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	354.30	5.18	18.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: [signature] /III/ FOR CMB

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-4a
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @60°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / 1T		26-Aug-11	**Start** 0507	**End** 0517	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	68.81	69.00	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	354.14	Upper Limit	83.81	83.00	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	354.30	68.81	82.81

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C H Barberino / III / 26-Aug-11

ISWT FORM No. UT 50 (Rev. 1/11)

RPI755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-4b
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @60°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos Barberino / 1T		26-Aug-11	**Start** 0522	**End** 0529	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	82.91	83.00	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	353.76	Upper Limit	97.91	97.08	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	353.40	82.80	97.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C M Barn / III / 26 ~~22~~-Aug-11 C.M.B

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:** ID-4c	
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @60°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos Barberino / 1T		26-Aug-11	**Start** 0535	**End** 0539	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	339.32	339.32
Upper Limit	354.62	346.57
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	97.01	95.76
Upper Limit	112.01	109.76
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Cw/Up/Ccw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (180)

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-9	339.00	346.20	95.76	109.73

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: C M Barberino / III / 26-Aug-11

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-5a
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @120°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	Carlos H. Barberino / 1T	26-Aug-11	**Start** 0545	**End** 0551	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	159.23	159.97	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	353.77	Upper Limit	174.23	173.97	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	353.40	159.94	173.94

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C H Barberino / III / 26 Aug-11 CHB

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-5b
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @120°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / 1T		26-Aug-11	**Start** 0556	**End** 0600	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	173.33	174.66	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	348.35	Upper Limit	188.33	187.66	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-11	339.00	348.00	173.63	187.93

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Carl M Barberino / III / 26 (CMB) 22-Aug-11

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-5c
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @120°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / 1T		26-Aug-11	**Start** 0605	**End** 0610	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	339.32	339.32
Upper Limit	354.62	351.99
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	187.43	186.35
Upper Limit	202.43	199.35
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Cw/Up/Ccw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (180)

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-15	339.00	351.60	186.32	199.42

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: C H Barberino / III / CHB 22-Aug-11 26

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-6a
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @180°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / 1T		26-Aug-11	**Start** 0622	**End** 0628	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	249.64	249.56	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	353.78	Upper Limit	264.64	264.56	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	353.40	250.53	263.83

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C H Barberino / III / 26 22-Aug-11 CHB

ISWT FORM No. UT 50 (Rev. 1/11)

R-PITSS

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-6b
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @180°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos Barberino / 1T			**Start**	**End**	**Start** / **End**
		26-Aug-11	0632	0639	78 / 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	**Planned**	**Actual**
Lower Limit	339.32	339.32
Upper Limit	354.62	354.69
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	**Planned**	**Actual**
Lower Limit	263.74	263.24
Upper Limit	278.74	277.24
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Cw/Up/Ccw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (180)

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	354.30	263.21	277.30

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: C J M Barberino / III / 26 22-Aug-11 CMB

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-6c
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @180°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos Barberino / 1T		26-Aug-11	**Start** 0647	**End** 0655	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis/Device**	**Planned**	**Actual**	**Scan Axis/Arm**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	277.84	276.93	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	354.60	Upper Limit	292.84	289.93	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	339.00	354.30	276.90	290.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: C J Barberino / III / 26-Aug-11

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-7a
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @240°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: R. A. Riddles / III		26-Aug-11	**Start** 0713	**End** 0720	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	340.06	340.14	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	349.81	Upper Limit	355.06	355.14	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-13	338.90	349.70	341.11	355.41

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C. M. Barr / III / 26 22-Aug-11

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-7b
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @240°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: R. A. Riddles / III		26-Aug-11	**Start** 0728	**End** 0735	**Start** 78 **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	339.32	339.32
Upper Limit	354.62	354.62
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	354.16	355.83
Upper Limit	369.16	368.83
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Cw/Up/Ccw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (180)

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	11045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	338.90	354.20	355.80	368.90

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☐ No

Further Evaluation Required:
☐ Yes ☐ No

Archive Media:
☐ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: [signature] / III / FORCMB 1 26 AUG 2011

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ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-7c
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @240°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: R. A. Riddles / III		26-Aug-11	**Start** 0741	**End** 0756	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	368.26	368.51	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	354.62	Upper Limit	383.26	382.51	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	338.90	354.20	368.48	382.78

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: J. M. III FOR CMB 26 AUG 2011

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ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-8a
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @300°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: R. A. Riddles / III		26-Aug-11	**Start** 0804	**End** 0813	**Start** 78 **End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis/Device**	**Planned**	**Actual**	**Scan Axis/Arm**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	430.47	430.72	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	352.04	Upper Limit	445.47	445.72	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-15	339.80	352.40	430.69	444.79

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: NL/III/FOR CMB / 26 AUG 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-8b
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @300°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: R. A. Riddles / III		26-Aug-11	**Start** 0821	**End** 0833	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	339.32	339.32	Lower Limit	444.57	444.41	Beam Direction:	Cw/Up/Ccw/Dn
Scan:	Arm	Upper Limit	354.62	354.62	Upper Limit	459.57	458.41	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (180)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	338.90	354.20	444.38	458.58

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: [signature] / III / 26 AUG 2011 FOR CMB

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ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-8c
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell @300°	**Device Configuration:** 136-00018			
Mod.Conf.: 138-00021A	**Scan Path Drawing:** 134-00056/57	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: R. A. Riddles / III		26-Aug-11	**Start** 0838	**End** 0845	**Start** 78 **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	**Planned**	**Actual**
Lower Limit	339.32	339.32
Upper Limit	354.62	349.28
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	**Planned**	**Actual**
Lower Limit	458.67	458.09
Upper Limit	473.67	472.09
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Cw/Up/Ccw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (180)

Master Acquisition File: RPV ID CH1_0 skew (CW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.93(in)	- 2.33(in)	110045
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	- 3.61(in)	110046
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.93(in)	- 2.33(in)	110047
N/A	N/A	N/A	N/A	N/A	110048

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-13	338.90	349.70	458.06	472.16

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: [signature] III / FOR CMB / 26 AUG 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:** ID-15A	
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (0°-60°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2121	**End** 2128	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	0.00	17.30	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.08	Upper Limit	90.58	31.00	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	331.85	347.15	17.30	31.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: C H Barb III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-15B
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (0°-60°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2135 / **End** 2143	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.08
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	0.00	30.65
Upper Limit	90.58	45.50
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-18	331.85	347.15	30.60	45.50

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C H Barberino III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-15C
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (0°-60°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2201	**End** 2208	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis/Device**	**Planned**	**Actual**	**Scan Axis/Arm**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	0.00	45.00	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.08	Upper Limit	90.58	60.00	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-17	331.85	347.15	45.00	60.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C H Barberino III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-15D
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (0°-60°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2217	**End** 2223	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	**Planned**	**Actual**
Lower Limit	331.98	331.98
Upper Limit	347.28	347.28
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	**Planned**	**Actual**
Lower Limit	0.00	59.50
Upper Limit	90.58	73.30
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-17	332.25	346.65	63.22	77.12

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C H Barberino III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-16A
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (59°-120°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2237	**End** 2243	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	89.07	107.88	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.28	Upper Limit	181.17	121.58	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 -19	331.85	348.05	111.80	125.30

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

IEWT FORM No. UT 50 (Rev. 1/11)

R-P1795

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-16B
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (59°-120°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2254	**End** 2301	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.26
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	89.07	121.12
Upper Limit	181.17	136.12
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 19	331.85	348.05	124.84	139.94

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-16C
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (59°-120°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2305	**End** 2312	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.00
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	89.07	135.62
Upper Limit	181.17	150.65
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 18	331.85	347.15	139.34	154.44

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUTS/1/0/0	**Examination No.:** ID-16D		
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (59°-120°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25-Aug-11	**Start** 2317	**End** 2326	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	89.07	150.12	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.10	Upper Limit	181.17	163.87	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 18	332.75	348.05	153.84	167.84

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-17A
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (119°-180°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25 Aug. 11	**Start** 2332	**End** 2339	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	179.67	198.47	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.47	Upper Limit	271.75	212.20	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 19	331.85	348.05	202.19	215.99

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

RPI755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-17B
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (119°-180°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25 Aug. 11	**Start** 2342	**End** 2349	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	179.67	211.70	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.47	Upper Limit	271.75	226.70	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 18	332.75	348.05	215.42	230.62

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUTS/1/0/0		**Examination No.:**	ID-17C
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (115°-180°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		25 Aug. 11	**Start** 2354	**End** 0001	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	179.67	226.20	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.44	Upper Limit	271.75	241.20	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 18	332.75	348.05	229.92	245.02

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-17D
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (119°-180°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0010	**End** 0016	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	179.67	240.70	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.40	Upper Limit	271.75	254.45	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 18	332.75	348.05	244.42	258.32

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-18A
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (179°-240°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0027	**End** 0033	**Start** 78 **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.39
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	271.75	289.05
Upper Limit	362.33	302.78
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 -18	332.75	348.05	292.77	306.57

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-18B
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (179°-240°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0036	**End** 0046	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.39
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	271.75	302.28
Upper Limit	362.33	317.28
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 -17	332.75	347.15	306.00	321.10

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP2011

ISWT FORM No. UT 80 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-18C
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (179°-240°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0045	**End** 0052	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.36
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	271.75	316.79
Upper Limit	362.33	331.79
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
I -18	332.75	348.05	320.51	335.61

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-18D
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (179°-240°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0059	**End** 0106	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.69
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	271.75	331.29
Upper Limit	362.33	345.03
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 -18	332.75	348.54	335.01	348.81

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-19A
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (239°-300°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0111	**End** 0117	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	360.82	379.63	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.00	Upper Limit	452.91	393.36	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 17	332.75	347.15	383.35	397.15

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 80 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-19B
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (239°-300°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0124	**End** 0129	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	360.82	392.87	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.40	Upper Limit	452.91	407.87	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 17	332.75	347.15	396.59	411.69

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-19C
Project No.: 11-0690	**Weld Description:** Bot Hd.-to-Lwr Shell (239°-300°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0133	**End** 0143	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.29
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	360.82	407.37
Upper Limit	452.91	422.37
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 19	331.85	348.05	411.09	426.19

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP2011

ISWT FORM No. UT 80 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-19D
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (239°-300°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0149	**End** 0155	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.32
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	360.82	421.87
Upper Limit	452.91	435.61
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 18	332.75	348.05	425.59	439.39

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-20A
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (299°-362°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0201	**End** 0208	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS-21
Scan:	Arm
Increment:	Device
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis/Device	Planned	Actual
Lower Limit	331.98	331.98
Upper Limit	347.28	347.68
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis/Arm	Planned	Actual
Lower Limit	451.40	470.21
Upper Limit	546.51	483.95
DCI (Scan Resolution)	0.10	
Conversion Counts	100	
Conversion Units	Inches	

Positional Parameters	
Beam Direction:	Ccw/Up/Cw/Dn
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	18
Device Position:	A (0)

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 19	331.85	348.05	473.93	487.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-20B
Project No.: 11-0690	**Weld Description:** Bot Hd.-to-Lwr Shell (299°-362°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0211	**End** 0217	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	451.40	483.45	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.21	Upper Limit	546.51	498.45	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100025
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100026
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100027
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100028

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 17	332.75	347.15	487.17	502.27

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-20C
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (299°-362°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	Carlos H. Barberino / It	26 Aug. 11	**Start** 0221	**End** 0226	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	451.40	497.95	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.49	Upper Limit	546.51	512.95	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100001
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100002
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100003
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100004

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 19	331.85	348.05	501.07	516.77

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 25 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1755

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** W02-03	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-20D
Project No.: 11-0690	**Weld Description:** Bot. Hd.-to-Lwr Shell (299°-362°)	**Device Configuration:** 136-00017			
Mod.Conf.: 138-00019B	**Scan Path Drawing:** 134-00055	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino / It		26 Aug. 11	**Start** 0233	**End** 0239	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis/Device	Planned	Actual	Scan Axis/Arm	Planned	Actual	Positional Parameters	
Controller:	AIRIS-21	Lower Limit	331.98	331.98	Lower Limit	451.40	512.45	Beam Direction:	Ccw/Up/Cw/Dn
Scan:	Arm	Upper Limit	347.28	347.40	Upper Limit	546.51	526.20	Probe Type:	PA22-006
Increment:	Device	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.10		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	18
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Inches		Device Position:	A (0)
Correction:	N/A								

Master Acquisition File: RPV ID CH1_180 skew (CCW)_beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 2.32(in)	+ 0.00(in)	1100001
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 0.00(in)	+ 1.15(in)	1100002
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 2.32(in)	+ 0.00(in)	1100003
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	+ 0.00(in)	- 1.15(in)	1100004

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 19	331.85	348.05	516.17	530.74

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 2 SEP 2011

ISWT FORM No. UT 5[illegible] (Rev. 1/11)

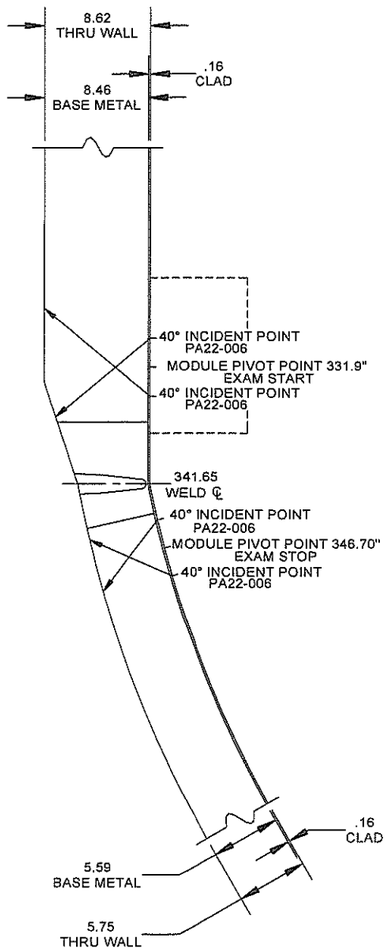
R-P1755

NOTES:
1. THIS MODEL IS NOT CONTROLLED BY IHI.
2. VESSEL DIMENSIONS SHOWN ARE FROM SITE SUPPLIED DRAWINGS UNLESS NOTED.
3. CHECK FOR LIMITATIONS DUE TO THE PROXIMITY OF THE CORE STOP LUGS AND THE INSTRUMENTATION TUBES.

REVISION HISTORY

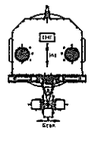
REV	ZONE	DESCRIPTION	DESIGN ENGR	DWG ENGR	CHECKER	PROJ. MGR	ENG. MGR	DATE
A		INITIAL RELEASE	jgeerlings	jgeerlings	RLP	SJ	WD	6/27/17

W02-03 BETWEEN THE LUG EXAMINATION

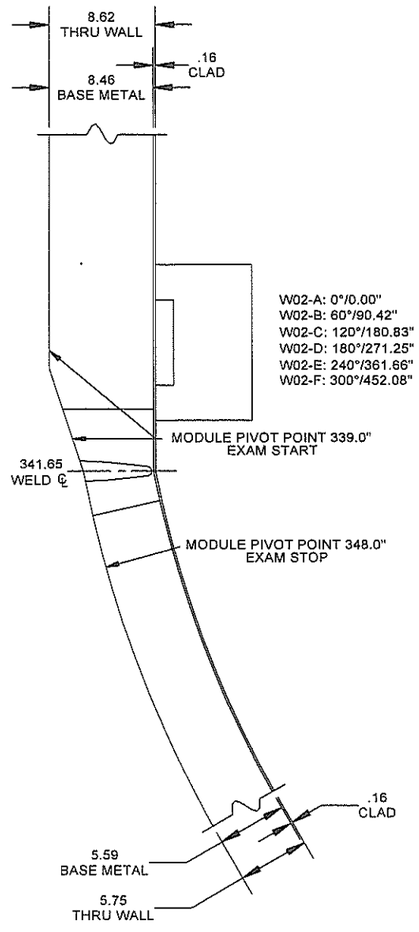


W02-03 BETWEEN THE LUG COVERAGE

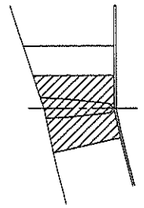
(Module 138-00019B)



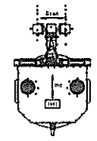
W02-03 UNDER THE LUG EXAMINATION



W02-03 UNDER THE LUG COVERAGE



(Module 138-00021A)



SQ INCHES OF WELD EXAMINED	7302.8
TOTAL SQ INCHES	8300.1
% OF AREA COVERED	88.0%

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
GEOMETRIC TOLERANCES FOR MACHINED SURFACES UNLESS SPECIFIED ON DRAWING

SYM.	GEOMETRY	TOLERANCE
▱	FLATNESS	.008
⌒	PROFILE OF LINE	SEE DRAWING
⌓	PROFILE OF SURFACE	.008
—	STRAIGHT	.004
⊥	PERPENDICULARITY	.004
//	PARALLELISM	.004
∠	ANGULARITY	SEE DRAWING
≡	SYMMETRY	SEE DRAWING
⌖	TRUE POSITION	SEE DRAWING
◎	CONCENTRICITY	.10 TIR
○	CIRCULARITY/ROUNDNESS	SIZE TOL.

DECIMAL TOLERANCES
1 PLACE ± .1
2 PLACES ± .02
3 PLACES ± .005
ANGLES ± 2°
FINISH 63ST or 63u IN

MACHINE SHOP DETAILS
BREAK/DEBUR ALL SHARP EDGES

MATERIAL ON PART	N/A
PART FINISH	N/A

ENGINEERING		DATE
ENGINEER	jgeerlings	06/27/2017
DRAWN BY	jgeerlings	06/27/2017
CHECKED BY	RULEP	6/27/17
CHECKED BY	RLP	6/27/17
PROJECT MGR	SJ	6/27/17
ENGINEERING MGR	WD	6/27/17

IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

DRAWING TITLE **WATTS BAR UNIT 2 PSI 2011 BOTTOM-HEAD TO LOWER SHELL W02-03 COVERAGE**

DRAWING NUMBER	SHEET SIZE	REV
SP00101	B	A
WEIGHT (LB) N/A	SHEET 1 OF 1	

Enclosure 2

Amended PSI Reports for W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA

Amended PSI Report N-15

B-P1763

IHI Southwest Technologies Examination Summary Record

Utility: TVA	Site: Watts Bar Nuclear Plant Unit 2 Outage: PSI	Summary Sheet No. 001300
System: Reactor Pressure Vessel	Line Subassembly: Outlet Nozzle to Shell @ 22-degree	Identification: N-15

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT5/1/0/1	Probe 1	1100097	29	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 2	1100098	29	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 3	1100099	29	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 4	1100100	29	X	-	
AUT	ISwT-PDI-AUT4/3/0/0	Probe 1	1100001-A	30 - 35	X	-	

Examination Summary:

DC 12-15-4

* This weld was examined from the inside surface using AIRIS & DynaRay

This weld was examined from the nozzle inside surface using ANTS and T-III examination equipment.
No recordable indications were detected during this examination.
Examination Angles for each probe used with procedure ISwT-PDI-AUT 5 include: PA60°-80°L, PA40°-50°S, PA30°-60°L, & PA0°L.
Examination Angles for probe used with procedure ISwT-PDI-AUT-4 include: PA5°- 40°L, PA35°-45S.
Exam #29 was divided into sections A - D (sections C & D were additional exams using specfic probes for improved examination coverage).
The examination was limited due to the proximity of the nozzle intregral extension. The examination coverage was 84%.

Prepared By: Steven J. Todd Signature: Steven J. Todd Date: 9/2/2011 ISwT Project Manager	
Reviewed By: Signature: Date: 10/24/11 Tennessee Valley Authority	Reviewed By: Daniel R Williams Signature: Date: 12/12/11 ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-29A
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (Wall)	**Device Configuration:** 136-00025			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	Carlos H. Barberino/ It	27 Aug. 11	**Start** 0603	**End** 0627	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS ~~ANT~~ DS 13-5-11	Lower Limit	19.85	24.00	Lower Limit	0.00	0.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.60	Upper Limit	362.00	180.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	22.41	34.10	0.00	180.00
P2 - P4	24.50	37.10	0.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: JM / III / SEP 2, 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17463

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-29B
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (Wall)	**Device Configuration:** 136-00025			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	Carlos H. Barberino/ It	27 Aug. 11	**Start** 633	**End** 657	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	~~ANT~~ AIRIS ~~AIRIS~~	Lower Limit	19.85	24.00	Lower Limit	0.00	180.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.60	Upper Limit	362.00	362.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	22.41	34.10	180.00	360.00
P2 - P4	24.50	37.10	180.00	360.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: [signature] / III / SEP. 2, 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1163

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-29C
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (Wall)	**Device Configuration:** 136-00025			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	Bryan Wright / II	27 Aug. 11	**Start** 1020	**End** 1050	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS ~~ANT~~ 2.05-11
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	19.85	24.00
Upper Limit	37.85	35.60
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	0.00	0.00
Upper Limit	362.00	180.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Cw/Twd/Awy/Ccw
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	21
Azimuth/Nozzle C/L	22.00°
Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P2 - P4	21.90	32.70	122.00	172.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: SEP 2, 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1763

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-29D
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (Wall)	**Device Configuration:** 136-00025			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	Bryan Wright / II	27 Aug. 11	**Start** 1100	**End** 1130	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS ~~ANT~~ BD 15U	Lower Limit	19.85	24.00	Lower Limit	0.00	180.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.60	Upper Limit	362.00	362.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P2	24.91	35.71	182.00	222.00
P4	24.49	33.29	182.00	222.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: J M III 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1763

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-30
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (0°-60°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	24 Aug. 2011	**Start** 1013	**End** 1022	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	0.00	0.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	60.00	60.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75 (in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.91	116.91	0.00	60.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☑ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Carlos M. Barrera / III / 2011

ISWT FORM No. UT 50 (Rev. 1/11)

E-P1763

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-31
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (59°-120°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	24 Aug. 2011	**Start** 1030	**End** 1041	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	59.00	58.99	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	120.00	120.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75 (in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
28	86.91	116.91	59.00	120.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☑ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Carlos M. Barrera / III / 2011

C M Barr

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1763

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0			**Examination No.:** ID-32
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (119°-185°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	24 Aug. 2011	**Start** 1051	**End** 1103	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.99	Lower Limit	119.00	119.01	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	185.00	185.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75 (in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.91	116.91	119.00	185.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☑ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Carlos M. Barrera / III / 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1763

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:** ID-33	
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (184°-245°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	24 Aug. 2011	**Start** 1105	**End** 1116	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	184.00	184.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	245.00	245.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75 (in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.91	116.91	184.00	245.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☑ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Carlos M. Barrera / III / 2011 C M Barrera / III / FOR CMB 26 AUG 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17463

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-34
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (244°-305°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	24 Aug. 2011	**Start** 1120	**End** 1131	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	244.00	244.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	305.00	305.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	22.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75 (in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.91	116.91	244.00	305.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☑ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Carlos M. Barrera / III / 2011 C M Barrera / III / FOR CMB 26 AUG 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17163

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-15	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-35
Project No.: 11-0690	**Weld Description:** Outlet NTS @22° (304°-362°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	24 Aug. 2011	**Start** 1133	**End** 1142	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	ANT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	89.91	89.91
Upper Limit	116.91	116.91
Inc. Interval (Resolution)	1.00	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	304.00	304.00
Upper Limit	362.00	362.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Twd
Probe Type:	PA16
Scanning Speed:	4.5 degrees per sec.
Number of Scans:	28
Azimuth/Nozzle C/L	22.00°
Elevation/Nozzle C/L	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75 (in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
28	89.91	116.91	304.00	362.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☑ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Carlos M. Barrera / III / 2011 — NL / III / FOR CMB 26AUG 2011

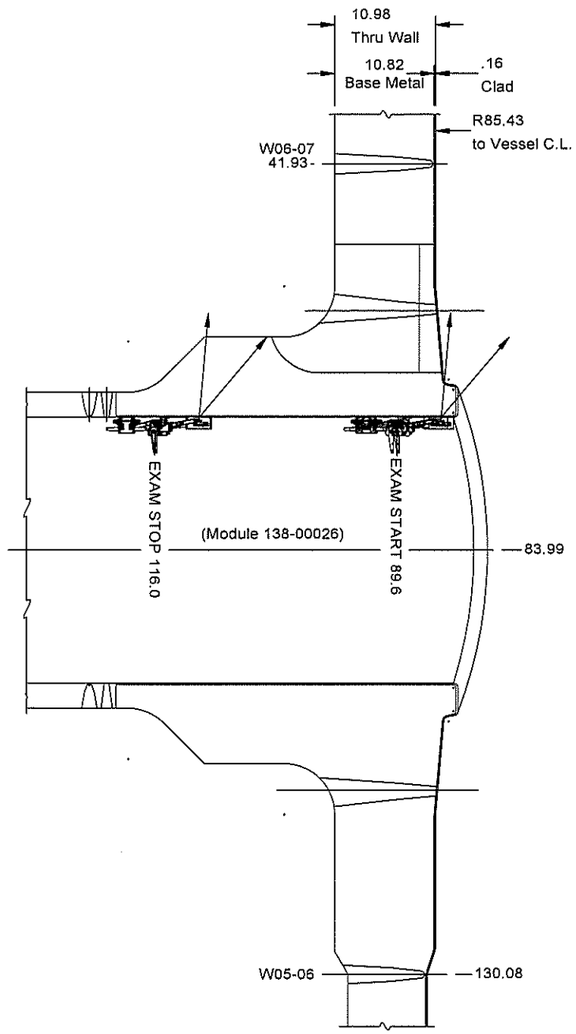
ISWT FORM No. UT 50 (Rev. 1/11)

R-P1763

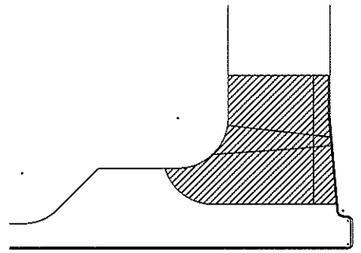
NOTES:
1. THIS MODEL IS NOT CONTROLLED BY IHI.
2. VESSEL DIMENSIONS SHOWN ARE FROM SITE SUPPLIED DRAWINGS UNLESS NOTED.
3. CHECK FOR LIMITATIONS DUE TO INTEGRAL EXTENSION OF OUTLET NOZZLES.

REVISION HISTORY								
REV	ZONE	DESCRIPTION	DESIGN ENGR	DWG ENGR	CHECKER	PROJ MGR	ENG. MGR	DATE

OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE COVERAGE = 100.0%



EXAMINATION	N15 & N16	N17 & N18
PARALLEL BORE	100.0%	100.0%
PARALLEL WALL (SHEET 2)	67.6%	67.6%
TRANSVERSE WALL (SHEET 2)	85.9%	82.3%
AVERAGE	84.5%	83.5%

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
GEOMETRIC TOLERANCES FOR MACHINED SURFACES UNLESS SPECIFIED ON DRAWING

SYM.	GEOMETRY	TOLERANCE
▱	FLATNESS	.008
⌒	PROFILE OF LINE	SEE DRAWING
⌓	PROFILE OF SURFACE	.008
—	STRAIGHT	.004
⊥	PERPENDICULARITY	.004
//	PARALLELISM	.004
∠	ANGULARITY	SEE DRAWING
⌯	SYMMETRY	SEE DRAWING
⌖	TRUE POSITION	SEE DRAWING
◎	CONCENTRICITY	.10 TIR
○	CIRCULARITY/ROUNDNESS	SIZE TOL.

DECIMAL TOLERANCES
1 PLACE ± .1
2 PLACES ± .02
3 PLACES ± .005
ANGLES ± 2°
FINISH 63ST or 63u IN

MACHINE SHOP DETAILS
BREAK/DEBUR ALL SHARP EDGES

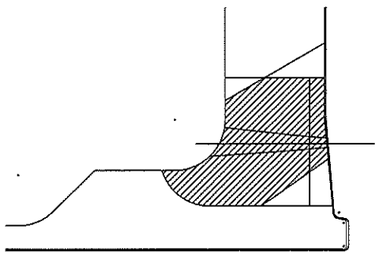
MATERIAL ON PART	N/A	
PART FINISH	N/A	
	ENGINEERING	DATE
ENGINEER	jgeerlings	06/26/2017
DRAWN BY	jgeerlings	06/27/2017
CHECKED BY	rulep	06/27/2017
CHECKED BY	RJP	06/27/17
PROJECT MGR	[signature]	6/27/17
ENGINEERING MGR	[signature]	6/27/17

IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

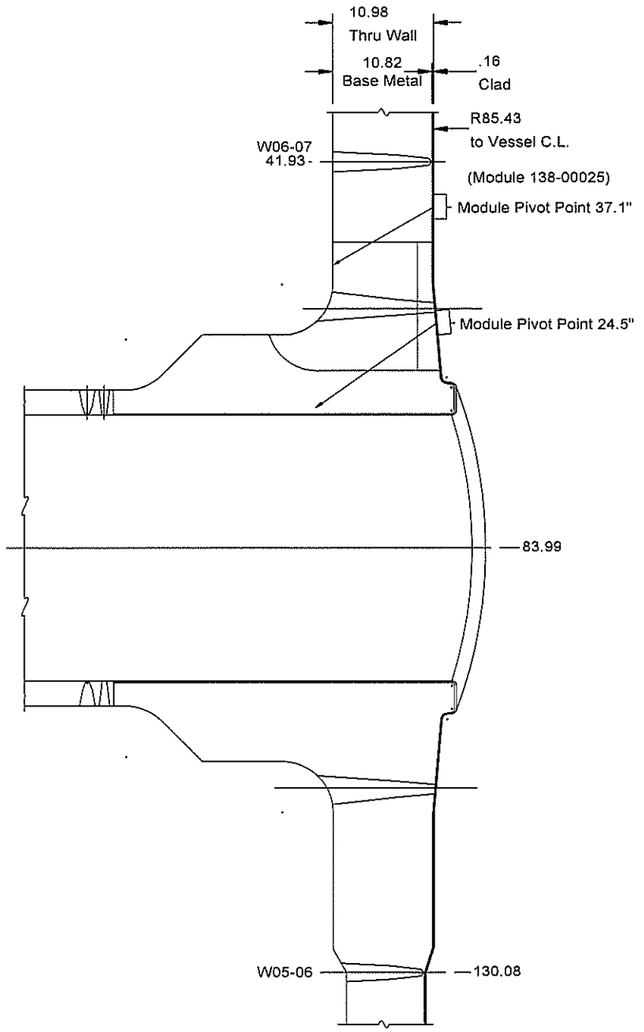
DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	SHEET SIZE	REV
SP00100	B	A
WEIGHT (LB) N/A	SHEET 1 OF 2	

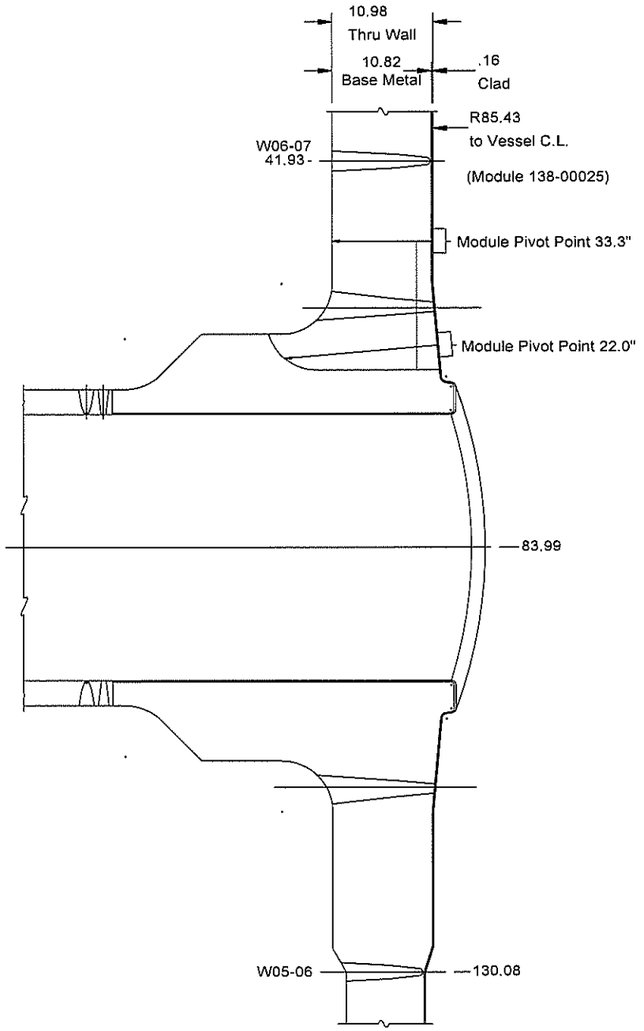
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL COVERAGE = 67.6%



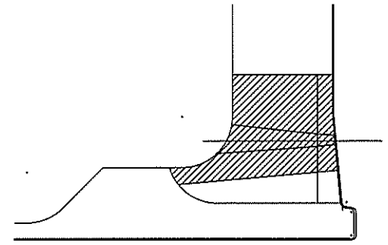
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18
TRANSVERSE WALL EXAMINATION



OUTLET NOZZLE TRANSVERSE WALL
N15 & N16 COVERAGE =85.9%
N17 & N18 COVERAGE = 82.3%



IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	Rev	SHEET
SP00100	A	2 OF 2

Enclosure 2

Amended PSI Reports for W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA

Amended PSI Report N-16

R-P1766

IHI Southwest Technologies Examination Summary Record

Utility: TVA	Site: Watts Bar Nuclear Plant Unit 2 PSI	Outage:	Summary Sheet No. 001600

System: Reactor Pressure Vessel	Line Subassembly: Outlet Nozzle to Shell @ 158-degree	Identification: N-16

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT5/1/0/1	Probe 1	1100097	50	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 2	1100098	50	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 3	1100099	50	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 4	1100100	50	X	-	
AUT	ISwT-PDI-AUT4/3/0/0	Probe 1	1100001-A	51 - 56	X	-	

Examination Summary:

This weld was examined from the inside surface using AIRIS-21 and Dynaray examination equipment.
No recordable indications were detected during this examination.
Examination Angles for each probe used with procedure ISwT-PDI-AUT 5 include: PA60°-80°L, PA40°-50°S, PA30°-60°L, & PA0°L.
Examination Angles for probe used with procedure ISwT-PDI-AUT-4 include: PA5°- 40°L, PA35°-45S.
Exam #50 was divided into sections A - D (sections C & D were additional exams using specfic probes for improved examination coverage).
The examination was limited due to the proximity of the nozzle intregral extension. The examination coverage was 84%.

This weld was examined From the nozzle inside surface using AUT & T-111 examination equipment. DT 12-05-11

Prepared By: Steven J. Todd Signature: Steven J. Todd Date: 9/2/2011 ISwT Project Manager	
Reviewed By: Signature: Date: 10/24/11 Tennessee Valley Authority	Reviewed By: Daniel R Williams Signature: Date: 12/12/11 ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-50A
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: J. Delgado / III			**Start**	**End**	**Start** / **End**
		27-Aug-11	0100	0128	78 / 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS ~~ANT~~ 12.15.11 DT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	19.85	23.00
Upper Limit	37.85	35.60
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	0.00	0.00
Upper Limit	362.00	180.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Cw/Twd/Awy/Ccw
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	21
Azimuth/Nozzle C/L	158.00°
Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1	21.51	35.00	0.00	172.00
P2	24.50	37.11	0.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: JM III 2SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-PIMLOL

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-50B
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos Barberino / It			**Start**	**End**	**Start** / **End**
		27-Aug-11	0147	0214	78 / 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	AIRIS ~~ANT~~ OE 12.15.11	Lower Limit	19.85	23.00	Lower Limit	0.00	180.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.60	Upper Limit	362.00	362.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P2	24.51	37.10	182.00	364.00
P4	22.09	34.70	178.00	360.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
[signature] III 25SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17Lo

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-50C
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: J. Delgado / III			**Start**	**End**	**Start** / **End**
		27-Aug-11	1825	1839	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS ~~ANT~~ 12.15.1	Lower Limit	19.85	23.00	Lower Limit	0.00	150.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	36.00	Upper Limit	362.00	180.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	24.51	37.10	130.00	180.00
P2 - P4	22.09	34.11	130.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: [signature] III 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1766

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-50D
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: J. Delgado / III			**Start**	**End**	**Start** / **End**
		27-Aug-11	0147	0214	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	~~AIRIS ANT~~ BE 12-16-11	Lower Limit	19.85	23.00	Lower Limit	0.00	180.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	36.00	Upper Limit	362.00	220.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	24.51	37.11	180.00	220.00
P2 - P4	24.51	37.11	180.00	220.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: III 2SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17Ud

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:** ID-51	
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (0°-60°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II			**Start** / **End**	**Start**	**End**
		25-Aug-11	1012 / 1023	78	78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.63	89.63	Lower Limit	0.00	0.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.63	116.63	Upper Limit	60.00	60.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
26	89.63	116.91	0.00	60.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III /Aug 26,2011 III FOR CMB 25SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17606

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:** ID-52	
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (59°-120°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:			**Start**	**End**	**Start** / **End**
Bryan Wright / II		25-Aug-11	1025	1036	78 / 78

Data Acquisition

Scan Controller Parameters	
Controller:	ANT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	89.91	89.91
Upper Limit	116.91	116.91
Inc. Interval (Resolution)	1.00	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	59.00	59.00
Upper Limit	120.00	120.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Twd
Probe Type:	PA16
Scanning Speed:	4.5 degrees per sec.
Number of Scans:	28
Azimuth/Nozzle C/L	158.00°
Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.91	116.91	59.00	120.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III / Aug 26, 2011 for CMB

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17Ld

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-53
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (119°-185°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II		25-Aug-11	**Start** 1038	**End** 1049	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	119.00	119.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	185.00	185.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.10		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.91	116.91	119.00	185.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III / Aug 26, 2011 4 ML FOR CMB

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17666

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-54
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (184°-245°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II		25-Aug-11	**Start** 1051	**End** 1101	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	184.00	184.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	245.00	245.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	86.91	116.91	184.00	245.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III / Aug 26, 2011 FOR CMB

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17166

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-55
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (244°-305°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II			**Start**	**End**	**Start** / **End**
		25-Aug-11	1103	1113	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	244.00	244.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	305.00	305.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	86.91	116.91	244.00	305.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III / Aug 26, 2011

FOR CMB

ISWT FORM No. UT 50 (Rev. 1/11)

R-P176d0

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-16	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-56
Project No.: 11-0690	**Weld Description:** Outlet NTS @158° (304°-362°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:			**Start**	**End**	**Start** / **End**
Bryan Wright / II		25-Aug-11	1115	1125	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.63	89.91	Lower Limit	304.00	304.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.63	116.905	Upper Limit	362.00	362.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	158.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	86.91	116.91	304.00	362.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:

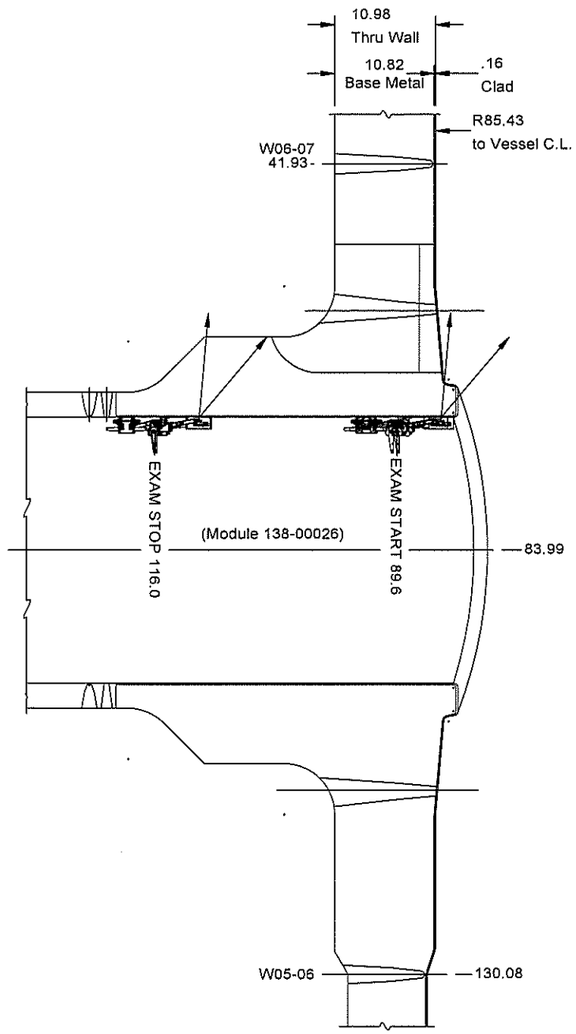
Carlos M. Barrera / III / Aug 26, 2011 CMB FOR CMB

R-P17666

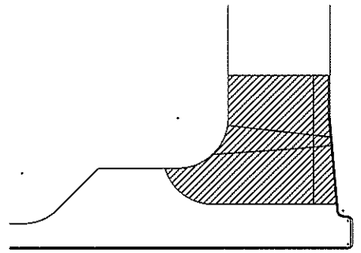
NOTES:
1. THIS MODEL IS NOT CONTROLLED BY IHI.
2. VESSEL DIMENSIONS SHOWN ARE FROM SITE SUPPLIED DRAWINGS UNLESS NOTED.
3. CHECK FOR LIMITATIONS DUE TO INTEGRAL EXTENSION OF OUTLET NOZZLES.

REVISION HISTORY								
REV	ZONE	DESCRIPTION	DESIGN ENGR	DWG ENGR	CHECKER	PROJ MGR	ENG. MGR	DATE

OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE COVERAGE = 100.0%



EXAMINATION	N15 & N16	N17 & N18
PARALLEL BORE	100.0%	100.0%
PARALLEL WALL (SHEET 2)	67.6%	67.6%
TRANSVERSE WALL (SHEET 2)	85.9%	82.3%
AVERAGE	84.5%	83.5%

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
GEOMETRIC TOLERANCES FOR MACHINED SURFACES UNLESS SPECIFIED ON DRAWING

SYM.	GEOMETRY	TOLERANCE
▱	FLATNESS	.008
⌒	PROFILE OF LINE	SEE DRAWING
⌓	PROFILE OF SURFACE	.008
—	STRAIGHT	.004
⊥	PERPENDICULARITY	.004
//	PARALLELISM	.004
∠	ANGULARITY	SEE DRAWING
⌯	SYMMETRY	SEE DRAWING
⌖	TRUE POSITION	SEE DRAWING
◎	CONCENTRICITY	.10 TIR
○	CIRCULARITY/ROUNDNESS	SIZE TOL.

DECIMAL TOLERANCES
1 PLACE ± .1
2 PLACES ± .02
3 PLACES ± .005
ANGLES ± 2°
FINISH 63ST or 63u IN

MACHINE SHOP DETAILS
BREAK/DEBUR ALL SHARP EDGES

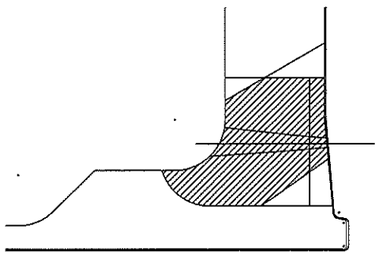
MATERIAL ON PART	N/A	
PART FINISH	N/A	
	ENGINEERING	DATE
ENGINEER	jgeerlings	06/26/2017
DRAWN BY	jgeerlings	06/27/2017
CHECKED BY	rulep	06/27/2017
CHECKED BY	RJP	06/27/17
PROJECT MGR	[signature]	6/27/17
ENGINEERING MGR	[signature]	6/27/17

IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

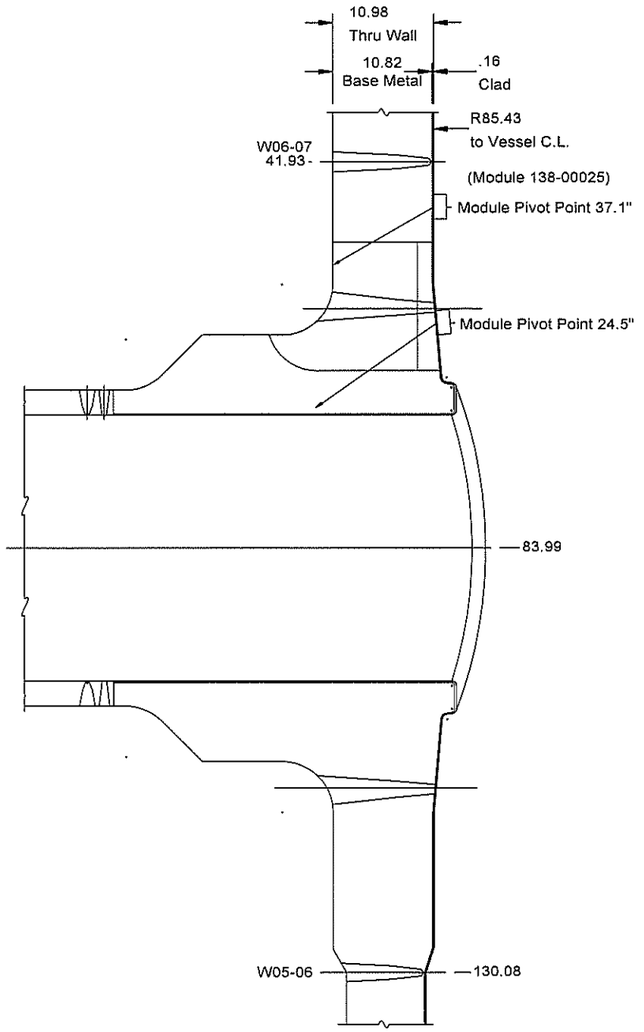
DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	SHEET SIZE	REV
SP00100	B	A
WEIGHT (LB) N/A	SHEET 1 OF 2	

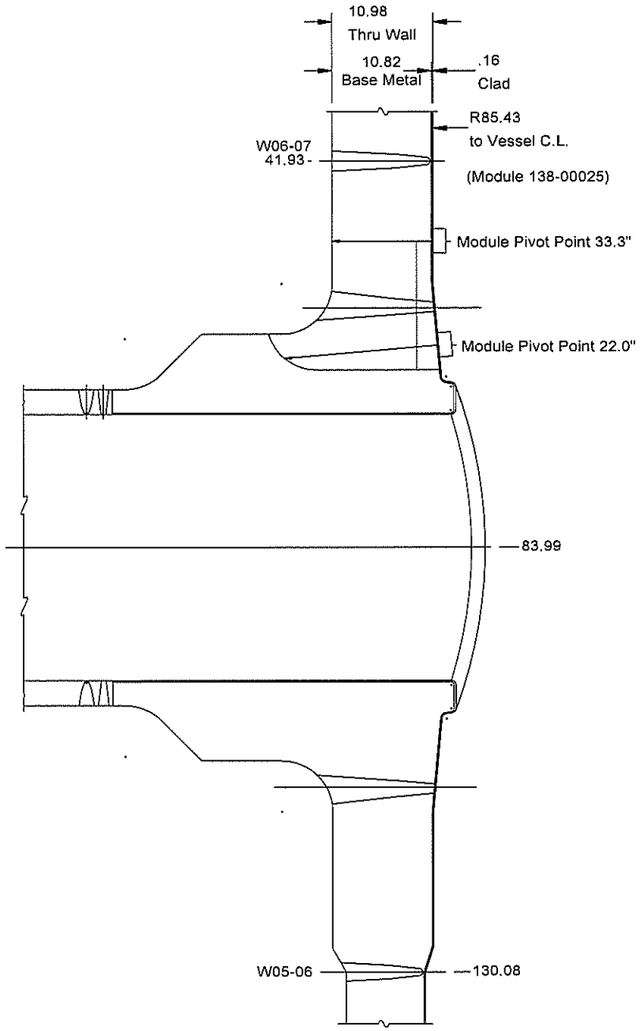
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL COVERAGE = 67.6%



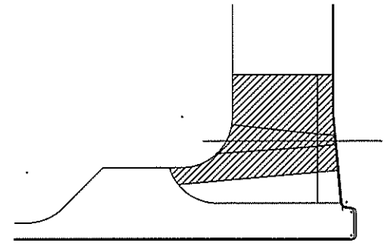
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18
TRANSVERSE WALL EXAMINATION



OUTLET NOZZLE TRANSVERSE WALL
N15 & N16 COVERAGE =85.9%
N17 & N18 COVERAGE = 82.3%



IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	Rev	SHEET
SP00100	A	2 OF 2

Enclosure 2

Amended PSI Reports for W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA

Amended PSI Report N-17

R-P1767

IHI Southwest Technologies Examination Summary Record

Utility: TVA	Site: Watts Bar Nuclear Plant Unit 2 PSI	Outage:	Summary Sheet No. 001700
System: Reactor Pressure Vessel	Line Subassembly: Outlet Nozzle to Shell @ 202-degree		Identification: N-17

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT5/1/0/1	Probe 1	1100097	57	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 2	1100098	57	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 3	1100099	57	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 4	1100100	57	X	-	
AUT	ISwT-PDI-AUT4/3/0/0	Probe 1	1100001-A	58 - 63	X	-	

Examination Summary:

This weld was examined from the inside surface using AIRIS-21 and Dynaray examination equipment.
No recordable indications were detected during this examination.
Examination Angles for each probe used with procedure ISwT-PDI-AUT 5 include: PA60°-80°L, PA40°-50°S, PA30°-60°L, & PA0°L.
Examination Angles for probe used with procedure ISwT-PDI-AUT-4 include: PA5°- 40°L, PA35°-45S.
Exam #57 was divided into sections A - D (sections C & D were additional exams using specfic probes for improved examination coverage).
The examination was limited due to the proximity of the nozzle intregral extension. The examination coverage was 83%.

This weld was examined from the nozzle inside surface using AUT & T-111 examination equipment - DB 12-15-11

Prepared By: Steven J. Todd
Signature: Steven J. Todd Date: 9/2/2011
ISwT Project Manager

Reviewed By:
Signature:
Tennessee Valley Authority Date: 10/24/11

Reviewed By: Daniel R Williams
Signature:
ANII Date: 12/12/11

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-57A
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start** 232	**End** 258	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller: ~~PDI IS~~ ~~ANT~~ PDI 15.4		Lower Limit	19.85	23.00	Lower Limit	0.00	0.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.60	Upper Limit	362.00	180.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P3	24.51	34.10	0.00	180.00
P4	22.10	34.70	0.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: J M III 2SEP2011

R-P1767

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0			**Examination No.:** ID-57B
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start**	**End**	**Start** / **End**
			307	336	78 / 78

Data Acquisition

Scan Controller Parameters	
Controller: AIRIS ~~ANT~~ D6 13.15.1	
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	19.85	23.00
Upper Limit	37.85	35.88
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	0.00	180.00
Upper Limit	362.00	362.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Cw/Twd/Awy/Ccw
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	21
Azimuth/Nozzle C/L	202.00°
Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P3	25.40	37.11	180.00	360.00
P4	22.10	34.70	178.00	360.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: [signature] III 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P17167

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-57C
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	Carlos H. Barberino /It	27-Aug-11	**Start**	**End**	**Start** / **End**
					78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	~~AIRIS ANT~~ DB 13-15-C	Lower Limit	19.85	23.00	Lower Limit	0.00	140.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.60	Upper Limit	362.00	180.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	24.51	34.70	140.00	180.00
P2 - P4	22.09	34.11	140.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
[signature] III 2SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1767

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0			**Examination No.:** ID-57D
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start**	**End**	**Start** / **End**
			232	258	78 / 78

Data Acquisition

Scan Controller Parameters	
Controller: AIRIS ~~ANT~~ DS 12-15-11	
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	19.85	23.00
Upper Limit	37.85	35.60
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	0.00	180.00
Upper Limit	362.00	230.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Cw/Twd/Awy/Ccw
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	21
Azimuth/Nozzle C/L	202.00°
Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	21.90	33.60	180.00	230.00
P2 - P4	21.90	33.00	180.00	230.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
[signature] III 2 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1767

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-58
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (0°-60°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Jesse Delgado / III			**Start**	**End**	**Start** / **End**
		25-Aug-11	0100	0115	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.63	89.63	Lower Limit	0.00	0.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.63	116.63	Upper Limit	60.00	60.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.63	116.63	0.00	60.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III / Aug 26, 2011 FOR CMB

R-P17167

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:** ID-59	
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (59°-120°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Jesse Delgado / III		25-Aug-11	**Start** 0303	**End** 0314	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.63	89.63	Lower Limit	59.00	59.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.63	116.63	Upper Limit	120.00	120.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.63	116.63	59.00	120.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
Carlos M. Barrera / III / Aug 26, 2011 for CMB

R-P1967

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-60
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (119°-185°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Jesse Delgado / III		25-Aug-11	**Start** 0138	**End** 0150	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.63	89.63	Lower Limit	119.00	119.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.63	116.63	Upper Limit	185.00	185.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.10		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.63	116.63	119.00	185.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
Carlos M. Barrera / III / Aug 26, 2011 4 NL FOR CMB

R-P17167

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-61
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (184°-245°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Jesse Delgado / III		25-Aug-11	**Start** 0205	**End** 0217	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.63	89.63	Lower Limit	184.00	184.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	117.63	117.63	Upper Limit	245.00	245.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	29
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.63	116.63	184.00	245.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III / Aug 26, 2011 for CMB

R-P1767

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0			**Examination No.:** ID-62
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (244°-305°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Jesse Delgado / III			**Start**	**End**	**Start** / **End**
		25-Aug-11	0219	0232	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.63	89.63	Lower Limit	244.00	244.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.63	117.63	Upper Limit	305.00	305.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual					**Recordable Indications**					**Analyst Remarks**
Scan No.(s)	Increment Position		Scan Position				Yes	No	N/A	Attachment:
	Start	Stop	Start	Stop	Probe 1	Channel 1	☐	☑	☐	
28	89.63	116.63	244.00	305.00		Channel 2	☐	☑	☐	☐ Yes ☑ No
						Channel 3	☐	☐	☑	Further Evaluation Required:
					Probe 2	Channel 1	☐	☐	☑	
						Channel 2	☐	☐	☑	☐ Yes ☑ No
						Channel 3	☐	☐	☑	
					Probe 3	Channel 1	☐	☐	☑	Archive Media:
						Channel 2	☐	☐	☑	
						Channel 3	☐	☐	☑	☑ External Hard Drive
					Probe 4	Channel 1	☐	☐	☑	
						Channel 2	☐	☐	☑	☐ CD-ROM
						Channel 3	☐	☐	☑	DVD-ROM

Analyst / SNT Level / Date:

Carlos M. Barrera / III / Aug 26, 2011 JML FOR CMB

R-P1767

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-17	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:** ID-63	
Project No.: 11-0690	**Weld Description:** Outlet NTS @202° (304°-362°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Jesse Delgado / III		25-Aug-11	**Start** 0234	**End** 0246	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.63	89.63	Lower Limit	304.00	304.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.63	117.63	Upper Limit	362.00	362.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	202.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.63	117.63	304.00	362.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:

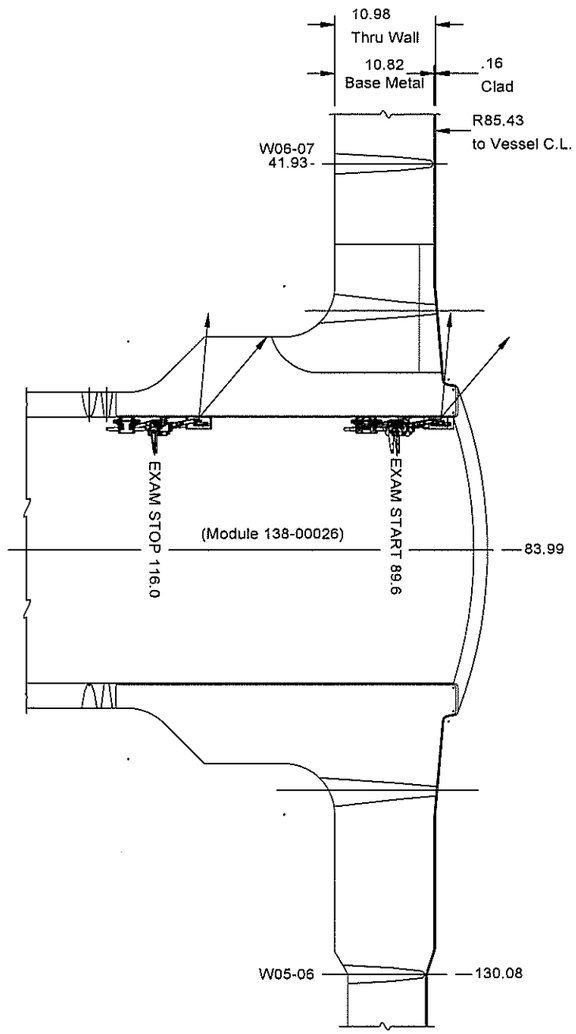
Carlos M. Barrera / III / Aug 26, 2011 for CMB

R-P1767

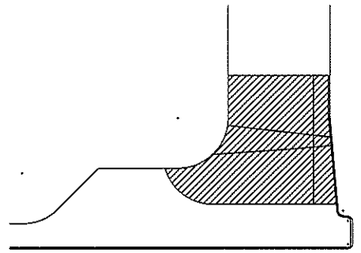
NOTES:
1. THIS MODEL IS NOT CONTROLLED BY IHI.
2. VESSEL DIMENSIONS SHOWN ARE FROM SITE SUPPLIED DRAWINGS UNLESS NOTED.
3. CHECK FOR LIMITATIONS DUE TO INTEGRAL EXTENSION OF OUTLET NOZZLES.

REVISION HISTORY								
REV	ZONE	DESCRIPTION	DESIGN ENGR	DWG ENGR	CHECKER	PROJ MGR	ENG. MGR	DATE

OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE COVERAGE = 100.0%



EXAMINATION	N15 & N16	N17 & N18
PARALLEL BORE	100.0%	100.0%
PARALLEL WALL (SHEET 2)	67.6%	67.6%
TRANSVERSE WALL (SHEET 2)	85.9%	82.3%
AVERAGE	84.5%	83.5%

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
GEOMETRIC TOLERANCES FOR MACHINED SURFACES UNLESS SPECIFIED ON DRAWING

SYM.	GEOMETRY	TOLERANCE
▱	FLATNESS	.008
⌒	PROFILE OF LINE	SEE DRAWING
⌓	PROFILE OF SURFACE	.008
—	STRAIGHT	.004
⊥	PERPENDICULARITY	.004
//	PARALLELISM	.004
∠	ANGULARITY	SEE DRAWING
⌯	SYMMETRY	SEE DRAWING
⌖	TRUE POSITION	SEE DRAWING
◎	CONCENTRICITY	.10 TIR
○	CIRCULARITY/ROUNDNESS	SIZE TOL.

DECIMAL TOLERANCES
1 PLACE ± .1
2 PLACES ± .02
3 PLACES ± .005
ANGLES ± 2°
FINISH 63ST or 63u IN

MACHINE SHOP DETAILS
BREAK/DEBUR ALL SHARP EDGES

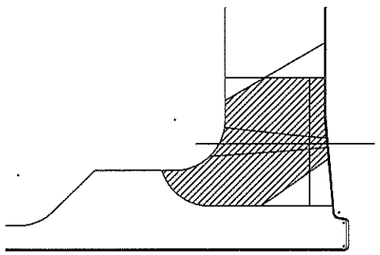
MATERIAL ON PART	N/A	
PART FINISH	N/A	
	ENGINEERING	DATE
ENGINEER	jgeerlings	06/26/2017
DRAWN BY	jgeerlings	06/27/2017
CHECKED BY	rulep	06/27/2017
CHECKED BY	RJP	06/27/17
PROJECT MGR	[signature]	6/27/17
ENGINEERING MGR	[signature]	6/27/17

IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

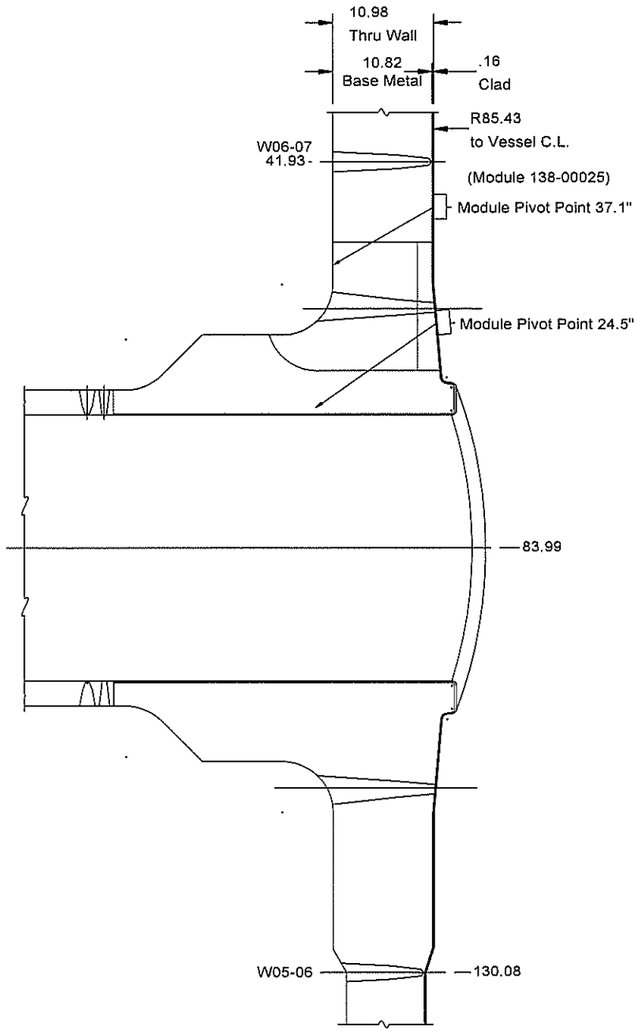
DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	SHEET SIZE	REV
SP00100	B	A
WEIGHT (LB) N/A	SHEET 1 OF 2	

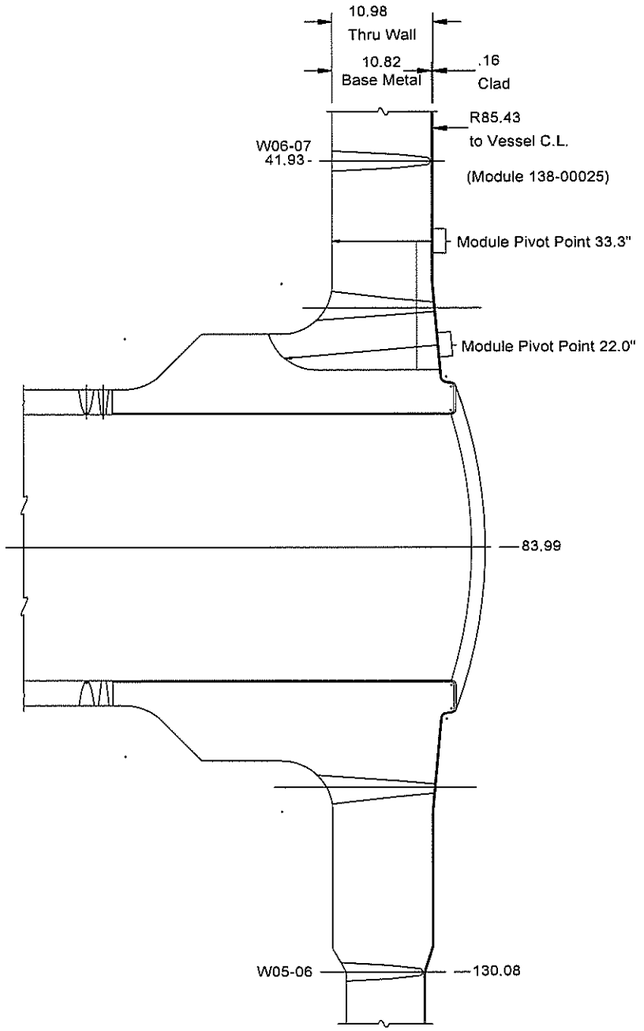
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL COVERAGE = 67.6%



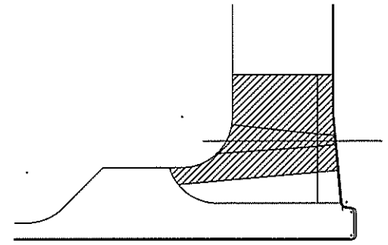
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18
TRANSVERSE WALL EXAMINATION



OUTLET NOZZLE TRANSVERSE WALL
N15 & N16 COVERAGE =85.9%
N17 & N18 COVERAGE = 82.3%



IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	Rev	SHEET
SP00100	A	2 OF 2

Enclosure 2

Amended PSI Reports for W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA

Amended PSI Report N-18

R.P1770

IHI Southwest Technologies Examination Summary Record

Utility: TVA	Site: Watts Bar Nuclear Plant Unit 2 Outage: PSI	Summary Sheet No. 002000
System: Reactor Pressure Vessel	Line Subassembly: Outlet Nozzle to Shell @ 338-degree	Identification: N-18

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT5/1/0/1	Probe 1	1100097	78	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 2	1100098	78	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 3	1100099	78	X	-	
AUT	ISwT-PDI-AUT5/1/0/1	Probe 4	1100100	78	X	-	
AUT	ISwT-PDI-AUT4/3/0/0	Probe 1	1100001-A	79 - 84	X	-	

Examination Summary:

This weld was examined from the inside surface using AIRIS-21 and Dynaray examination equipment.
No recordable indications were detected during this examination.
Examination Angles for each probe used with procedure ISwT-PDI-AUT 5 include: PA60°-80°L, PA40°-50°S, PA30°-60°L, & PA0°L.
Examination Angles for probe used with procedure ISwT-PDI-AUT-4 include: PA5°- 40°L, PA35°-45S.
Exam #78 was divided into sections A - D (sections C & D were additional exams using specfic probes for improved examination coverage).
The examination was limited due to the proximity of the nozzle intregral extension. The examination coverage was 84%.
This weld was examined from the nozzle inside surface using AUT & T-111 examination equipment. AB 13.15-11

Prepared By: Steven J. Todd Signature: Steven J. Todd Date: 9/2/2011 ISwT Project Manager	
Reviewed By: Signature: Date: 10/21/11 Tennessee Valley Authority	Reviewed By: Daniel R Williams Signature: Date: 12/12/11 ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-78A1
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start** 401	**End** 424	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS ~~eANT~~ PC 15.4
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	19.85	23.00
Upper Limit	37.85	34.70
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	0.00	0.00
Upper Limit	362.00	180.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Cw/Twd/Awy/Ccw
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	21
Azimuth/Nozzle C/L	338.00°
Elevation/Nozzle C/l	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	21.50	32.30	0.00	180.00
P2 - P4	24.50	35.30	0.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: [signature] / III / 2SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-78A2
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start** 440	**End** 449	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters	
Controller:	AIRIS ~~ANT~~ BC 13.15.11
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	19.85	32.00
Upper Limit	37.85	35.60
Inc. Interval (Resolution)	0.90	
Conversion Counts	100	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	0.00	0.00
Upper Limit	362.00	180.00
DCI (Scan Resolution)	0.20	
Conversion Counts	100	
Conversion Units	Degrees	
Radius In.	14.47"	

Positional Parameters	
Beam Direction:	Cw/Twd/Awy/Ccw
Probe Type:	PA22-006
Scanning Speed:	1.5 inches per second
Number of Scans:	21
Azimuth/Nozzle C/L	338.00°
Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	30.50	34.10	0.00	180.00
P2 - P4	33.50	37.10	0.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: [signature] III 2-SEP-2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0			**Examination No.:** ID-78B
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start** 454	**End** 527	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	AIRIS ANT 3151	Lower Limit	19.85	23.00	Lower Limit	0.00	180.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.60	Upper Limit	362.00	362.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	21.50	34.10	180.00	360.00
P2 - P4	24.50	37.10	180.00	360.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: 12SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-78C
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start** 1730	**End** 1742	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	AIRIS ~~ANT 3511~~	Lower Limit	19.85	24.00	Lower Limit	0.00	130.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.50	Upper Limit	362.00	180.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	21.50	34.10	130.00	180.00
P2 - P4	24.50	37.10	130.00	180.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: [signature] III 2SEP2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT5/1/0/0		**Examination No.:**	ID-78D
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (Wall)	**Device Configuration:** 136-00021			
Mod.Conf.: 138-00025	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Carlos H. Barberino /It		27-Aug-11	**Start** 1750	**End** 1802	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	AIRIS ~~ANT~~ Be 13.15.1	Lower Limit	19.85	24.00	Lower Limit	0.00	180.00	Beam Direction:	Cw/Twd/Awy/Ccw
Scan:	X Rotator Drive	Upper Limit	37.85	35.50	Upper Limit	362.00	120.00	Probe Type:	PA22-006
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.90		DCI (Scan Resolution)	0.20		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	21
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: 0 Skew CW Beam.UVSetup

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	0°	- 5.17(in)	+ 0.29(in)	1100097
Probe 2	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	90°	- 2.87(in)	+ 1.21(in)	1100098
Probe 3	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	270°	+ 3.13(in)	- 1.21(in)	1100099
Probe 4	1-(60-80°L) 2-(40-50°S) 3-(30-60°L) 4-(0°)	180°	+ 5.19(in)	+ 0.29(in)	1100100

Examination Notes:
Limited exam due to the proximity of the outlet nozzle integral extension.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
P1 - P3	21.50	34.10	180.00	220.00
P2 - P4	24.50	37.10	180.00	220.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 4	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☐ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: [signature] III 25 SEP 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-79
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (0°-60°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II			**Start**	**End**	**Start** / **End**
		24-Aug-11	1712	1724	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	0.00	0.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	60.00	60.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.75(in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.91	116.91	0.00	60.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: C M Bar III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-80
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (59°-120°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II			**Start**	**End**	**Start** / **End**
		24-Aug-11	1731	1742	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.91	89.910	Lower Limit	59.00	59.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.811	Upper Limit	120.00	120.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.74(in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	89.61	116.91	59.00	120.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C J M Bar III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-81
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (119°-185°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II		24-Aug-11	**Start** 1744	**End** 1755	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	119.00	119.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	185.00	185.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.10		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.74	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
28	86.91	116.91	119.00	185.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: C M Bar III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-82
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (184°-245°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II		24-Aug-11	**Start** 1757	**End** 1808	**Start** 78 / **End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.63	89.91	Lower Limit	184.00	184.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.80	Upper Limit	245.00	245.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.74(in)	1100001-A
N/A	N/A n/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
This exam is a backup if only 1 Probe is used for scanning.
When using 2 Probes, 0 and 180 this exam will not be used.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
28	86.91	116.91	184.00	245.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM ☐ DVD-ROM

Analyst / SNT Level / Date: Ed M Bar III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1720

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:**	ID-83
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (244°-305°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II			**Start**	**End**	**Start** / **End**
		24-Aug-11	1810	1820	78 / 78

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	ANT	Lower Limit	89.910	89.910	Lower Limit	244.00	244.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.910	116.788	Upper Limit	305.00	305.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.74(in)	1100001-A
N/A	N/A n/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
This exam is a backup if only 1 Probe is used for scanning.
When using 2 Probes, 0 and 180 this exam will not be used.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
28	86.91	116.91	244.00	305.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: C J M Bar III 26 Aug 2011

ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Watts Bar Unit 2	**Weld Identification:** N-18	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT4/2/0/0		**Examination No.:** ID-84	
Project No.: 11-0690	**Weld Description:** Outlet NTS @338° (304°-362°)	**Device Configuration:** 136-00024			
Mod.Conf.: 138-00026	**Scan Path Drawing:** 134-00061	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II		24-Aug-11	**Start** 1823 / **End** 1834	**Start** 78	**End** 78

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	ANT	Lower Limit	89.91	89.91	Lower Limit	304.00	304.00	Beam Direction:	Twd
Scan:	X Rotator Drive	Upper Limit	116.91	116.91	Upper Limit	362.00	362.00	Probe Type:	PA16
Increment:	Y Axial Drive	Inc. Interval (Resolution)	1.00		DCI (Scan Resolution)	0.20		Scanning Speed:	4.5 degrees per sec.
Mode:	Automatic Scan	Conversion Counts	100		Conversion Counts	100		Number of Scans:	28
Scan Motion:	Bi-directional	Conversion Units	Inches		Conversion Units	Degrees		Azimuth/Nozzle C/L	338.00°
Correction:	N/A				Radius In.	14.47"		Elevation/Nozzle C/I	83.98"

Master Acquisition File: RPV-ID-PA-NTS-bore.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(5-40°L) 2-(35-45°S)	270°	+ 0.00(deg)	- 3.74(in)	1100001-A
N/A	N/A N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
This exam is a backup if only 1 Probe is used for scanning.
When using 2 Probes, 0 and 180 this exam will not be used.

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
28	89.91	116.91	304.00	362.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☐	☑
Probe 2	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
Probe 4	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Ed M Bar III 26 Aug 2011

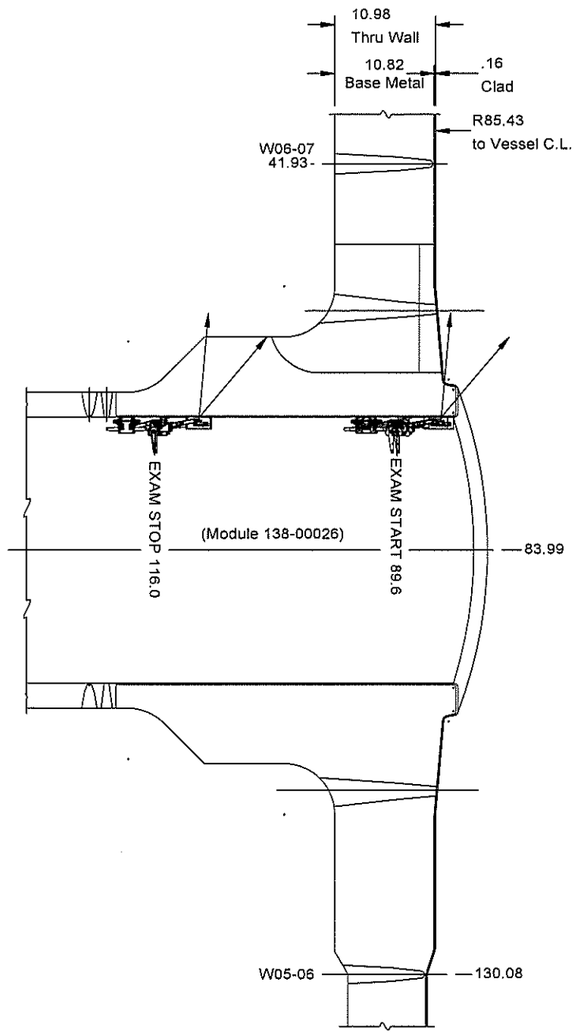
ISWT FORM No. UT 50 (Rev. 1/11)

R-P1770

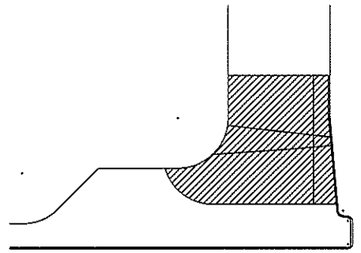
NOTES:
1. THIS MODEL IS NOT CONTROLLED BY IHI.
2. VESSEL DIMENSIONS SHOWN ARE FROM SITE SUPPLIED DRAWINGS UNLESS NOTED.
3. CHECK FOR LIMITATIONS DUE TO INTEGRAL EXTENSION OF OUTLET NOZZLES.

REVISION HISTORY								
REV	ZONE	DESCRIPTION	DESIGN ENGR	DWG ENGR	CHECKER	PROJ MGR	ENG. MGR	DATE

OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18 PARALLEL BORE COVERAGE = 100.0%



EXAMINATION	N15 & N16	N17 & N18
PARALLEL BORE	100.0%	100.0%
PARALLEL WALL (SHEET 2)	67.6%	67.6%
TRANSVERSE WALL (SHEET 2)	85.9%	82.3%
AVERAGE	84.5%	83.5%

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
GEOMETRIC TOLERANCES FOR MACHINED SURFACES UNLESS SPECIFIED ON DRAWING

SYM.	GEOMETRY	TOLERANCE
▱	FLATNESS	.008
⌒	PROFILE OF LINE	SEE DRAWING
⌓	PROFILE OF SURFACE	.008
—	STRAIGHT	.004
⊥	PERPENDICULARITY	.004
//	PARALLELISM	.004
∠	ANGULARITY	SEE DRAWING
⌯	SYMMETRY	SEE DRAWING
⌖	TRUE POSITION	SEE DRAWING
◎	CONCENTRICITY	.10 TIR
○	CIRCULARITY/ROUNDNESS	SIZE TOL.

DECIMAL TOLERANCES
1 PLACE ± .1
2 PLACES ± .02
3 PLACES ± .005
ANGLES ± 2°
FINISH 63ST or 63u IN

MACHINE SHOP DETAILS
BREAK/DEBUR ALL SHARP EDGES

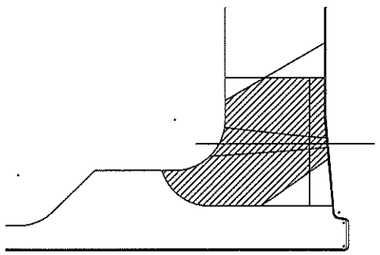
MATERIAL ON PART	N/A	
PART FINISH	N/A	
	ENGINEERING	DATE
ENGINEER	jgeerlings	06/26/2017
DRAWN BY	jgeerlings	06/27/2017
CHECKED BY	rulep	06/27/2017
CHECKED BY	RJP	06/27/17
PROJECT MGR	[signature]	6/27/17
ENGINEERING MGR	[signature]	6/27/17

IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

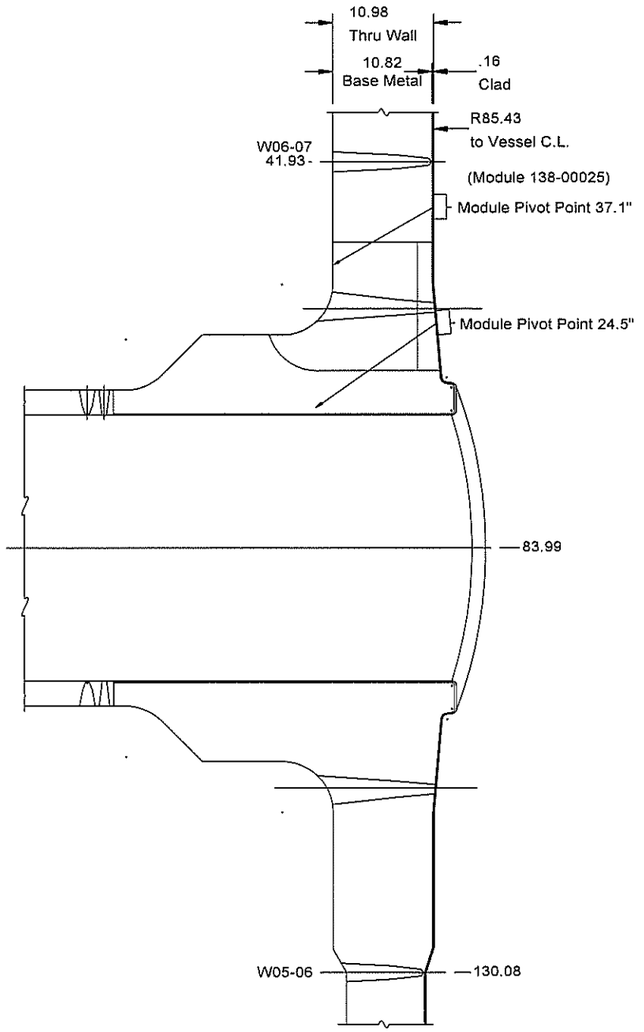
DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	SHEET SIZE	REV
SP00100	B	A
WEIGHT (LB) N/A	SHEET 1 OF 2	

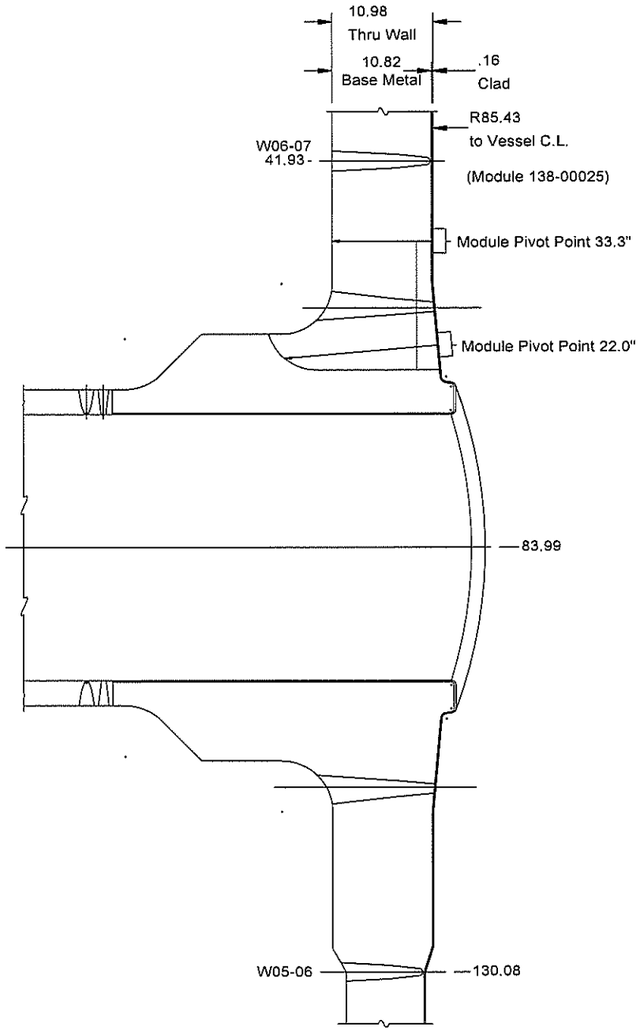
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL COVERAGE = 67.6%



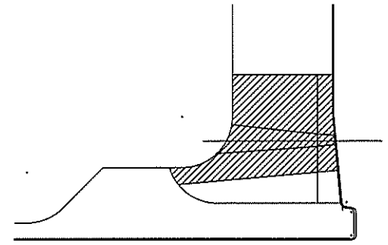
OUTLET NOZZLE N15, N16, N17, N18
PARALLEL WALL EXAMINATION



OUTLET NOZZLE N15, N16, N17, N18
TRANSVERSE WALL EXAMINATION



OUTLET NOZZLE TRANSVERSE WALL
N15 & N16 COVERAGE =85.9%
N17 & N18 COVERAGE = 82.3%



IHI Southwest Technologies, Inc.
6766 Culebra Road San Antonio, Texas 78238

DRAWING TITLE: **WATTS BAR UNIT 2 PSI 2011 OUTLET NOZZLE COVERAGE**

DRAWING NUMBER	Rev	SHEET
SP00100	A	2 OF 2

Enclosure 2

Amended PSI Reports for W02-03, N-15, N-16, N-17, N-18, and CCPH-2B-B-IA

Amended PSI Report CCPH-2B-B-IA

TENNESSEE VALLEY AUTHORITY	RECORD OF LIQUID PENETRANT EXAM	REPORT NUMBER R-P3950

PROJECT: *WBN* UNIT: *2* CYCLE: *00*
SYSTEM: *CVCS* MATL.: *S* Thickness: *0.000*
WELD/COMPONENT ID: *CCPH-2B-B-IA*
CONFIG.: *WLD ATT* TO
PROCEDURE: *N-PT-9* REV.: 37 TC: 15-08
EXAMINATION CODE *PSI*
CODE CLASS: 2 CATEGORY: *C-C*
CODE ITEM N *C3.30*

EXAMINATION DATE 10-31-15
EXAM TIME 1545
EXAM SURFACE: ID ☐ OD ☒
ORIGINAL EXAM: ☒ RE-EXAM: ☐
REF. DRAWING NO.: *ISI-2062A-E-01*
VISUAL CARD S/N.: 393
PRESERVICE ☒ INSERVICE ☐

ACCEPTANCE CRITERIA
☐ APPDX. A ☒ APPDX. C
☐ OTHER:

METHOD OF EXAMINATION

METHOD

WATER-WASHABLE FLUORESCENT DYE: ☐
POST-EMULSIFIABLE FLUORESCENT DYE: ☐
SOLVENT-REMOVABLE FLUORESCENT DYE: ☐
WATER-WASHABLE VISIBLE DYE: ☐
POST-EMULSIFIABLE VISIBLE DYE: ☐
SOLVENT REMOVABLE VISIBLE DYE: ☒

PENETRANT MATERIALS

BRAND NAME: MAGNAFLUX
PENETRANT: SKL-SP2 BATCH: 12G13K
REMOVER: SKC-S BATCH: 10M07K
DEVELOPER: SKD-S2 BATCH: 15E09K

BLACK LIGHT/LIGHT METER

METER S/N: N/A
CAL. DUE DATE:
ILLUMINATION CARD S/N: 393

PART TEMP: 74 °F PYROMETER S/N: E39055 CAL. DUE DATE: 06-04-2016

EXAMINATION RESULTS SATISFACTORY: ☒ UNSATISFACTORY: ☐ NOI NO.: NONE

EXPLANATION OF EXAM RESULTS: NO RECORDABLE INDICATIONS.

COMMENTS/LIMITATIONS: LIMITED EXAM ON PUMP FEET DUE TO PUMP INSTALLATION. LIMITED AT BOTTOM QUADRANT OF PUMP FEET. APPROXIMATELY 75% COVERAGE. 82.6 BTM 7/13/17

ILLUMINATION SOURCE: FLASHLIGHT ILLUMINATION CHECK PRE-EXAM: ☒ POST EXAM: ☒

EXAMINER: BTM DONALD BTM DONALD LEVEL: II
EXAMINER: — NA BTM 10-31-15 — LEVEL: —
REVIEWER: Brandon Calvery LEVEL: II DATE: 4/1/16

ANII:
DATE: 4-1-16
PAGE: 3 1 OF 4

ACCESS: FORMS DATABASE 9-13-06

BTM 7/13/17

RAI-1

R-P3950
Pg. 2 of 3
BM 7/13/17

DISCUSSION:

Reference Dwg ISI-2062A-E-01 and Vendor (Dresser/Pacific Pumps) Dwg FC-48590
ISI Report No. R-P3950

The 2B Centrifugal Charging Pump integral attachment (IA) welds (component identifier CCPH-2B-B-IA) are installed and mounted at 4 points to the pump case (assembly) and are welded their entire perimeter. The pump assembly is bolted down to the pump pedestal at these same locations. The intersection of the pump assembly to the pump pedestal does not allow accessibility to perform examination of the bottom horizontal 6 inches of the weld per mounting point (24 inches total) due to opening restrictions of approximately 0.625 to 2.5 inches.

To gain access to the weld at this location would require pump assembly removal and subsequent reinstallation from and to the pump pedestal that would require extensive operations, maintenance, and plant support. To conduct the NDE exam in place would be difficult to perform and would not be a meaningful exam due to the weld access.

The quality of a meaningful examination would not be significantly increased if the weld was examined in place without removal of the pump as described above.

COVERAGE CALCULATION:

The weld surface is approximately 1.5 inches wide. An additional 1 inch is added for the 1/2 inch of component base metal on each side within the exam boundary. Total coverage is 2.5 in^2 per linear inch.

The outboard weld length is 35 and 35 inches per individual mounting point (70 inches combined for both outboard attachments).
The inboard weld length is 35 and 33 inches per individual mounting point (68 inches combined for both inboard attachments).

The overall weld length is 138 inches (total for all 4 mounting points combined). (70 + 68 = 138)
Subtract 24 inches (6 inches per mounting point) from the overall weld length (138 - 24 = 114)

The IA weld length acquired exam coverage is 82.6 percent (114 ÷ 138 = .8260) × 100 = 82.6.
This is greater than what was initially estimated at 75 per cent.

The overall surface coverage is 138 × 2.5 in^2 = 345 in^2
The accessible surface coverage is 114 × 2.5 in^2 = 285 in^2
The acquired surface coverage is 82.6 per cent (285 ÷ 345 = .8260) × 100 = 82.6

See attached sketch for exam coverage.

TVA

WALL THICKNESS PROFILE SHEET

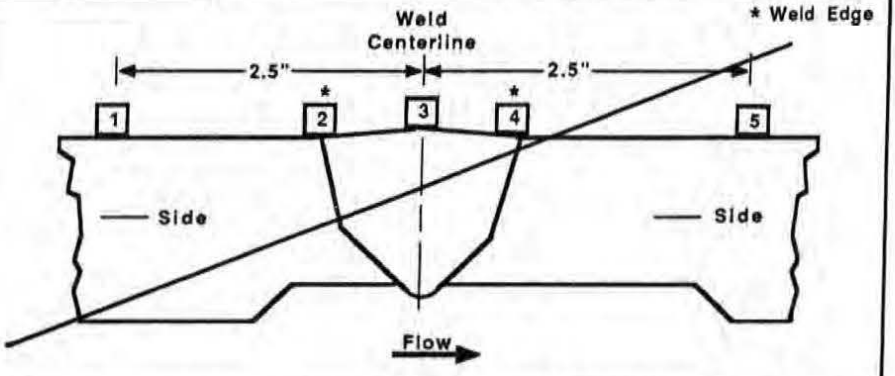
REPORT NO: R-P3950

PROJECT: WATTS BAR NUCLEAR
UNIT: 2

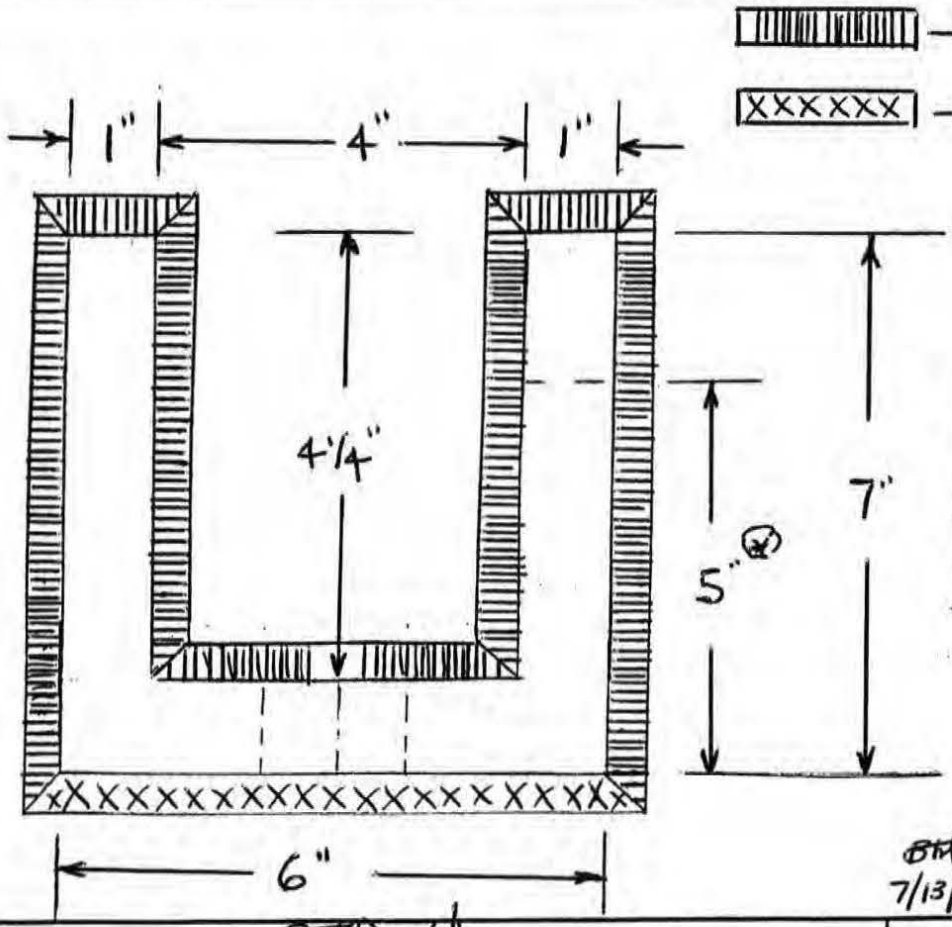
WELD NO: CCPH-2B-B-IA
SYSTEM: 062 (CVCS)

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1				
2				
3				
4				
5				



CROWN HEIGHT: N/A
CROWN WIDTH: 1.5 INCHES
DIAMETER: N/A
WELD LENGTH: 138 INCHES



▭ – ACCESSIBLE

XXXXXX – NOT ACCESSIBLE

* 5 INCH DUE TO BALANCING LINE PENETRATION INTO THE PUMP CASING ON ONE SIDE OF THE INBOARD MOUNTING POINT.

BM
06-16-17

BM
7/13/17

EXAMINER: BEN T. MCDONALD BTMcDonald
LEVEL: II
DATE: 06-16-2017

REVIEWED BY:
LEVEL: DATE:

ANII:
DATE:
PAGE OF

REFERENCE DRAWINGS
VENDOR TECHNICAL MANUAL
WBN-VTM-W120-0010
VTD-W120-2628
FC-48590

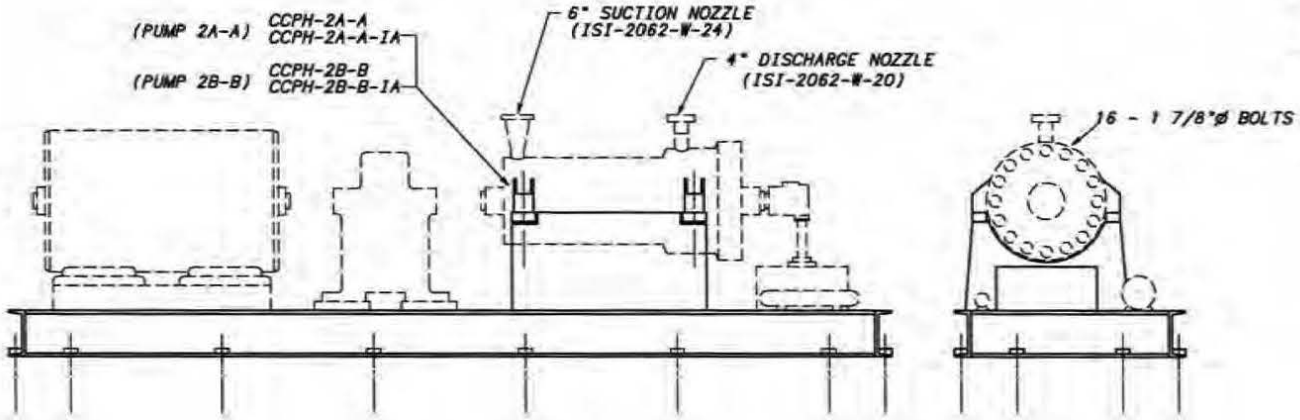
MATERIAL SPECIFICATIONS

PUMP CASING
SA 182 F 304

ASME CC-2 (EQUIVALENT)

NOTES:

1. THE PUMP FEET ARE BOLTED TO A COMMON SUPPORT.
2. THE PUMP FEET ARE INTEGRALLY WELDED TO THE CASING AND IDENTIFIED WITH A COMMON ID.
3. THIS DRAWING MAY NOT REPRESENT THE TRUE CONFIGURATION. REFER TO THE REFERENCED DRAWINGS FOR SPECIFIC DETAILS.



REV.	PHB	N/A			
ADD REFERENCE DRAWINGS					
REV.	BY	CHECKED	SUBMITTED	APPROVED	DATE

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT
UNIT 2
CENTRIFUGAL CHARGING PUMP
WELD AND SUPPORT LOCATIONS

DRAWN: PHB	DATE: 9-28-10	SCALE: NOT TO SCALE	
CHECKED: N/A	APPROVED: DT	CAD MAINTAINED DRAWING	REV
SUBMITTED: JTL	ISI-2062A-E-01		01

Enclosure 3

Scan Directions Reports for W08-09, WP-11, WP-12, WP-13, WP-14, WP-15

Scan Directions Report for W08-09

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-P1014

PROJECT: *WBN* UNIT: *2*	CYCLE *00*	COMPONENT ID: *W08-09*	
EXAMINATION METHOD		SYSTEM: RV	ISI DWG NO: *ISI-2068A-E-04*

MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-19*	REV *17*	TC: *10-01*		*CHd Flg* TO *CHd Rin*	*B-A*

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
Jose Alejandro	Jason Polisensky	N/A	N/A
LEVEL: II	LEVEL: II	LEVEL:	LEVEL:

Total coverage calculated to be approximately ~~75.3 %~~ 69.3% mw 6/20/17 ©

An ultrasonic examination was performed on RPV Closure Head Flange to Closure Head weld. This examination wds performed to meet the requirements of ASME Section XI preservice inspection.

A 0° longitudinal and 45° 60° shear waves were calibrated and used to performed this examination.

The examination was limited to one side due to configuration. There were three lifting lugs located in the exam area that limited the scans as well.

No recordable indications observed.

mw 6/20/17
~~75.3%~~ 69.3% examination volume coverage achieved.

© See page 9 of 11. Matt Welch 6/20/17
MATT WELCH LIII

RESOLUTION BY:	REVIEWED BY:	ANII: (w)
LEVEL II DATE: 04-12-10	LEVEL: III DATE: 4/15/10	DATE: 5/25/10
		Page: 1 OF ~~6~~ 11

6/20/17

ACCESS: FORMS DATABASE R-10/04/01

SO 4-28-10

PS 1/15 mw 6/20/17

TENNESSEE VALLEY AUTHORITY

DIGITAL ULTRASONIC CALIBRATION DATA SHEET

REPORT NUMBER R-P1014

PROJECT *WBN* UNIT/CYCLE *2/ 00*
PROCEDURE: *N-UT-19* REV: *17* TC: *10-01*

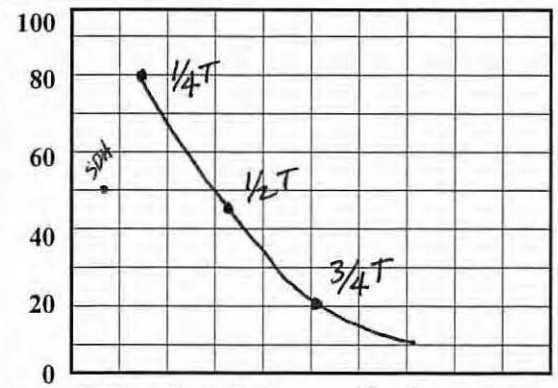
TRANSDUCER
MANUFAC *KBA* MODEL: *GAMMA RHP*
ELEMENTS: *1* SHAPE: *Round*
S/N *01FD75* SIZE: *1.0* FREQ: *1.0* MHz
CONTOUR: *N/A* FOCUS: *N/A*
CABLE TYPE *RG58* LENGTH: *12'* # CNT: *N/A*
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☐ SHEAR ☒ LONG ☐ RL

CALIBRATION DATE: *04-09-10*
CALIBRATION BLOCK NO. *WB51* TEMP: *72* °F
SIMULATOR BLOCK: *790390*
THERMOMETER S/N: *562773* DUE DATE: *06-12-10*
COUPLANT: *Ultragel II* BATCH: *07225E*

ANGLE VERIFICATION
BLOCK TYPE *IIW* S/N: *5311*
NOMINAL ANGLE: *0°* ACTUAL ANGLE *N/A*

INSTRUMENT
MANUFACTURER: *KrautKramer* DUE DATE: *06-23-10*
MODEL NO.: *USN 60* S/N: *E34780*

DAC



DISPLAY WIDTH *10.0* inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	*26.9* dB	*0°- Head*
CIRC.	☐	☐	*N/A* dB	*N/A*

RANGE: *10.0* inches *FREQ: *1.0* MHz
PROBE DELA *1.7328* msec *RECTIFY: *Fullwave*
VELOCITY *.2306* msec DUAL ☐ ON ☒ OFF
DISP DELAY: *0.000* *REJECT: *0* %
*ENERGY: *High* *DISP. START: *IP*
*DAMPING: *1K* ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: *Autohigh* TCG: ☐ ON ☒ OFF
ANGLE: *0* deg *PULSER: *Single*
ZERO: *N/A* msec

REF. REFLECTOR: *Rompus SDH* GAIN: *26.9* dB
AMPLITUDE: *50* % METAL PATH: *.79*

CALIBRATION TIMES
INITIAL TIME: *1218* FINAL TIME: *1639*

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)
	1330	*1421*	*1506*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	*20*		*80*		*80*	

COMMENTS	WELD / ITEMS EXAMINED
	W08-09

EXAMINER: *Jose Alejandro Reynoso* LVL.: *II*
EXAMINER: *JASON POLISENSKY* LVL.: *II*
REVIEWER: *Mark Wilder* LVL.: *III* DATE: *4/15/10*

ANII: *AW*
DATE: *5/25/10*
PAGE *2* OF *8 & 11*

Rev 6/29/17

ACCESS: FORMS DATABASE 07-25-07

ASO 4-28-10

TENNESSEE VALLEY AUTHORITY

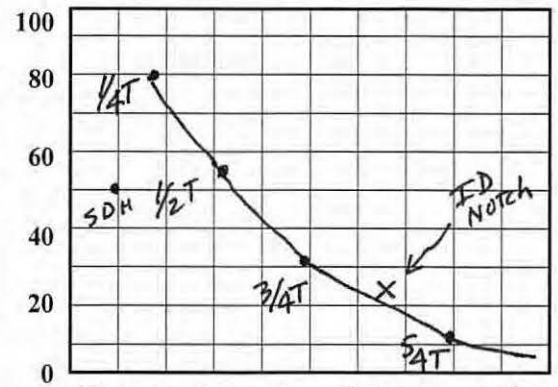
DIGITAL ULTRASONIC CALIBRATION DATA SHEET

REPORT NUMBER R-P1014

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: 10-01

TRANSDUCER
MANUFAC KBA MODEL: GAMMA
ELEMENTS: 1 SHAPE: Rectangle
S/N J10237 SIZE: .5X1.0 FREQ: 1.0 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG58 LENGTH: 12' # CNT: N/A
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 15.00 inches

CALIBRATION DATE: 04-09-10
CALIBRATION BLOCK NO. WB51 TEMP: 72 °F
SIMULATOR BLOCK: 790390
THERMOMETER S/N: 562773 DUE DATE: 06-12-10
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE IIW S/N: 5311
NOMINAL ANGLE: 45 ACTUAL ANGLE 45°

INSTRUMENT
MANUFACTURER: KrautKramer DUE DATE: 06-23-10
MODEL NO.: USN60 S/N: E34780

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTC	SDH		
AXIAL	☐	☒	50.9 dB	45°-Head
CIRC.	☐	☒	50.9 dB	45°-Head

RANGE: 15.00 inches *FREQ: 1.0 MHz
PROBE DELA 2.5534 msec *RECTIFY: Fullwave
VELOCITY .1268 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 45 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas 50H GAIN: 51.4 dB
AMPLITUDE: 50 % METAL PATH: 1.2

CALIBRATION TIMES
INITIAL TIME: 1228 FINAL TIME: 1643

VERIFICATION TIMES	1) 1339	2) 1423	3) 1509	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
3/4, 5/4 db difference 4db	W08-09

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: JASON POLISENSKY LVL.: II
REVIEWER: Matt Welch LVL.: III DATE: 4/15/10

ANII: [signature]
DATE: 5/25/10
PAGE 3 OF ~~8~~ 11

ACCESS: FORMS DATABASE 07-25-07

TENNESSEE VALLEY AUTHORITY

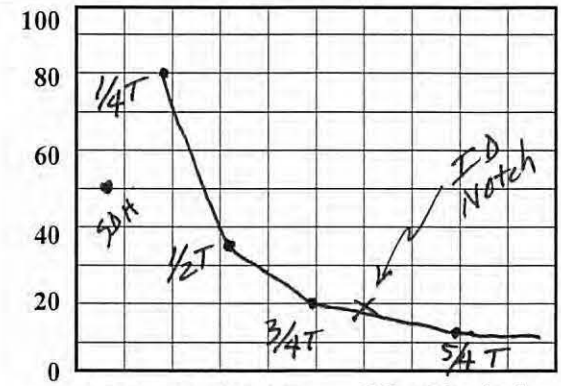
DIGITAL ULTRASONIC CALIBRATION DATA SHEET

REPORT NUMBER R-P1014

PROJECT: WBN UNIT/CYCLE: 2/00
PROCEDURE: N-UT-19 REV: 17 TC: 10-01

TRANSDUCER
MANUFAC: KBA MODEL: GAMMA
ELEMENTS: 1 SHAPE: Rectangle
S/N: J10239 SIZE: .5X1.0 FREQ: 1.0 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE: RG58 LENGTH: 12' # CNT: N/A
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 22.00 inches

CALIBRATION DATE: 04-09-10
CALIBRATION BLOCK NO. WB51 TEMP: 72 °F
SIMULATOR BLOCK: 790390
THERMOMETER S/N: 562773 DUE DATE: 06-12-10
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE: IIW S/N: 5311
NOMINAL ANGLE: 60 ACTUAL ANGLE: 60 °

INSTRUMENT
MANUFACTURER: KrautKramer DUE DATE: 06-23-10
MODEL NO.: USN60 S/N: E34780

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	55.8 dB	60°-Head
CIRC.	☐	☒	55.8 dB	60° Head

RANGE: 22.00 inches
PROBE DELA: 15.1906 msec
VELOCITY: .1238 msec
DISP DELAY: 0.000
*ENERGY: High
*DAMPING: 1K ohms
*PRR/PRF: Autohigh
ANGLE: 60 deg
ZERO: N/A msec

*FREQ: 1.0 MHz
*RECTIFY: Fullwave
DUAL ☐ ON ☒ OFF
*REJECT: 0 %
*DISP. START: IP
DET: ☐ Peak ☒ Flank
TCG: ☐ ON ☒ OFF
*PULSER: Single

REF. REFLECTOR: Rompas SDH GAIN: 56.2 dB
AMPLITUDE: 50 % METAL PATH: 1.5

CALIBRATION TIMES
INITIAL TIME: 1235 FINAL TIME: 1652

VERIFICATION TIMES	1) 1348	2) 1420	3) 1508	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP 80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
		40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
3/4, 5/4 db difference 5.5db	W08-09

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: JASON POLISENSKY for Polisensky LVL.: II
REVIEWER: Mark Wilson LVL.: III DATE: 4/15/10

ANII: W
DATE: 5/25/10
PAGE 4 OF 8 & 11

ver 6/20/07

ACCESS: FORMS DATABASE 07-25-07

DA 4-28-10

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R-P1014

PROJECT: WBN UNIT: 2
SYSTEM: RPV
WELD I.D.: W08-09
CONFIG: CHd Flg TO: CHd Rin
PROCEDURE: N-UT- 19 REV. 17 TC: 10-01

Wo REFERENCE: ℄ of weld
Lo REFERENCE: Vessel O
SURFACE TEMP: 68 F
PYRO. SERIAL NO. 562773

EXAMINATION DATE: 04-09-10
START TIME: 1333 END TIME: 1621

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
VLA	0°	32.9 dB
VLA	45°	56.9 dB
VLA	60°	61.8 dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N/A	N	N	N															

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
			0			NO		RECORDABLE				INDICATIONS												
		2	45			NO		RECORDABLE				INDICATIONS												
		2	60			NO		RECORDABLE				INDICATIONS												
		3	45			NO		RECORDABLE				INDICATIONS												
		3	60			NO		RECORDABLE				INDICATIONS												
		4	45			NO		RECORDABLE				INDICATIONS												
		4	60			NO		RECORDABLE				INDICATIONS												

REMARKS/LIMITATIONS: Examination limitations at L-41½ to L-47½, L-241 to L-248 and L-421 to L-428 due to lifting Lugs. No scans were performed from the flange side due to configuration. Examination was performed scanning +6db on all scans.

EXAMINER: Jose Alejandro LEVEL: II
EXAMINER: JASON POLISENSKY LEVEL: II

REVIEWED BY: Matt Welch
LEVEL: III DATE: 4/15/10

ANII 5/25/10

PAGE 5 OF 68

TVA 19870B (NP 7/92)

04-28-10

Watts Bar Unit 2

R-P1014

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	W08-09 0deg.				
Item 1	Required examination Volume in sq. in. **(width x height)**	10.2	7.2	73.44	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			293.76	sq. in.
Item 4	Total **length** of weld			500	inches
Item 5	Total required **exam volume** in cubic inches			146880	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	46.65	482	22485.3	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	46.65	482	22485.3	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	46.65	482	22485.3	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	46.65	482	22485.3	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			89941.2	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**61.23**	%

18" obstruction along length due to lift lugs (500-18=482). Flange to blend obstruction of 26.79"sq. (73.44-26.79= 46.65)

Initials MCW

Date 6/20/2017

Watts Bar Unit 2

R-P1014

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	W08-09 45deg.				
Item 1	Required examination Volume in sq. in. **(width x height)**	10.2	7.2	73.44	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			293.76	sq. in.
Item 4	Total **length** of weld			500	inches
Item 5	Total required **exam volume** in cubic inches			146880	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	0	500	0	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	69.7	500	34850	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	72.8142	500	36407.1	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	72.8142	500	36407.1	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			107664.2	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**73.30**	%

312.9"cu obstruction under lift lug (36720-312.0=36407.1).

Initials	Date
MCW	6/20/2017

pg 8/11

Watts Bar Unit 2

R-P1014

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	W08-09 60deg.				
Item 1	Required examination Volume in sq. in. **(width x height)**	10.2	7.2	73.44	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			293.76	sq. in.
Item 4	Total **length** of weld			500	inches
Item 5	Total required **exam volume** in cubic inches			146880	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	0	500	0	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	69.7	500	34850	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	73.05	500	36525	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	73.05	500	36525	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			107900	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**73.46**	%

195.3"cu obstruction under lift lug (36720-195.3=36524.7). 18" obstruction along length due to lift lugs (500-18=482).

Initials	Date
MCW	6/20/2017

PS 9/11

R-P1014

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1.

Reference CR: 1309817

Report: R-P1014

Coverage changed and clarification notes added. 0, 45 and 60 coverage sheets changed.

Additionally, for the components listed below:

- W08-09 – Notes that "scan #3 limitation is due to flange and scan #4 limitation is due to lifting lugs" however the scan directions are never defined with numbers. Please confirm which directions are associated with these scans. Also, please show graphically where these lifting lugs prevent examination.

Images of scan direction limitations have been added to the report.

Coverage has been recalculated to reflect the addition of the 0 degree coverage and the lifting lug obstructions associated with 45 and 60 degree scan directions 3 (item 8) and 4 (item 9). The reported coverage of 75.3% has been changed to 69.3%.

The notes on coverage calculation sheets have been changed to reflect values applicable to each examination angle.

MATT WELCH Matt Welch 6/20/17
L.TII

PS 10/11

R-P1014

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: N/A w 6/20/17

Reports: R-P1014/W0809, R-P1280/WP-15, R-P1281/WP-14, R-P1282/WP-12, R-P1283/WP-11 AND R-P1284/WP-13.

Scan directions provided for clarity.

Scan directions defined for W08-09:

- Scan 1 is axial from the flange surface.
- Scan 2 is axial from the RPV head surface.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan directions defined for WP-11 through WP-15:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

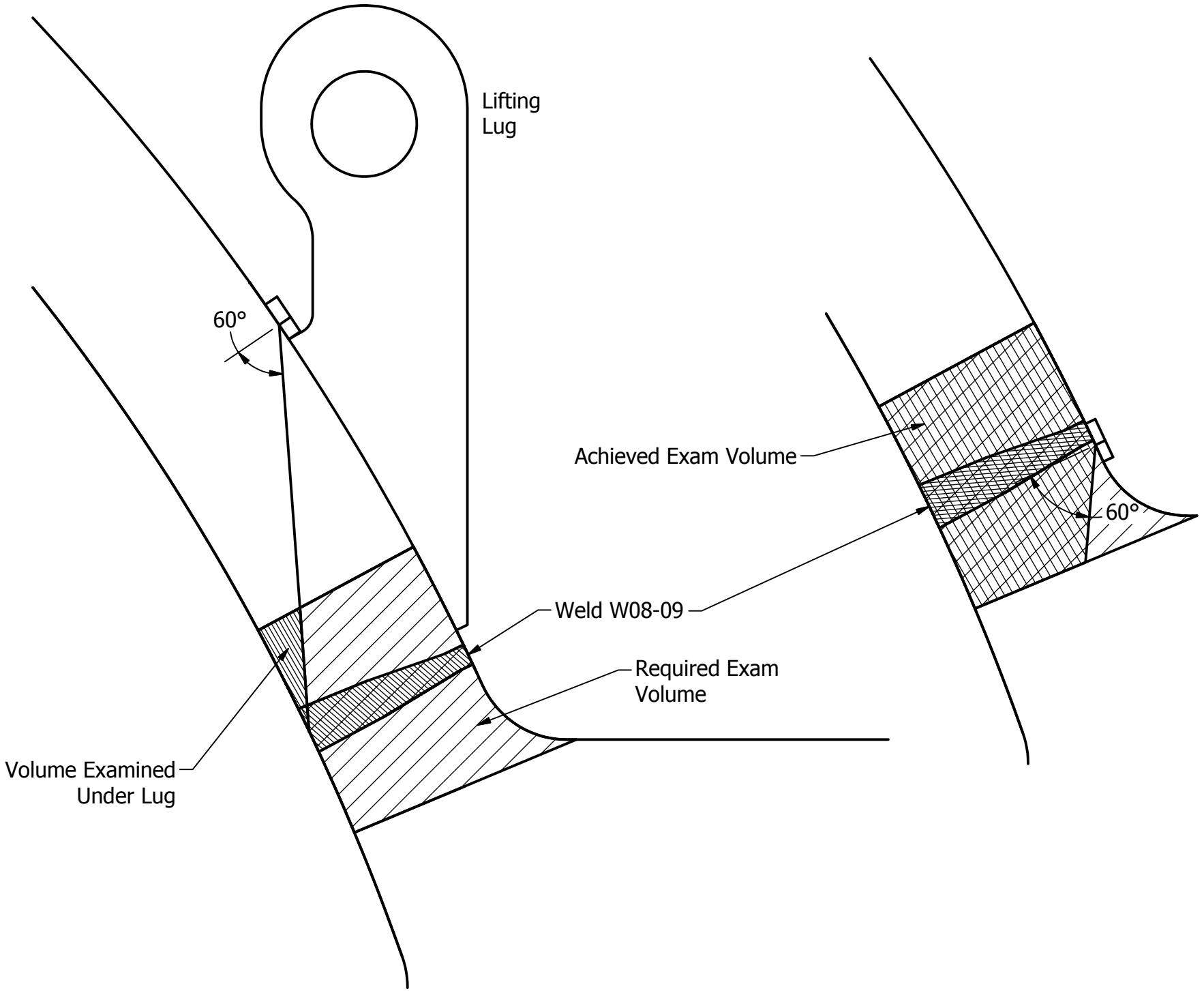
Scan direction figures submitted and added to applicable reports for:

- W08-09 (R-P1014)
- WP-11 (R-P1283)
- WP-12 (R-P1282)
- WP-13 (R-P1284)
- WP-14 (R-P1281)
- WP-15 (R-P1280)

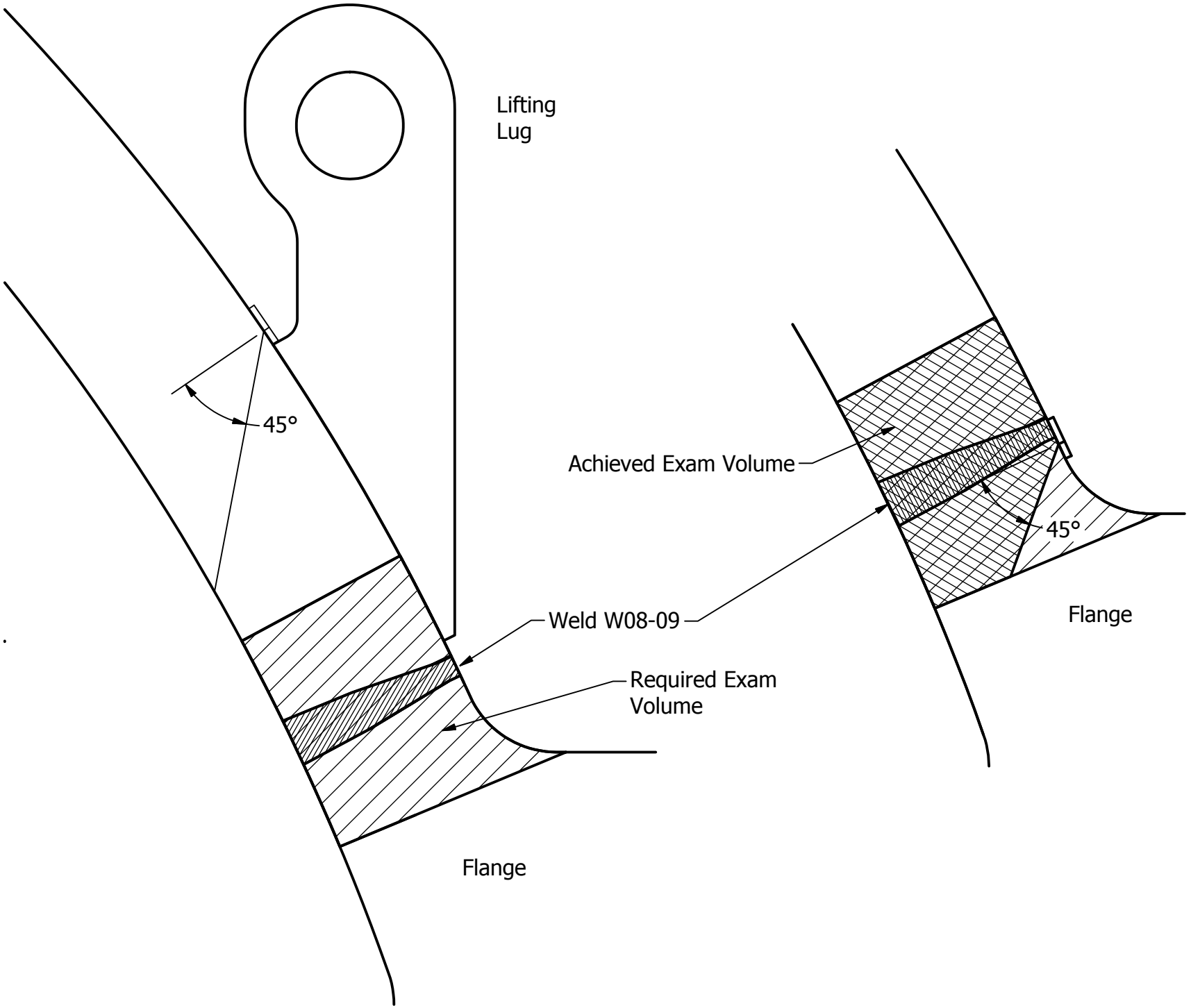
Matt Welch 6/20/17
MATT WELCH LTII

PG 11/11

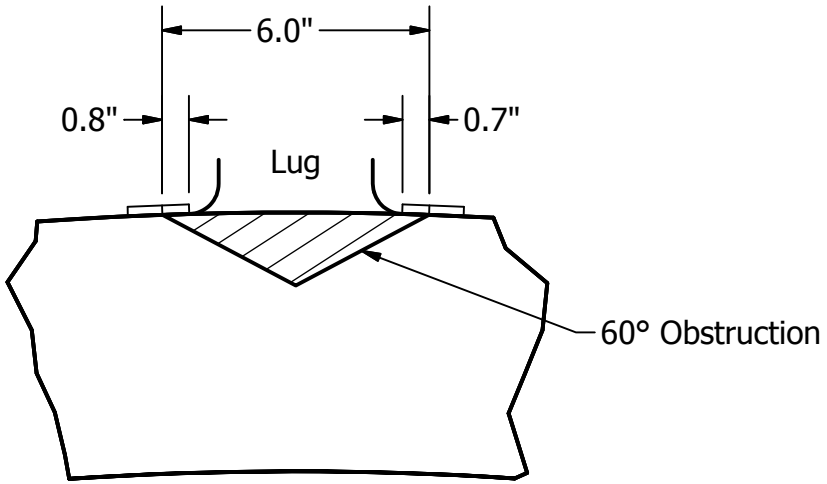
60° Scan 2 Limit at Lug and Flange

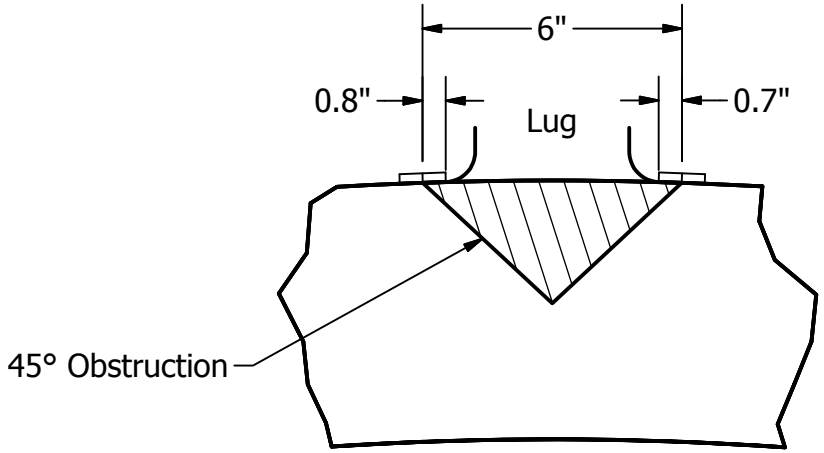


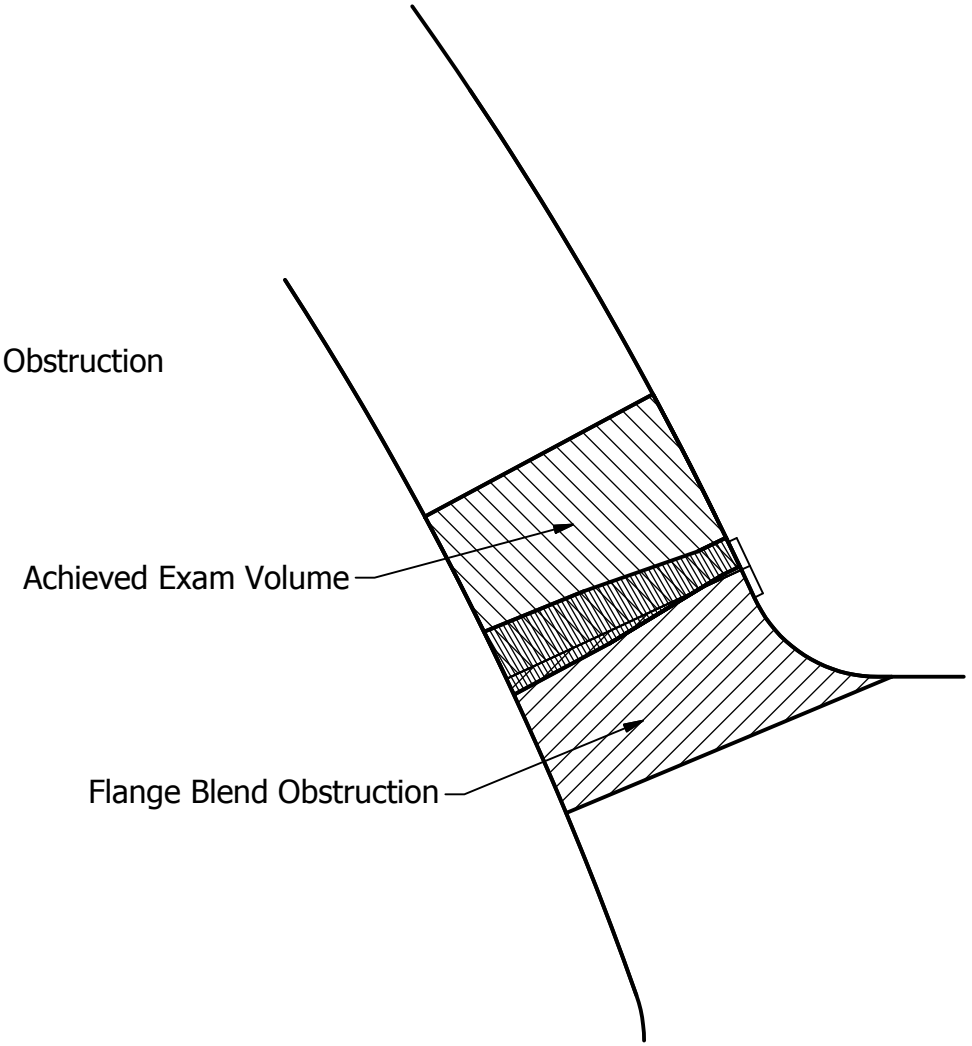
45° Scan 2 Limit at Lug and Flange



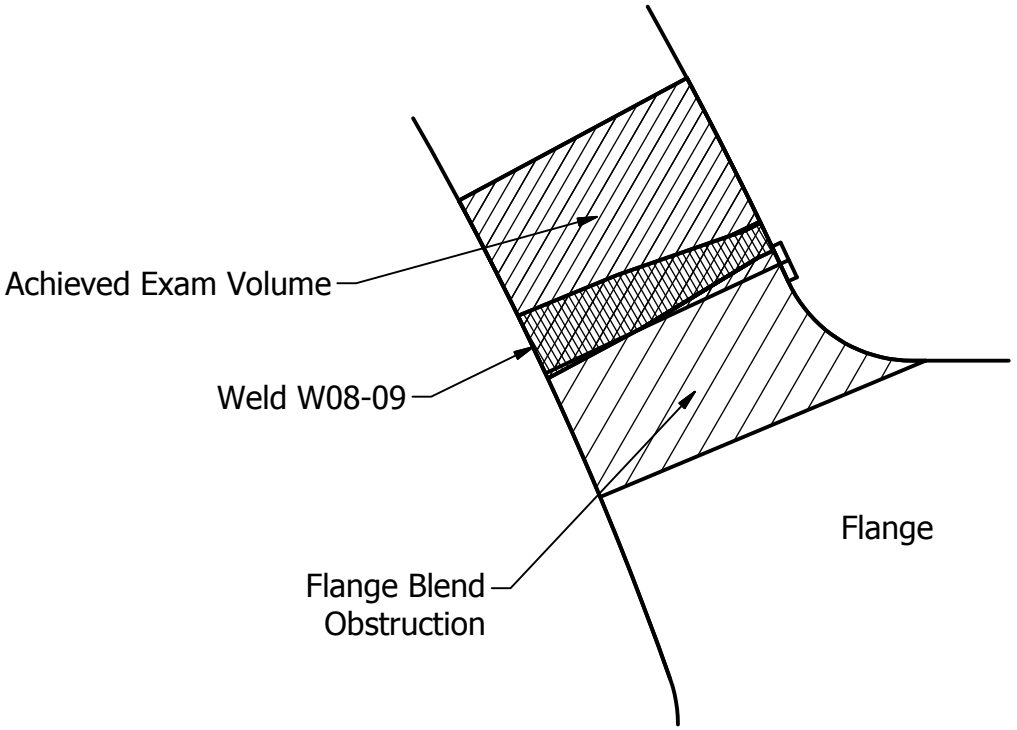
45° & 60° Scans 3 & 4 Lift Lug Obstructions







Straight Beam Limit at Lug and Flange



Enclosure 3

Scan Directions Reports for W08-09, WP-11, WP-12, WP-13, WP-14, WP-15

Scan Directions Report for WP-11

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-P1283

PROJECT: *WBN* UNIT: *2* CYCLE *00*				COMPONENT ID: *WP-11*	
EXAMINATION METHOD				SYSTEM: PZR	ISI DWG NO: *ISI-2068C-E-01*
MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-19*		REV 17	TC: N/A	*NOZ TO SHL*	*B-D*
EXAMINER: Jose Alejandro LEVEL: II		EXAMINER: Brandon Calvery LEVEL: IIL		EXAMINER: N/A LEVEL:	EXAMINER: N/A LEVEL:

Total coverage calculated to be approximately ~~68.73 %~~ 65.72% ©

An Ultrasonic examination was performed on the Nozzle to Shell Weld configuration. This examination was performed to meet the requirement of ASME XI preservice Inspection.

A 0° longitudinal wave and a 45° and 60° Shearwave were calibrated and used to perform this examination.

Examination was limited due to Nozzle configuration.

No recordable indications observed

~~68.73%~~ examination volume coverage achieved. 65.72% m-6/20/17

0° lamination scan was performed for PSI

© See page 14 of 15. Matt Welch 6/20/17
MATT WELCH LIII

RESOLUTION BY:	REVIEWED BY:	ANII:
Jose Alejandro	Darlene Quesenberry	DATE: 1-6-10
LEVEL II DATE: 10-22-10	LEVEL: III DATE: 10-31-10	Page: 1 OF 15

ACCESS: FORMS DATABASE R-10/04/01

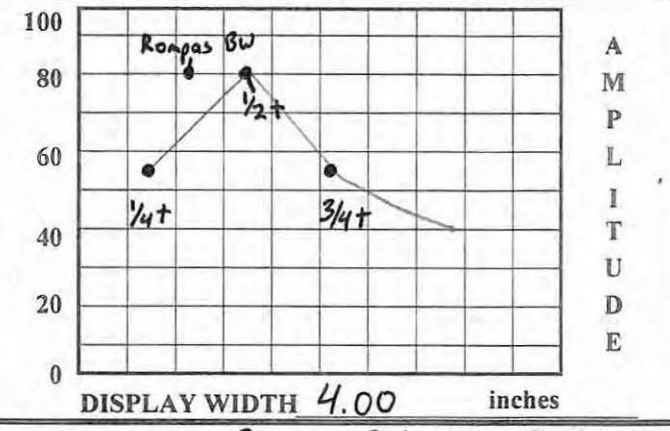
m-6/20/17

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P1283

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC KBA MODEL: Gamma HP
ELEMENTS: 1 SHAPE: Round
S/N F16128 SIZE: .750 FREQ: 2.25 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☐ SHEAR ☒ LONG ☐ RL

DAC



DISPLAY WIDTH 4.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7°F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 0° ACTUAL ANGLE 0 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	43.0 dB	0°-Noz-Sh
CIRC.	☐	☐ A	N/A dB	N/A

RANGE: 4.00 inches *FREQ: 2.25 MHz
PROBE DELA 1.2531 msec *RECTIFY: Fullwave
VELOCITY .2333 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☒ Peak ☐ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 0 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas BW GAIN: 21.5 dB
AMPLITUDE: 80 % METAL PATH: 1.00

CALIBRATION TIMES
INITIAL TIME: 0847 FINAL TIME: 1307

VERIFICATION TIMES	1) 0955	2) 1120	3) 1130	4) 1230	5) 1247	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	WP-11

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II
REVIEWER: [illegible] LVL.: III DATE: 6-30-10

ANII:
DATE: 1-6-10
PAGE 2 OF 15

ACCESS: FORMS DATABASE 07-25-07

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-P1283

PROJECT: WBN UNIT/CYCLE: 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

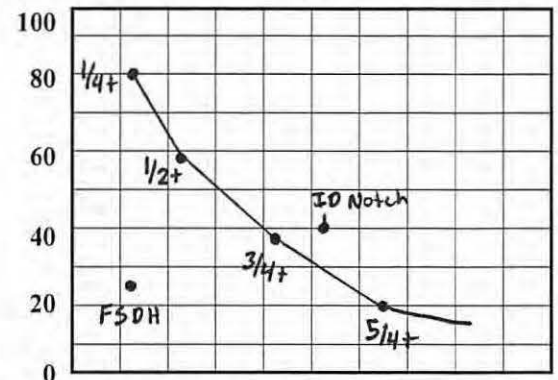
TRANSDUCER
MANUFAC: KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N: J10237 SIZE: .50×1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE: RG174 LENGTH: 6' # CNT: 0
CONFIG: ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO.: WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE: Rompas S/N: 967717
NOMINAL ANGLE: 45° ACTUAL ANGLE: 45 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

DAC



DISPLAY WIDTH: 8.00 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	54.2 dB	45-Noz-SH
CIRC.	☐	☐ A	54.2 dB	45-Noz-SH

RANGE: 8.00 inches *FREQ: 1 MHz
PROBE DELA: 3.3066 msec *RECTIFY: Full wave
VELOCITY: .1272 msec DUAL: ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1k ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 45 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 54.2 dB
AMPLITUDE: 25 % METAL PATH: 1.05

CALIBRATION TIMES
INITIAL TIME: 0834 FINAL TIME: 1306

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)
	1010	1100	1139	1220	1248	N/A	N/A	N/A	N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
4.9 db difference 3/4, 5/4	WP-11

EXAMINER: Jose Alejandro Mendoza LVL.: II
EXAMINER: Brandon Calvery LVL.: II
REVIEWER: Darlene Dudley LVL.: III DATE: 10-31-10

ANII:
DATE: 1-6-10 (11/20/10)
PAGE 3 OF 15

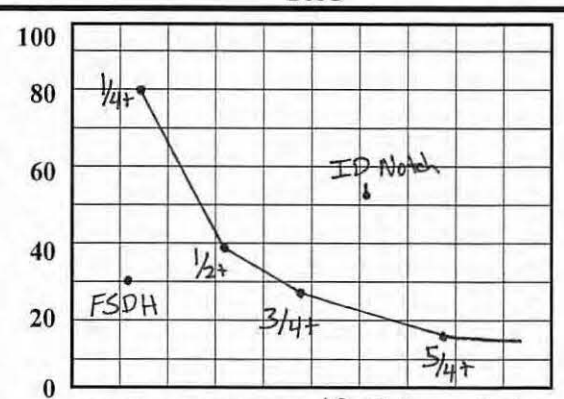
ACCESS: FORMS DATABASE 07-25-07

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P1283

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N J10239 SIZE: .5 x 1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE R6174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 10.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 60° ACTUAL ANGLE 60 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	50.5 dB	60-N02-SH
CIRC.	☐	☐ A	50.5 dB	60-N02-SH

RANGE: 10.00 inches *FREQ: 1 MHz
PROBE DELA 16.9716 msec *RECTIFY: Full wave
VELOCITY 1260 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 60 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 50.5 dB
AMPLITUDE: 30 % METAL PATH: 1.5

CALIBRATION TIMES
INITIAL TIME: 0815 FINAL TIME: 1305

VERIFICATION TIMES	1) 1026	2) 1037	3) 1149	4) 1217	5) 1255	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
6.6 db difference 3/4, 5/4	WP-11

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II L
REVIEWER: Darlene Dewey LVL.: II DATE: 10-31-10

ANII: none
DATE: 1-6-10
PAGE 4 OF 15 mwc 1/20/10

ACCESS: FORMS DATABASE 07-25-07

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- R.0123

PROJECT: WBN UNIT: 2
SYSTEM: Pressurizer
WELD I.D.: WP-11
CONFIG: Nozzle TO: Shell
PROCEDURE: N-UT- 19 REV. 17 TC: N/A

Wo REFERENCE: ℄ of weld
Lo REFERENCE: TDC of Nozzle
SURFACE TEMP: 77.7 F
PYRO. SERIAL NO. E44479

EXAMINATION DATE: 10-21-10
START TIME: 1242 END TIME: 1306

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
	0	51.0 dB
N/A	45	AX 59.1 Circ 62.0 dB
	60	AX 60.3 Circ. 61.5 dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N	N	N	N															

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX) Mp1	W1	L1	50% Mp1	W1	L1	20% Mp1	W1	L1	MAX Mp	W	L	20% Mp2	W2	L2	50% Mp2	W2	L2	100% (1/2 MAX) Mp2	W2	L2
			0				No Recordable Indications																	
		1	45				No Recordable Indications																	
		2	45				No Recordable Indications																	
		3	45				No Recordable Indications																	
		4	45				No Recordable Indications																	
		1	60				No Recordable Indications																	
		2	60				No Recordable Indications																	
		3	60				No Recordable Indications																	
		4	60				No Recordable Indications																	

REMARKS/LIMITATIONS: Examination limited on nozzle side due to configuration. All scans were performed maintaining 5-20% I.D. noise on base metal and on weld. 0 degree scanned at 80% back wall.

EXAMINER: Jose Alejandro LEVEL: II
EXAMINER: Brandon Calvery LEVEL: IIL

REVIEWED BY: Darlene Swaby
LEVEL: III DATE: 10-31-10

ANII Andrew Triplett 24413

PAGE 5 OF 15

TVA 19670B (NP 7/92)

* Reviewed by ANII Ronald Roberts on 1/6/2011, verified review in Bound Diary. Other pages initialed 1/6/2010. AOT 24413

Initialed

TVA

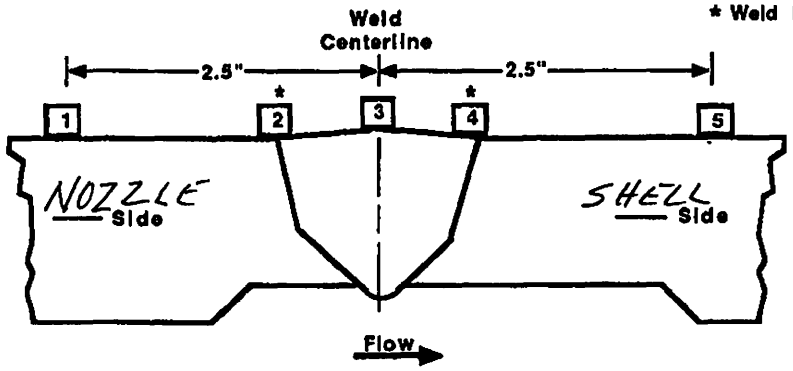
WALL THICKNESS PROFILE SHEET

REPORT NO: R-1283

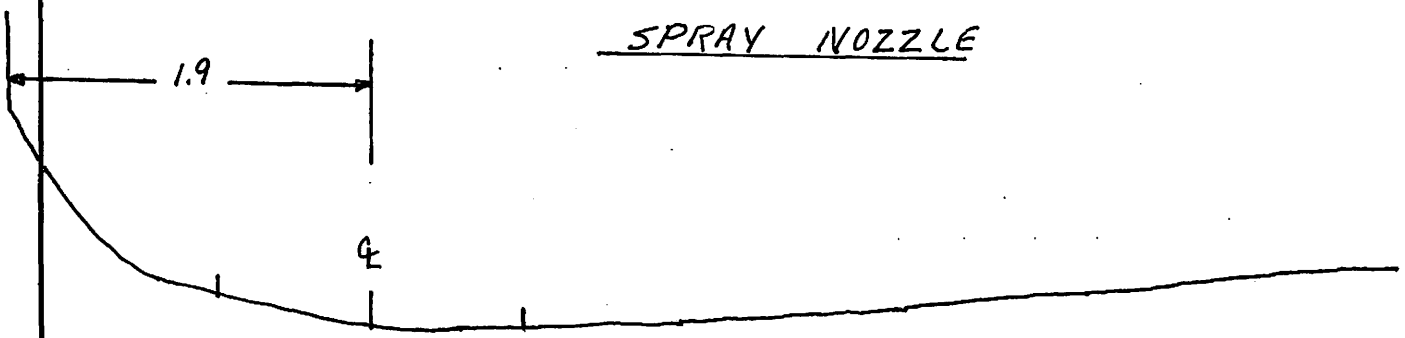
PROJECT: WBN
UNIT: 2
WELD NO: WP-11
SYSTEM: PZR

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	*	*	*	*
2	3.61	3.68	3.61	3.68
3	3.11	3.44	3.15	3.02
4	2.97	3.13	3.06	3.07
5	2.79	2.84	2.82	2.82



CROWN HEIGHT: FLUSH
CROWN WIDTH: 1.6
DIAMETER: ~~4.0~~ 6.0
WELD LENGTH: 39.8



* No thickness reading taken on nozzle side.

EXAMINER: [signature] II
DATE: 10-19-10

REVIEWED BY: [signature]
LEVEL: III
DATE: 10-31-10

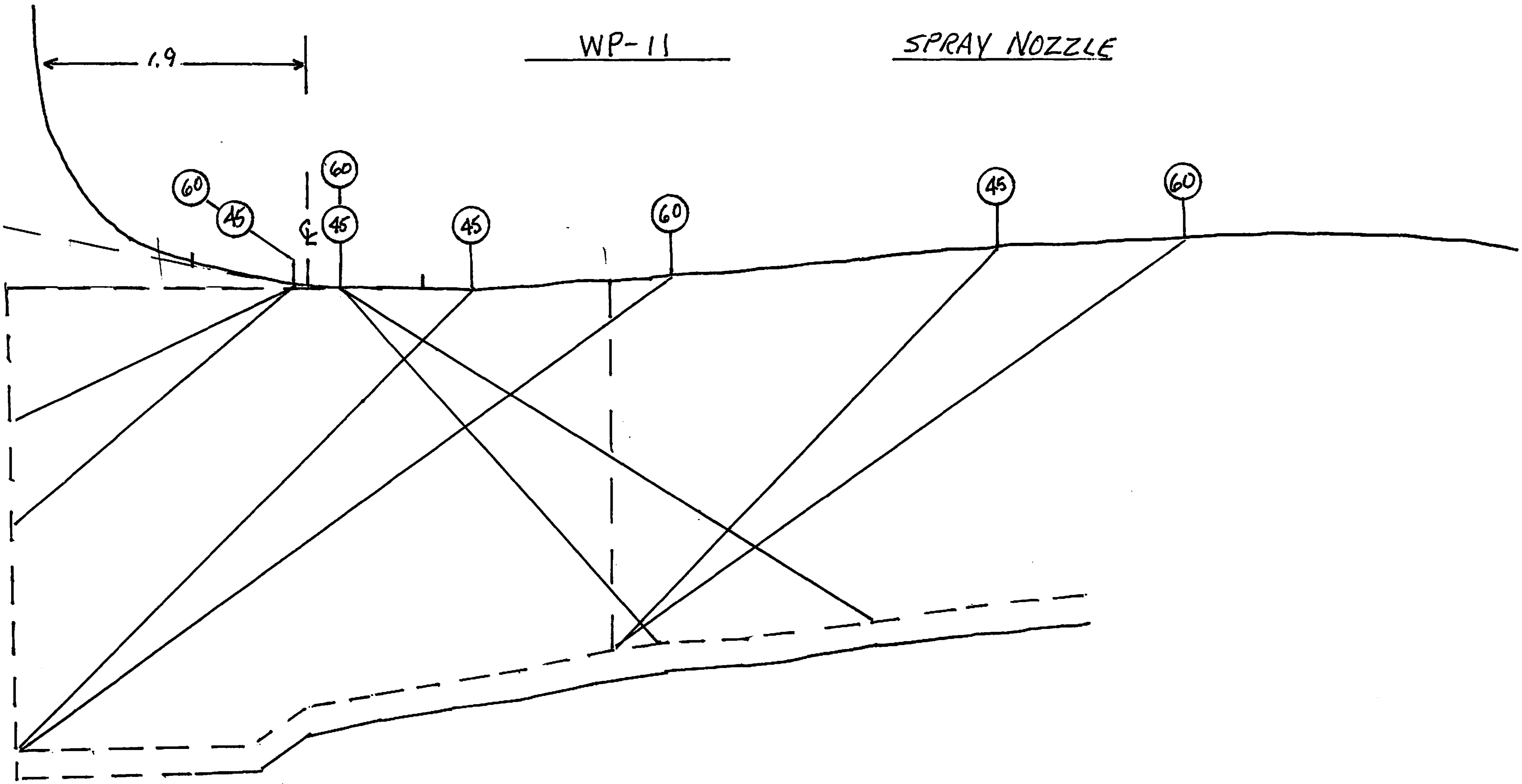
ANII: [signature]
DATE: 1-6-10

PAGE 6 OF ~~15~~ 16

TVA 19668 (NP-5-89) 1-108-999-44

WBN 2 PZR

WP-11 SPRAY NOZZLE



R.P1283

7 of 15

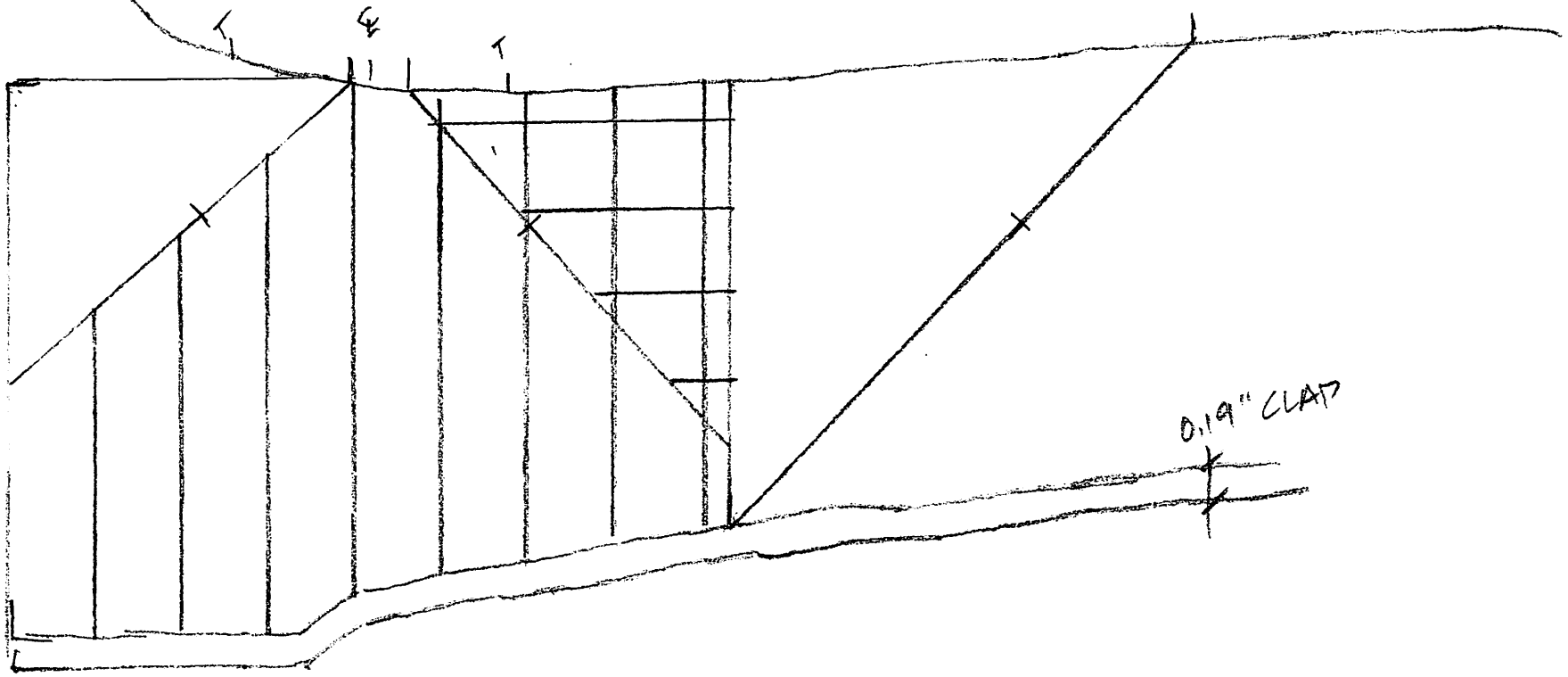
WP-11

45° SCANS 1 & 2 COVERAGE RADIAL DIRECTION

R-P1283

- SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE

- SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE



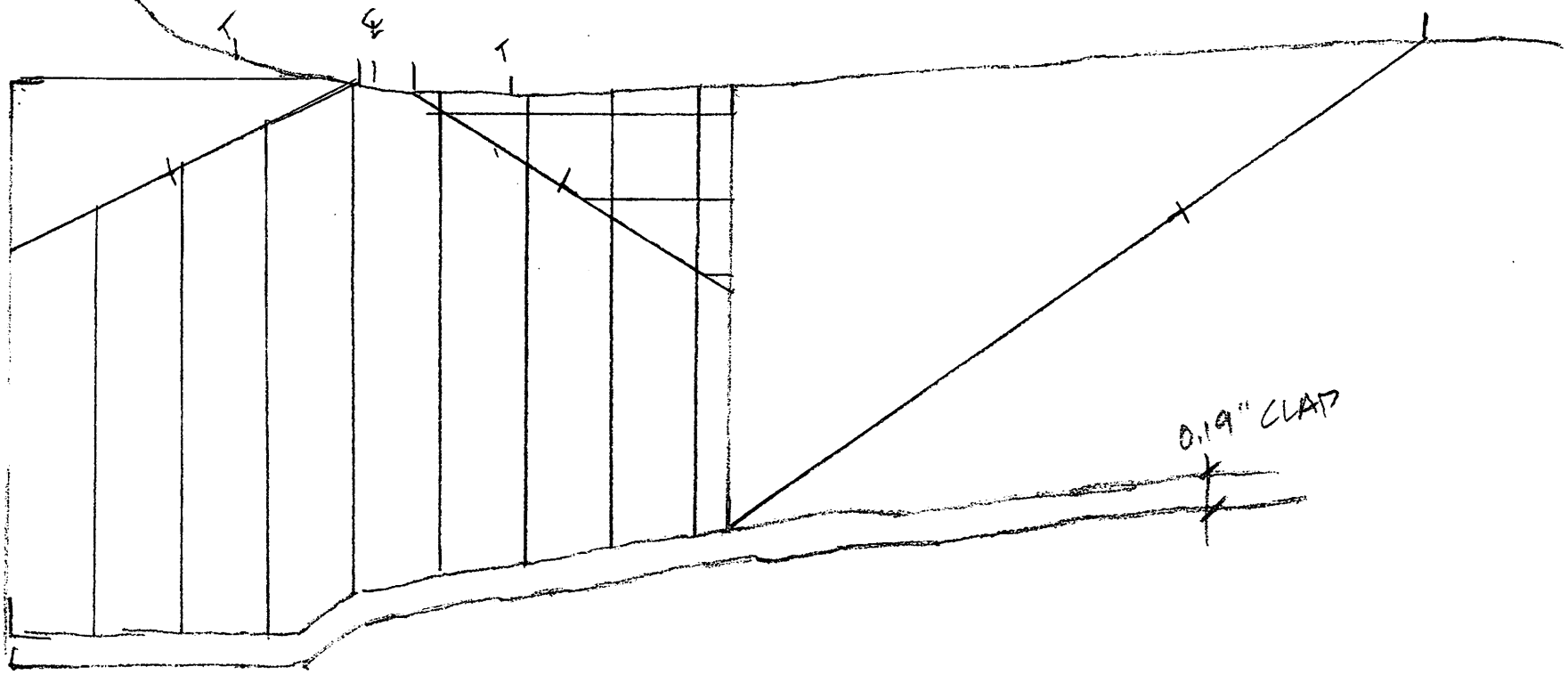
R-P1283

WP-11

60° SCANS 1:2 COVERAGE RADIAL DIRECTION

- SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE

- SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE



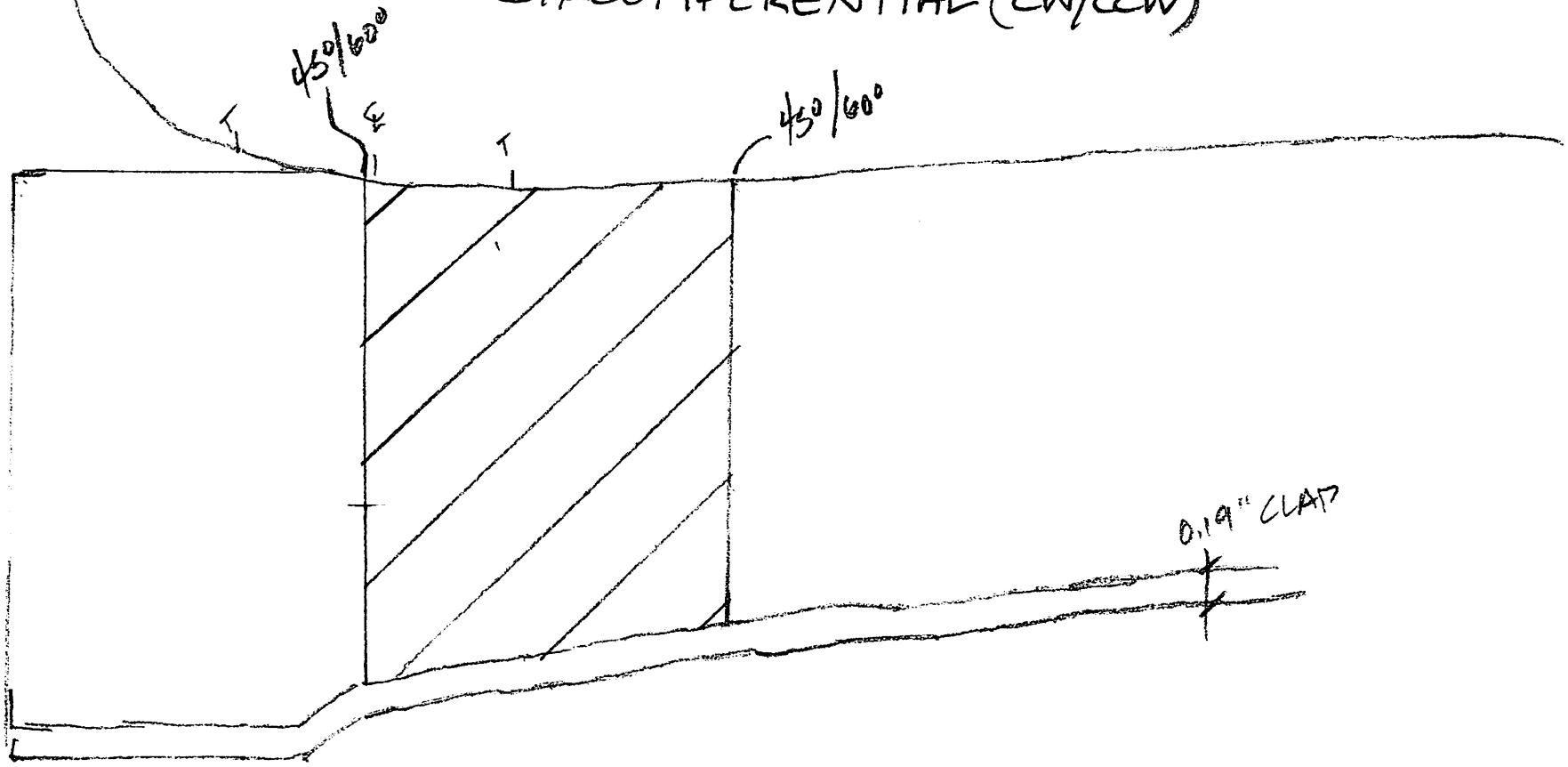
pg 9/15

B-P1283

WP-11

45° AND 60° SCAN COVERAGE

▨ - TWO DIRECTION COVERAGE (SCAN 3 & 4)
CIRCUMFERENTIAL (CW/CCW)



RG 10/15

Watts Bar Unit 2

R-P1283

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-11 0 DEG (R.1)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.2	2.6	10.92	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			43.68	sq. in.
Item 4	Total **length** of weld			39.7	inches
Item 5	Total required **exam volume** in cubic inches			1734.096	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	7.8	39.7	309.66	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	7.8	39.7	309.66	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	7.8	39.7	309.66	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	7.8	39.7	309.66	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1238.64	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**71.43**	%

SCAN LIMITATION DUE TO NOZZLE CONFIGURATION

Initials	Date
MCW	6/13/2017
pgl 11/15	

Watts Bar Unit 2

R-P1283

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

WELD NUMBER WP-11 45 DEG (R.1)

		Measured Fields		Calculated Fields	
Item 1	Required examination Volume in sq. in. **(width x height)**	4.2	2.6	10.92	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			43.68	sq. in.
Item 4	Total **length** of weld			39.7	inches
Item 5	Total required **exam volume** in cubic inches			1734.096	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	8.62	39.7	342.214	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	4.4	39.7	174.68	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	5.72	39.7	227.084	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	5.72	39.7	227.084	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			971.062	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**56.00**	%

SCAN LIMITATION DUE TO NOZZLE CONFIGURATION

Initials	Date
MCW	6/13/2017

pg 12/15

Watts Bar Unit 2

R-P1283

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-11 60DEG (R.1)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.2	2.6	10.92	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			43.68	sq. in.
Item 4	Total **length** of weld			39.7	inches
Item 5	Total required **exam volume** in cubic inches			1734.096	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	10.638	39.7	422.3286	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	7.7	39.7	305.69	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	5.72	39.7	227.084	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	5.72	39.7	227.084	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1182.1866	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**68.17**	%

SCAN LIMITATION DUE TO NOZZLE CONFIGURATION

Initials	Date
MCW	6/13/2017

pg 13/15

R-P1283

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2

Reference CR: 1309817

Report: R-P1283/WP-11

Coverage changed to 65.72%. 0, 45 and 60 coverage sheets changed.

- WP-11 – With two different angles scanning in the same direction with the same geometric obstructions, please explain how the same coverage was obtained for item 7 (direction 2) in both the 60 and 45 degree exams considering the transducers have two different angles but seem to have the same examination limitations. Also, for item 9 (direction 4) of the 0 degree exams, explain what prevented this scan from achieving the same weld length as the other three scans.

The calculated coverage for both the 45 and 60 degree scan performed away from the nozzle are incorrect (calculation sheet item 7) . Using the scan coverage depicted on page 7 of R-P1283, the following values were calculated.

- 60 degree, item 7, exam volume achieved is 7.7" square (page 8).
  - Changes total value achieved to 305.7 cubic inches.
- 45 degree, item 7, exam volume achieved is 4.4" square (page 9).
  - Changes total value achieved to 174.7 cubic inches.
- 0 degree value reported on page 9 is a typo. The report presents no description of any scan limitation or obstruction specific to the item 9 scan direction.
- Changes final obtained coverage from 68.73% to 65.72%.

Report R-P1283 has been corrected to reflect the adjusted values and obtained coverage.

Matt Welch 6/20/17
MATT WELCH LEVEL III

PS 14/15

R-P1283

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: N/A w-6/20/17

Reports: R-P1014/W0809, R-P1280/WP-15, R-P1281/WP-14, R-P1282/WP-12, R-P1283/WP-11 AND R-P1284/WP-13.

Scan directions provided for clarity.

Scan directions defined for W08-09:

- Scan 1 is axial from the flange surface.
- Scan 2 is axial from the RPV head surface.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan directions defined for WP-11 through WP-15:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan direction figures submitted and added to applicable reports for:

- W08-09 (R-P1014)
- WP-11 (R-P1283)
- WP-12 (R-P1282)
- WP-13 (R-P1284)
- WP-14 (R-P1281)
- WP-15 (R-P1280)

Matt Welch 6/20/17
MATT WELCH LIII

PS 1/5/18

Enclosure 3

Scan Directions Reports for W08-09, WP-11, WP-12, WP-13, WP-14, WP-15

Scan Directions Report for WP-12

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-P1282

PROJECT: *WBN* UNIT: *2* CYCLE *00*				COMPONENT ID: *WP-12*	
EXAMINATION METHOD				SYSTEM: PZR	ISI DWG NO: *ISI-2068C-E-01*
MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-19*		REV 17	TC: N/A	*NOZ TO SHL*	*B-D*
EXAMINER: Jose Alejandro LEVEL: II		EXAMINER: Brandon Calvery LEVEL: II L		EXAMINER: N/A LEVEL:	EXAMINER: N/A LEVEL:

Total coverage calculated to be approximately ~~60.65 %~~ 55.64% @ w-6/20/11

An Ultrasonic examination was performed on this nozzle to shell weld configuration. This examination was performed to meet the requirements of ASME section XI preservice inspection.

A 0° longitudinal wave and a 45° and 60° shearwave were calibrated and used to perform this examination.

Examination was limited due to nozzle configuration.

No recordable indications observed.

~~60.65 %~~ examination volume coverage achieved. 55.64% w-6/20/11

0° lamination scan was performed for PSI

@ See page 13 of 14. Matt Welch 6/20/11
MATT WELCH LEVEL III

RESOLUTION BY:	REVIEWED BY:	ANII:
LEVEL II DATE: 10-22-10	LEVEL: ~~III~~ DATE: 10-31-10	DATE: 1-6-11
		Page: 1 OF 14

ACCESS: FORMS DATABASE R-10/04/01

w-6/20/11

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER
		R.P 1282

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

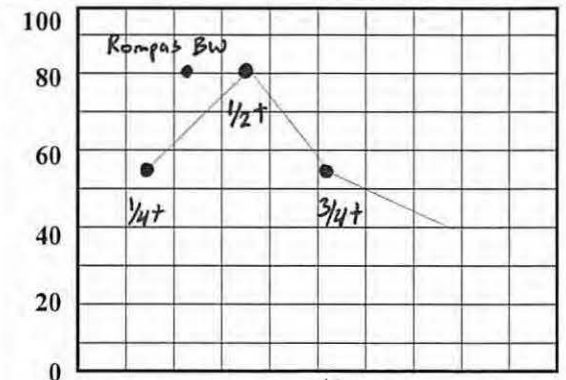
TRANSDUCER
MANUFAC KBA MODEL: Gamma HP
ELEMENTS: 1 SHAPE: Round
S/N F16128 SIZE: .750 FREQ: 2.25 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☐ SHEAR ☒ LONG ☐ RL

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7°F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 0° ACTUAL ANGLE 0 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

DAC



DISPLAY WIDTH 4.00 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	43.0 dB	0°-Noz-Sh
CIRC.	☐	☐ A	dB N A	

RANGE: 4.00 inches *FREQ: 2.25 MHz
PROBE DELA 1.2531 msec *RECTIFY: Fullwave
VELOCITY .2333 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☒ Peak ☐ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 0 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas BW GAIN: 21.5 dB
AMPLITUDE: 80 % METAL PATH: 1.00

CALIBRATION TIMES
INITIAL TIME: 0847 FINAL TIME: 1307

VERIFICATION TIMES	1) 0955	2) 1120	3) 1130	4) 1230	5) 1247	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	WP-12

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II L
REVIEWER: Darren Lucas LVL.: III DATE: 10-31-10

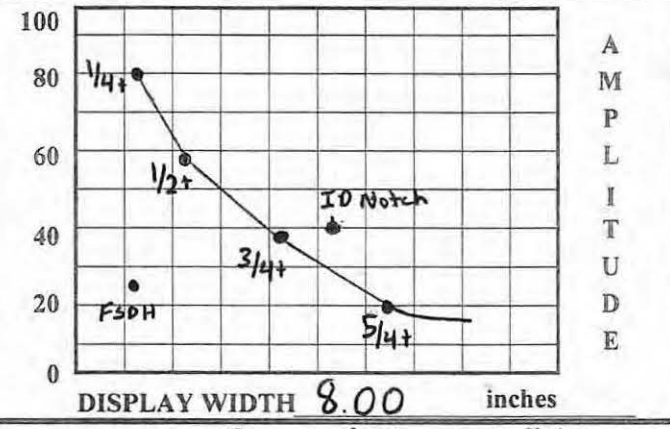
ANII:
DATE: 1-6-11
PAGE 2 OF 10 14

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P1282

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N J10237 SIZE: .50x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 8.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 45° ACTUAL ANGLE 45 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	54.2 dB	45-Noz-SH
CIRC.	☐	☐ A	54.2 dB	45-Noz-SH

RANGE: 8.00 inches *FREQ: 1 MHz
PROBE DELA 13.3066 msec *RECTIFY: Fullwave
VELOCITY .1272 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 45 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 54.2 dB
AMPLITUDE: 25 % METAL PATH: 1.05

CALIBRATION TIMES
INITIAL TIME: 0834 FINAL TIME: 1306

VERIFICATION TIMES	1) 1010	2) 1100	3) 1139	4) 1220	5) 1248	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
4.9 db difference 3/4, 5/4	WP-12

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II
REVIEWER: Darlene Dulaney LVL.: III DATE: 10-31-10

ANII:
DATE: 1-6-11
PAGE 3 OF ~~10~~ 14

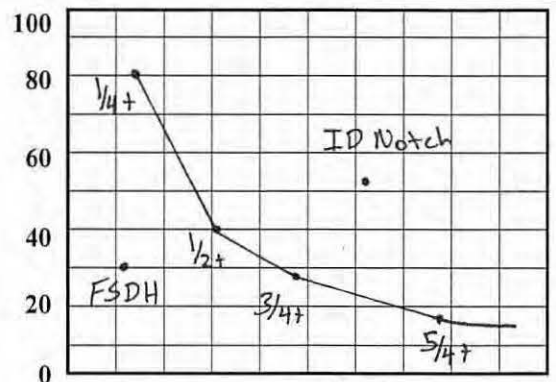
w-6/20/11

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R P1282

PROJECT *WBN* UNIT/CYCLE *2/ 00*
PROCEDURE: *N-UT-19* REV: 17 TC: N/A

TRANSDUCER
MANUFAC KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N J10239 SIZE: .5x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 10.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 60° ACTUAL ANGLE 60 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☒	50.5 dB	60-N02-SH
CIRC.	☐	☐	50.5 dB	60-N02-SH

RANGE: 10.00 inches *FREQ: 1 MHz
PROBE DELA 16.9716 msec *RECTIFY: Full wave
VELOCITY .1260 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 60 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 50.5 dB
AMPLITUDE: 30 % METAL PATH: 1.5

CALIBRATION TIMES
INITIAL TIME: 0815 FINAL TIME: 1305

VERIFICATION TIMES	1) 1026	2) 1037	3) 1149	4) 1217	5) 1255	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
6.6 db difference 3/4, 5/4	WP-12

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II
REVIEWER: Darlene Overcash LVL.: III DATE: 10-31-10

ANII:
DATE: 1-6-11
PAGE 4 OF 14

ACCESS: FORMS DATABASE 07-25-07

w 6/20/11

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- R-P1283

PROJECT: WBN UNIT: 2
SYSTEM: Pressurizer
WELD I.D.: WP-12
CONFIG: Nozzle TO: Shell
PROCEDURE: N-UT- 19 REV. 17 TC: N/A

Wo REFERENCE: ℄ of weld
Lo REFERENCE: TDC of Nozzle
SURFACE TEMP: 77.7 F
PYRO. SERIAL NO. E44479

EXAMINATION DATE: 10-21-10
START TIME: 1207 END TIME: 1240

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
	0	51.0 dB
N/A	45	Ax 60.4 Circ 63.2 dB
	60	Ax 63.1 Circ 65.4 dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N	N	N	N															

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
			0				No Recordable Indications																	
		1	45				No Recordable Indications																	
		2	45				No Recordable Indications																	
		3	45				No Recordable Indications																	
		4	45				No Recordable Indications																	
		1	60				No Recordable Indications																	
		2	60				No Recordable Indications																	
		3	60				No Recordable Indications																	
		4	60				No Recordable Indications																	

REMARKS/LIMITATIONS: Examination limited on nozzle side due to configuration. All scans were performed maintaining 5-20% I.D. noise on base metal and on weld. 0 degree scanned at 80% back wall.

EXAMINER: Jose Alejandro LEVEL: II
EXAMINER: Brandon Calvery LEVEL: IIL

REVIEWED BY: Darlene Dulong
LEVEL: IIL DATE: 10-31-10

ANII Andrew Siletti 2-1413

* Reviewed by ANII Ronald Robertson 1/6/2011, verified review in Band Diary. ART 2-1413

mb/2/12

TVA

WALL THICKNESS PROFILE SHEET

REPORT NO: R.P1282

PROJECT: WBN

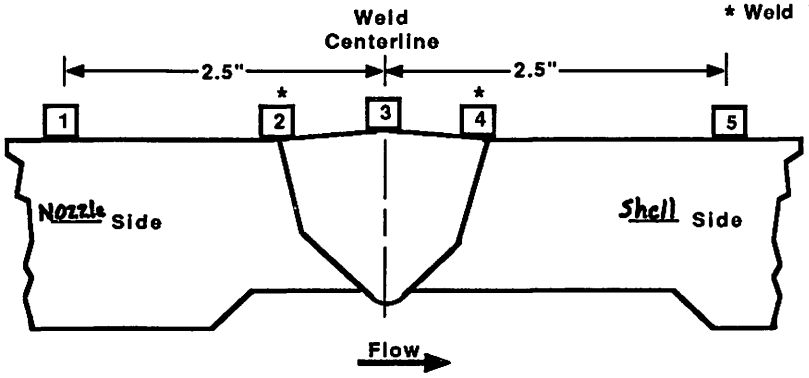
UNIT: 2

WELD NO: WP-12

SYSTEM: PZR

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A
3	3.93	3.54	3.29	3.55
4	3.28	3.41	3.19	3.31
5	2.96	3.14	3.31	3.07



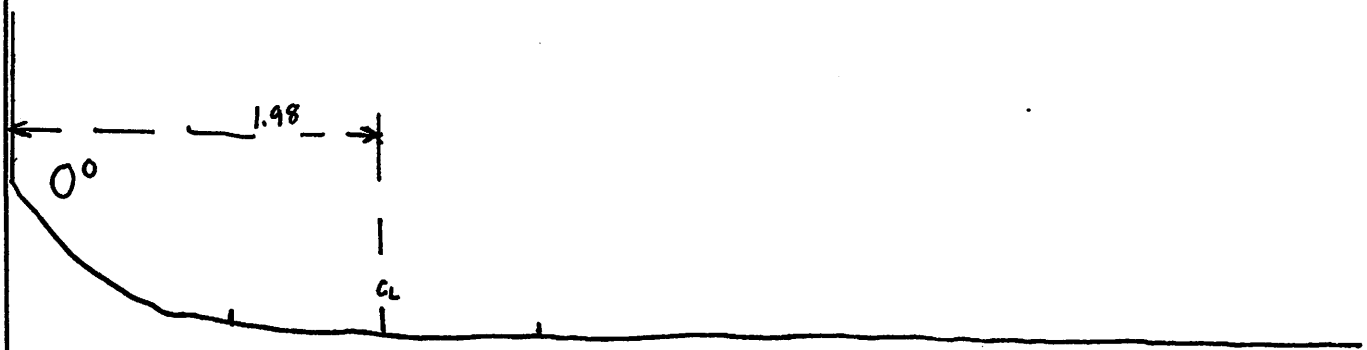
CROWN HEIGHT: Flush

CROWN WIDTH: 1.6"

DIAMETER: 6"

WELD LENGTH: 46.7

Relief Nozzle



Nozzle

Shell

EXAMINER: [signature]

LEVEL: II

DATE: 10-19-10

REVIEWED BY: [signature]

LEVEL: LII DATE: 10-31-10

ANII: [signature]

DATE: 1-6-11

PAGE 10 OF 14

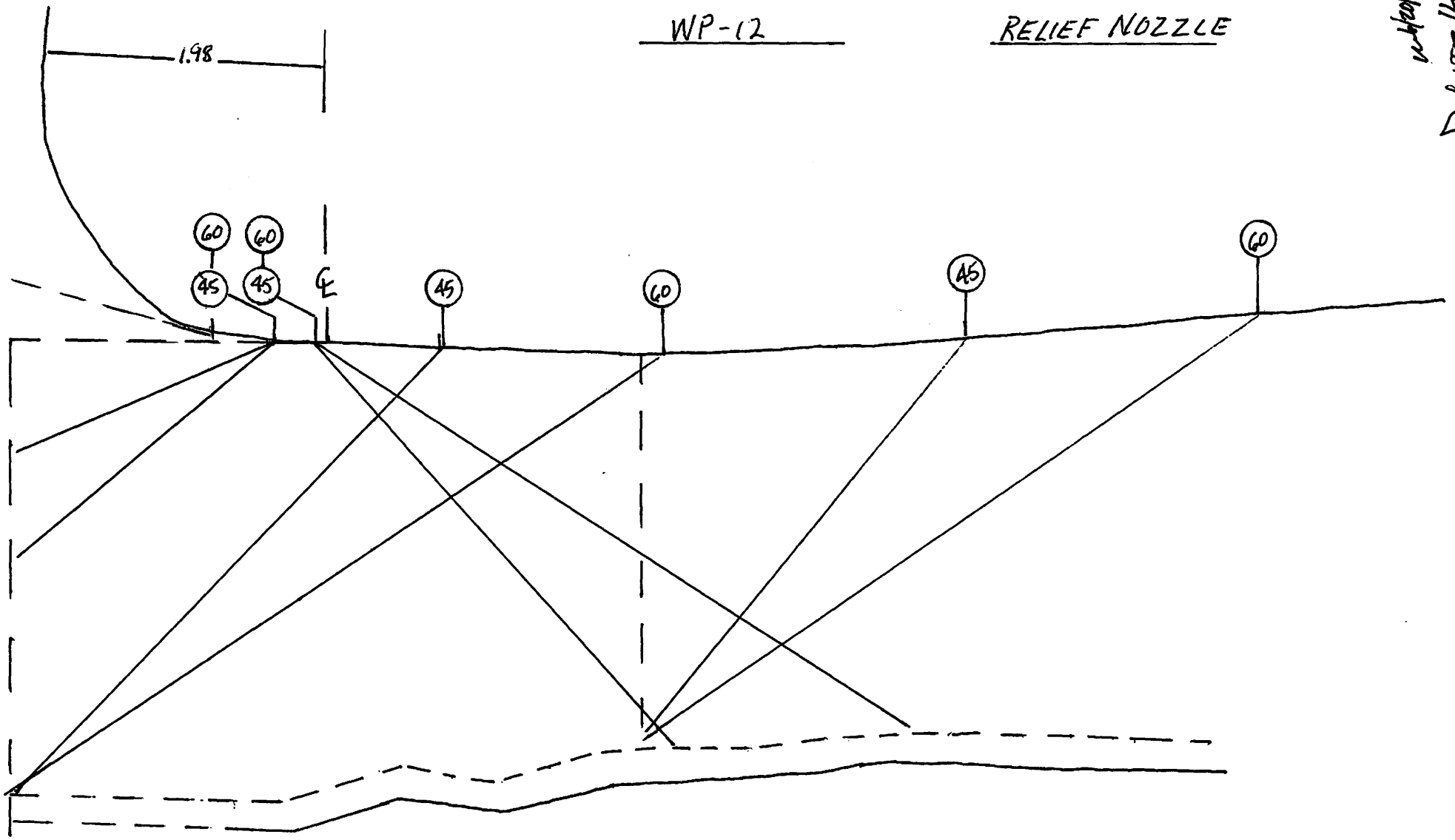
TVA 19668 (NP-5-89)

1-108-999-44

RA1280

WBN 2 PZR

WP-12 RELIEF NOZZLE



WP-12

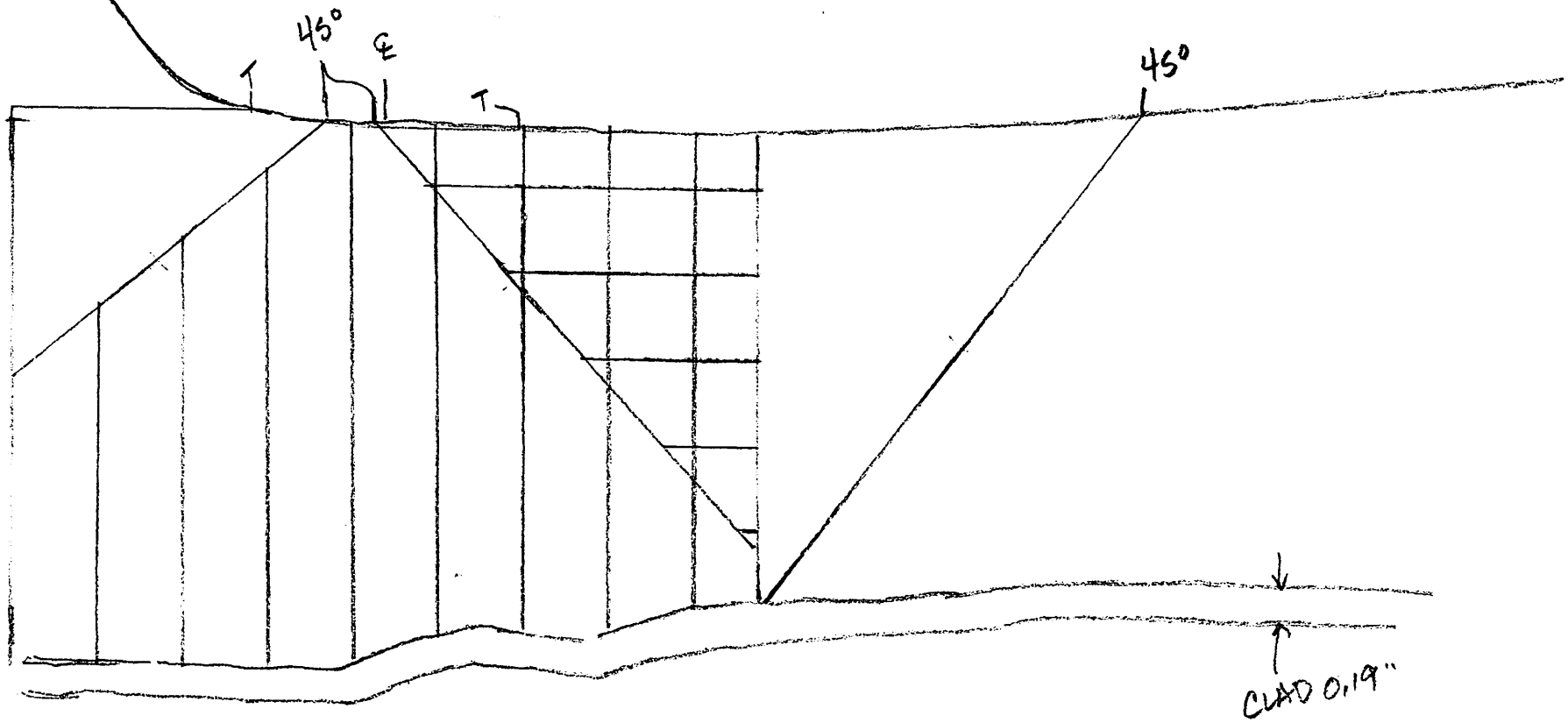
45° SCANS 1:2 COVERAGE RADIAL DIRECTION

B-P1282

4/18/94

▦ - SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE

▦ - SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE

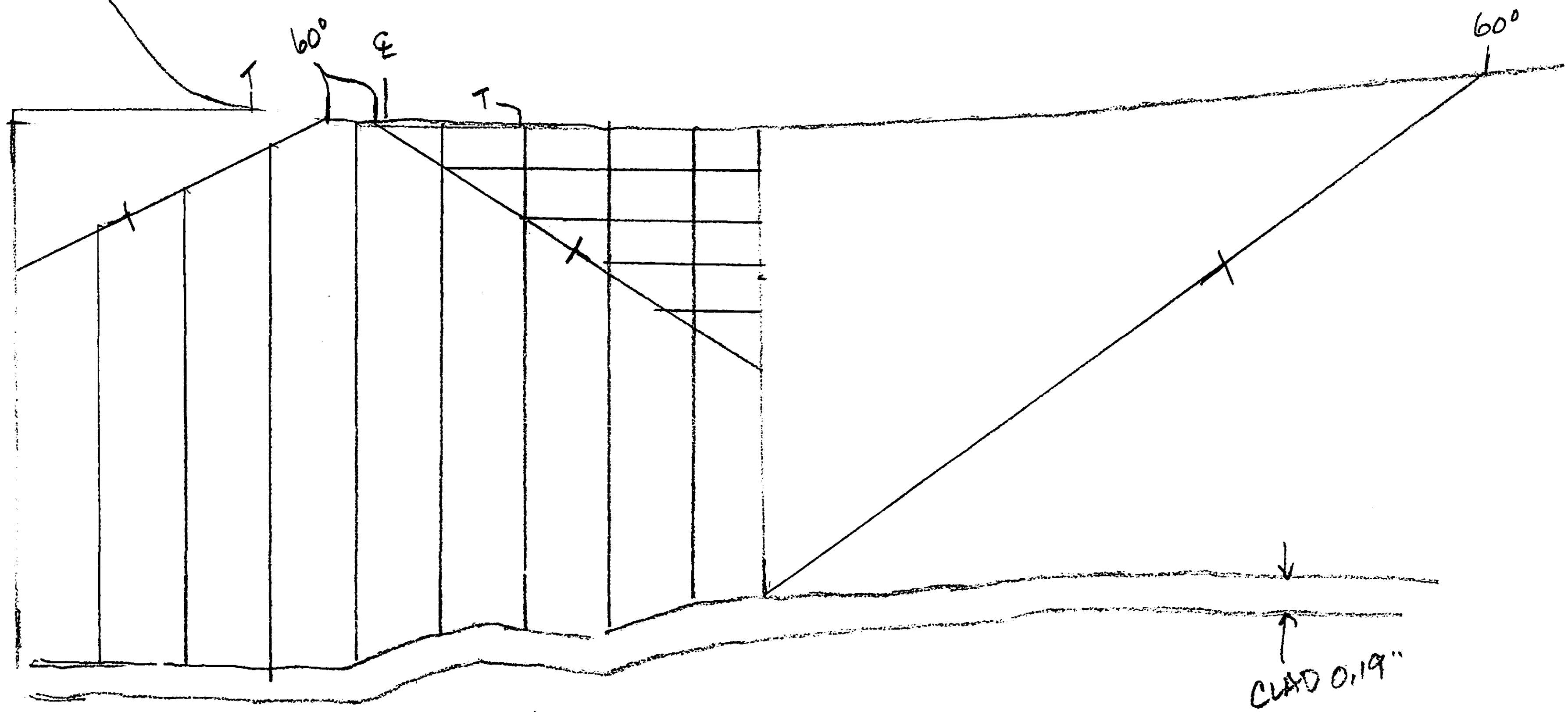


R-P1282

WP-12

60° SCANS 1 : 2 COVERAGE RADIAL DIRECTION

- SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE
- SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE

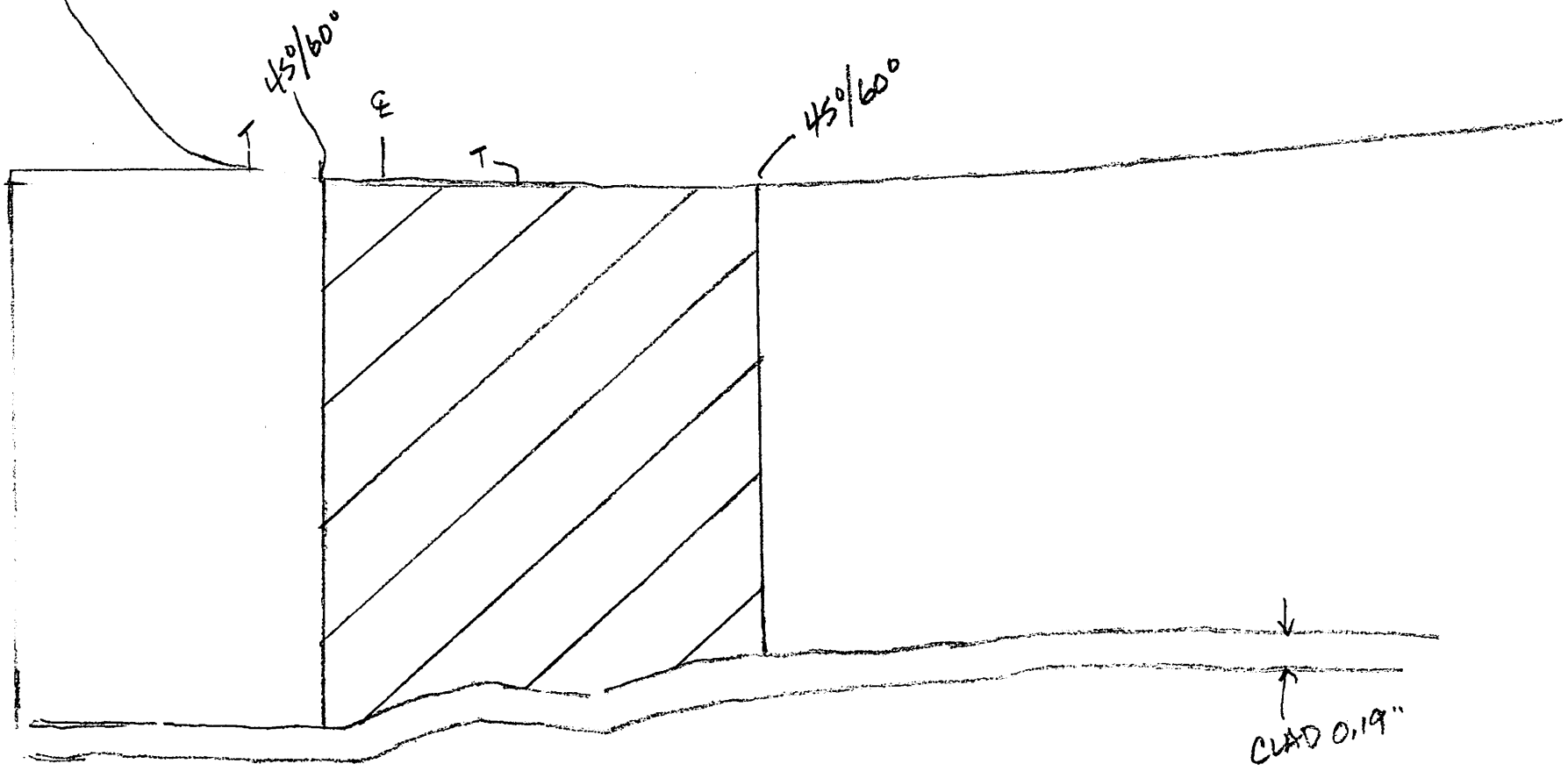


WP-12

45° AND 60° SCAN COVERAGE

R-P1282

 - TWO DIRECTION COVERAGE (SCANS 3 & 4)
CIRCUMFERENTIAL (CW/CCW)



pg 10/14

R.P1282

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-12 (45 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.8	12.32	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			49.28	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2301.376	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	10.9325	46.7	510.54775	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	✓ 2.645	46.7	123.5215	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	5.7625	46.7	269.10875	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	5.7625	46.7	269.10875	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1172.2868	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**50.94**	%

Scan limitation due to Nozzle configuration

Initials JA

Date 10/25/2010

8/11/14

Watts Bar Unit 2

R-P1282

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-12 60DEG R.1				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.8	12.32	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			49.28	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2301.376	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	11.58	46.7	540.786	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	1.575	46.7	73.5525	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	5.7625	46.7	269.10875	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	5.7625	46.7	269.10875	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1152.556	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**50.08**	%

One sided examination due to Cap.

Initials	Date
MCW	6/13/2017

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R. P1282

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-12 (0 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.8	12.32	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			49.28	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2301.376	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	8.12	46.7	379.204	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	8.12	46.7	379.204	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	8.12	46.7	379.204	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	8.12	46.7	379.204	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1516.816	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**65.91**	%

Scan limitation due to Nozzle configuration

Initials
JA

Date
10/25/2010

pg 12/14

R-P1282

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: 1309817

Report: R-P1282/WP-12

Coverage changed to 55.64%. 60degree coverage worksheet changed.

- WP-12 – The 60 degree scan should obtain greater coverage scanning in towards the nozzle than the 45 degree scan. On the other hand, the 45 degree scan should obtain greater coverage than the 60 degree scan when scanning outward away from the nozzle. Therefore, assuming that direction 1 is axial in and direction 2 is axial out for both degree scans, please explain how greater coverage was obtained for the 60 degree scans than for the 45 degree scans in both directions, for items 6 and 7 (directions 1 and 2).

The calculated coverage for the 60 degree scan performed away from the nozzle is incorrect (calculation sheet item 8). Using the scan coverage depicted on page 7 of R-P1282, the following values were calculated.

- 60 degree, item 7, exam volume achieved is 1.575"square.
  - Changes the total value achieved to 73.55 cubic inches.
  - Changes final obtained coverage from 60.65% to 55.64%

Matt Welch 6/20/17
MATT WELCH LEVEL III

pg 13/14

R-P1282

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: N/A w-6/22/17

Reports: R-P1014/W0809, R-P1280/WP-15, R-P1281/WP-14, R-P1282/WP-12, R-P1283/WP-11 AND R-P1284/WP-13.

Scan directions provided for clarity.

Scan directions defined for W08-09:

- Scan 1 is axial from the flange surface.
- Scan 2 is axial from the RPV head surface.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan directions defined for WP-11 through WP-15:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan direction figures submitted and added to applicable reports for:

- W08-09 (R-P1014)
- WP-11 (R-P1283)
- WP-12 (R-P1282)
- WP-13 (R-P1284)
- WP-14 (R-P1281)
- WP-15 (R-P1280)

Matt Welch 6/20/17
MATT WELCH LEVEL III

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Enclosure 3

Scan Directions Reports for W08-09, WP-11, WP-12, WP-13, WP-14, WP-15

Scan Directions Report for WP-13

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-P1284

PROJECT: *WBN* UNIT: *2* CYCLE *00*				COMPONENT ID: *WP-13*	
EXAMINATION METHOD				SYSTEM: PZR	ISI DWG NO: *ISI-2068C-E-01*
MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-19*		REV 17	TC: N/A	*NOZ TO SHL*	*B-D*

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
Jose Alejandro	SEAN Sullivan	N/A	N/A
LEVEL: II	LEVEL: Trainee	LEVEL:	LEVEL:

Total coverage calculated to be approximately 59.37 %

An Ultrasonic examination was performed on this Nozzle to Shell weld configuration. This examination was performed to meet the requirements of ASME Section XI preservice inspection.

A 0° longitudinal wave and a 45° and 60° Shear wave were calibrated and used to perform this examination

Examination was limited due to Nozzle Configuration

No recordable indications observed.

A 59.37 % examination volume coverage Achieved

0° lamination scan was performed For PSI

RESOLUTION BY:	REVIEWED BY:	ANII:
LEVEL II DATE: 10-22-10	LEVEL: II DATE: 10-31-10	DATE: 1-6-11
		Page: 1 OF 14

ACCESS: FORMS DATABASE R-10/04/01

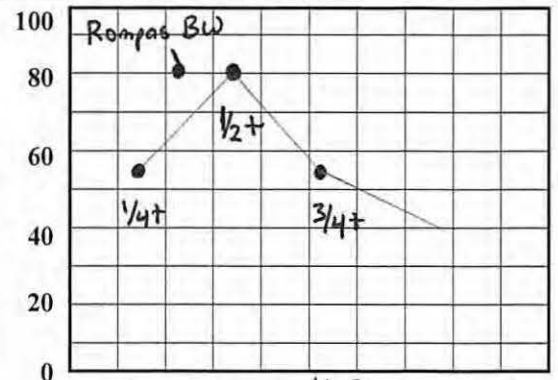
1-6-11

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P1284

PROJECT: WBN UNIT/CYCLE: 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC: KBA MODEL: Gamma HP
ELEMENTS: 1 SHAPE: Round
S/N: F16128 SIZE: .750 FREQ: 2.25 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE: RG174 LENGTH: 6' # CNT: 0
CONFIG: ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☐ SHEAR ☒ LONG ☐ RL

DAC



DISPLAY WIDTH: 4.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO.: WB-55 TEMP: 76.7°F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE: Rompas S/N: 967717
NOMINAL ANGLE: 0° ACTUAL ANGLE: 0 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	43.0 dB	0°-Noz-Sh
CIRC.	☐	☐ A	dB N / A	

RANGE: 4.00 inches *FREQ: 2.25 MHz
PROBE DELA: 1.2531 msec *RECTIFY: Fullwave
VELOCITY: .2333 msec DUAL: ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1k ohms DET: ☒ Peak ☐ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 0 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas BW GAIN: 21.5 dB
AMPLITUDE: 80 % METAL PATH: 1.00

CALIBRATION TIMES
INITIAL TIME: 0847 FINAL TIME: 1307

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)
	0955	1120	1130	1230	1247	N/A	N/A	N/A	N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN SET		-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	WP-13

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Sean Sullivan LVL.: TRN
REVIEWER: Darlene Dulay LVL.: III DATE: 10-31-10

ANII:
DATE: 1-6-11
PAGE 2 OF 14

ACCESS: FORMS DATABASE 07-25-07

mc 6/20/11

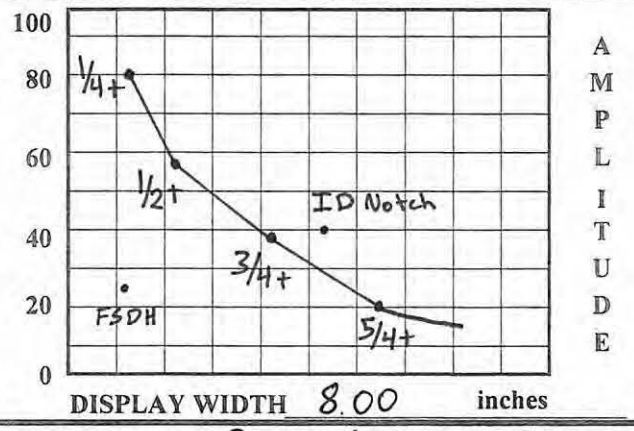
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P1284

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER

MANUFAC KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N J10237 SIZE: .50x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 8.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7°F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION

BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 45° ACTUAL ANGLE 45°

INSTRUMENT

MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	54.2 dB	45-Noz-SH
CIRC.	☐	☐	54.2 dB	45-Noz-SH

RANGE: 8.00 inches *FREQ: 1 MHz
PROBE DELA 3.3066 msec *RECTIFY: Fullwave
VELOCITY .1272 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 45 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 54.2 dB
AMPLITUDE: 25 % METAL PATH: 1.05

CALIBRATION TIMES

INITIAL TIME: 0834 FINAL TIME: 1306

VERIFICATION TIMES	1) 1010	2) 1100	3) 1139	4) 1220	5) 1248	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
4.9 db difference 3/4, 5/4	WP-13

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Sean Sullivan LVL.: TRN
REVIEWER: [illegible] LVL.: III DATE: 10-31-10

ANII:
DATE: 1-6-11
PAGE 3 OF ~~10~~ 14

ACCESS: FORMS DATABASE 07-25-07

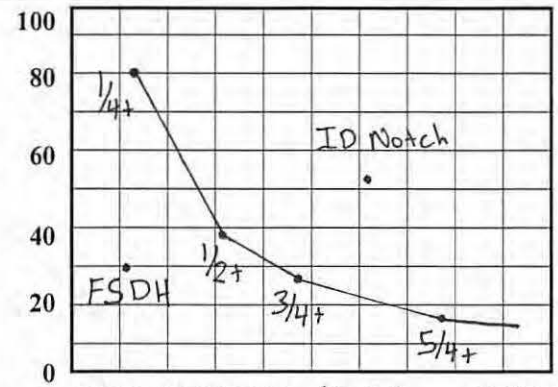
m 4/20/11

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P1284

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N J10239 SIZE: .5x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE R6174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 10.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7°F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 60° ACTUAL ANGLE 60°

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	~~☐ N~~	☒	50.5 dB	60-Noz-SH
CIRC.	☐	~~☐ A~~	50.5 dB	60-Noz-SH

RANGE: 10.00 inches *FREQ: 1 MHz
PROBE DELA 16.9716 msec *RECTIFY: Fullwave
VELOCITY .1260 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 60 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 50.5 dB
AMPLITUDE: 30 % METAL PATH: 1.5

CALIBRATION TIMES
INITIAL TIME: 0815 FINAL TIME: 1305

VERIFICATION TIMES	1) 1026	2) 1037	3) 1149	4) 1217	5) 1255	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
6.6 db difference 3/4, 5/4	WP-13

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Sean Sullivan LVL.: MLN
REVIEWER: Darlene Queary LVL.: III DATE: 10-31-10

ANII:
DATE: 1-6-11
PAGE 4 OF 14

ACCESS: FORMS DATABASE 07-25-07

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- R-P1284

PROJECT: WBN UNIT: 2
SYSTEM: PRESSURIZER
WELD I.D.: WP-13
CONFIG: NOZZLE TO: SHELL
PROCEDURE: N-UT- 19 REV. 17 TC: N/A

Wo REFERENCE: ℄ OF WELD
Lo REFERENCE: TOC OF NOZZLE
SURFACE TEMP: 77.7 F
PYRO. SERIAL NO. E44479

EXAMINATION DATE: 10-21-10
START TIME: 1131 END TIME: 1200

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
N / A	0	55.5 dB
	45	AX 60.8 CIRC 62.9 dB
	60	AX 60.5 CIRC 65.0 dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N	N	N	N															

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
			0				No Recordable Indications																	
		1	45				No Recordable Indications																	
		2	45				No Recordable Indications																	
		3	45				No Recordable Indications																	
		4	45				No Recordable Indications																	
		1	60				No Recordable Indications																	
		2	60				No Recordable Indications																	
		3	60				No Recordable Indications																	
		4	60				No Recordable Indications																	

REMARKS/LIMITATIONS: Examination limited on nozzle side due to configuration. Scans were performed maintaining 5-20% I.D. noise on base metal and on weld.

EXAMINER: Jose Alejandro LEVEL: II
EXAMINER: Sean Sullivan LEVEL: TRN

REVIEWED BY: LEVEL: III DATE: 10-31-10

ANII Andrew Tippett* 2-14-13

TVA 19670B (NP 7/92)

*Reviewed by ANII Ronald Robertson 1/6/2011, verified review in Bond Diary. AOT 2-14-13

TVA

WALL THICKNESS PROFILE SHEET

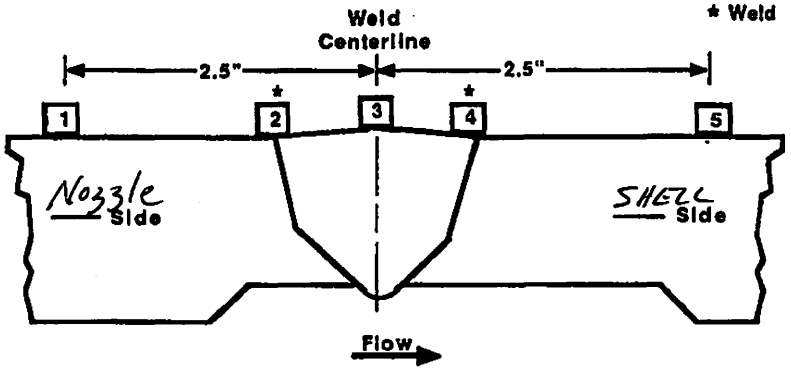
REPORT NO: R.P1284

PROJECT: WBN
UNIT: 2

WELD NO: WP-13
SYSTEM: PZR

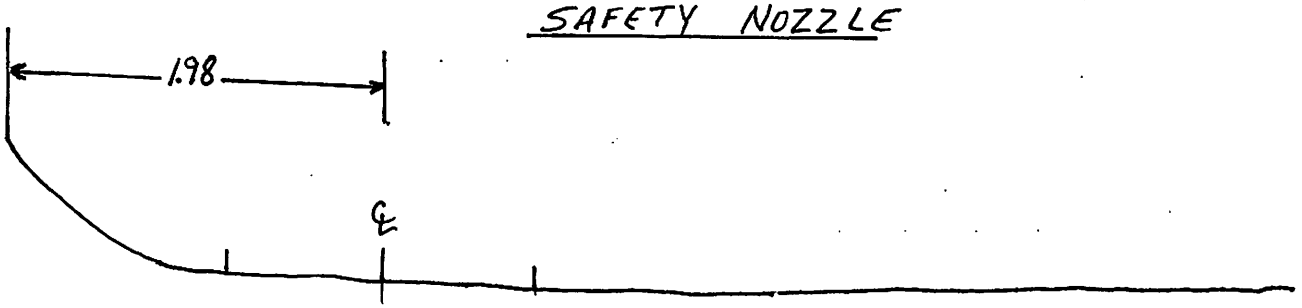
Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	*	*	*	*
2	3.35	3.44	3.22	3.17
3	3.09	3.29	3.25	3.22
4	2.97	3.24	3.18	3.16
5	2.92	3.14	3.21	3.05



CROWN HEIGHT: FLUSH
CROWN WIDTH: 1.6
DIAMETER: 6.0
WELD LENGTH: 46.7

SAFETY NOZZLE



* No thickness readings taken on nozzle side.

EXAMINER: [signature]
LEVEL: II
DATE: 10-19-10

REVIEWED BY: [signature]
LEVEL: III
DATE: 10-31-10

ANII: [signature]
DATE: 1-6-11

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w 6/20/17

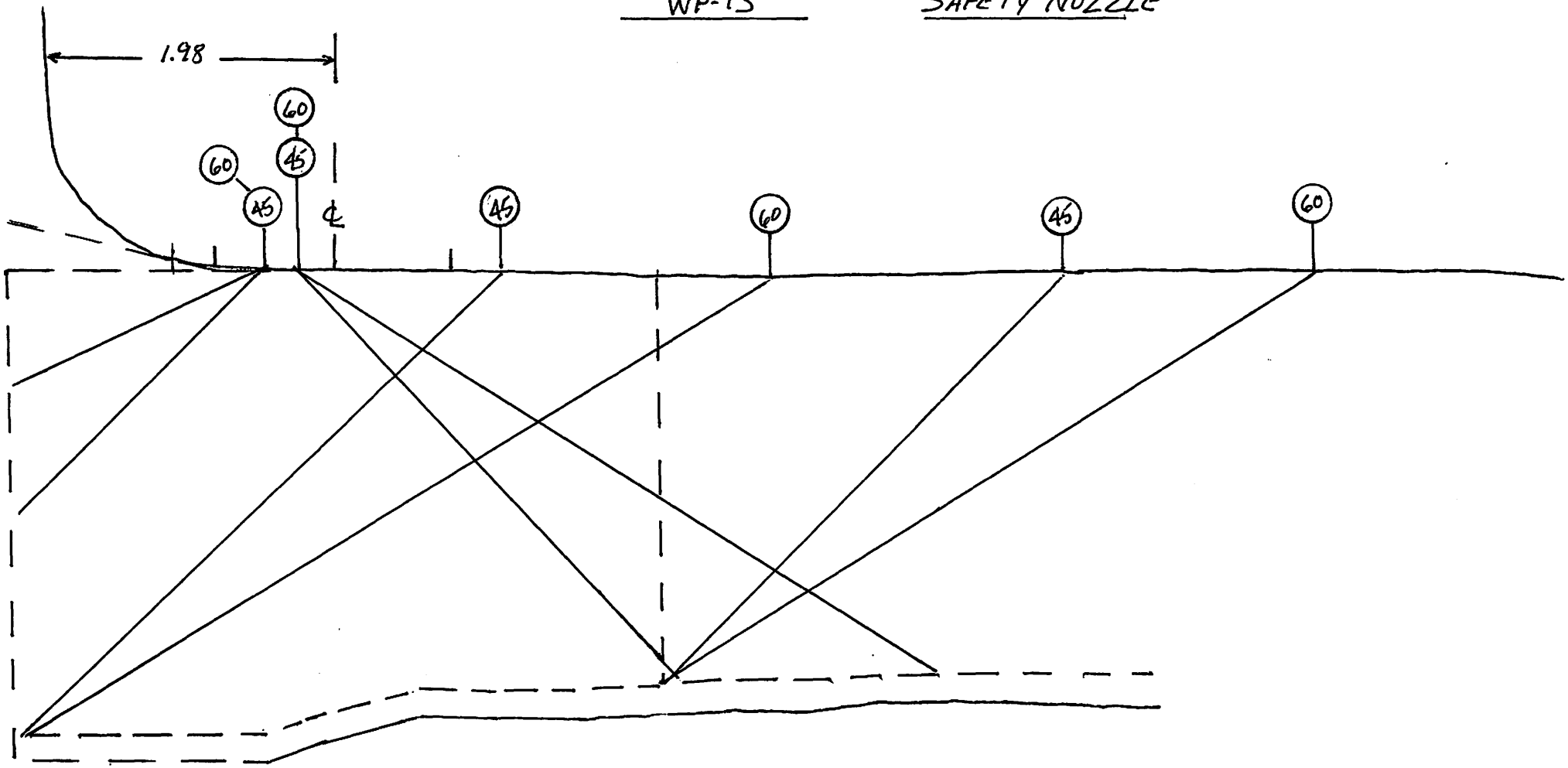
TVA 19668 (NP-5-89)

1-108-999-44

R.PI384

WBN 2 PZR

WP-13 SAFETY NOZZLE



4/20/17

7/16/14

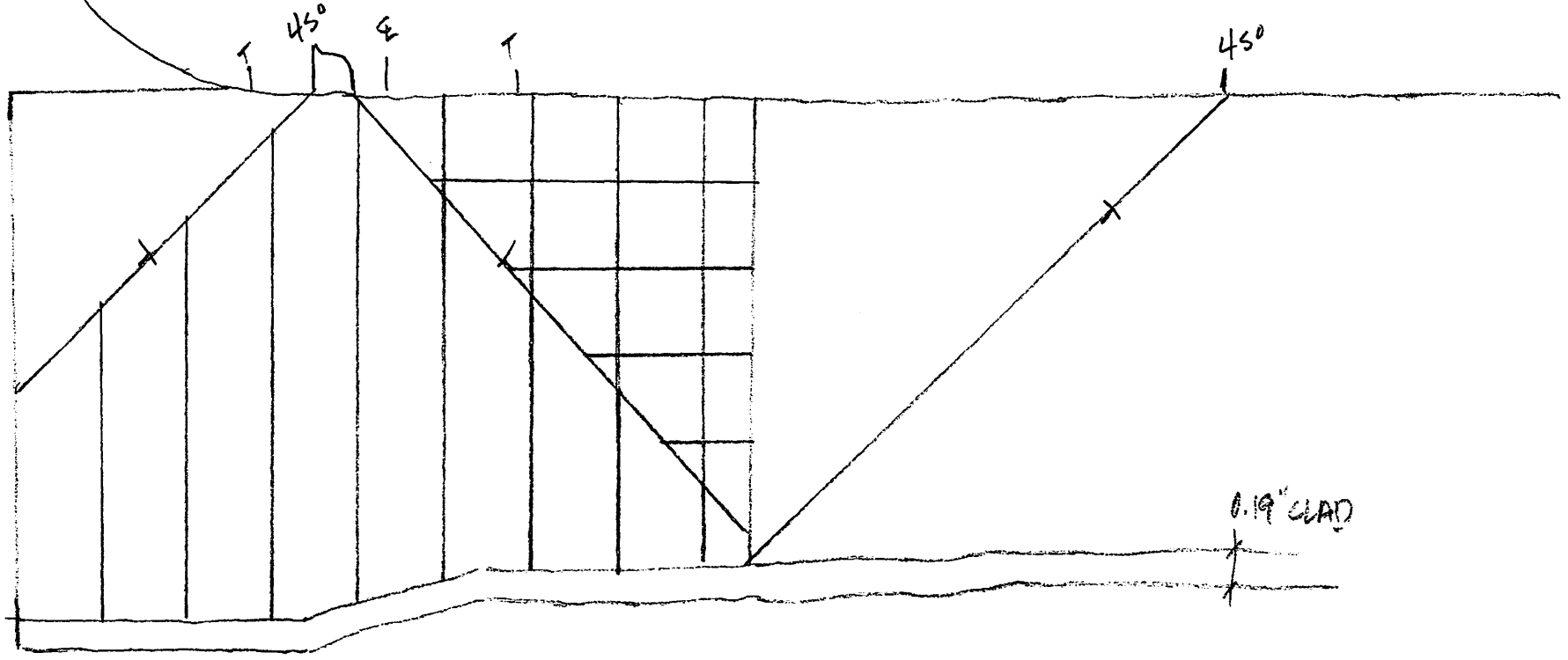
B-P1284

WP-13

45° SCANS 1 & 2 COVERAGE RADIAL DIRECTION

- SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE

- SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE



4/1/94

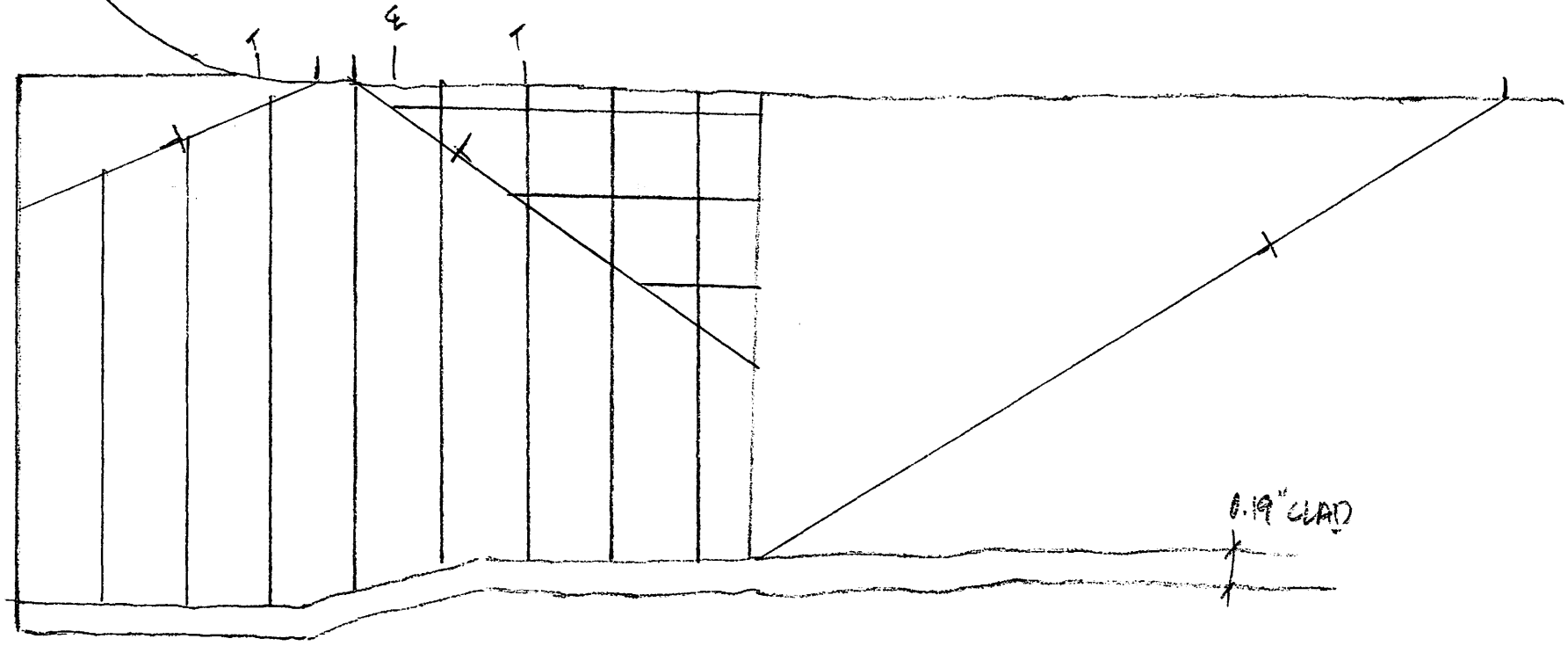
WP-13

R-P1284

60° SCANS 1:2 COVERAGE RADIAL DIRECTION

- SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE

- SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE



pg 9/14

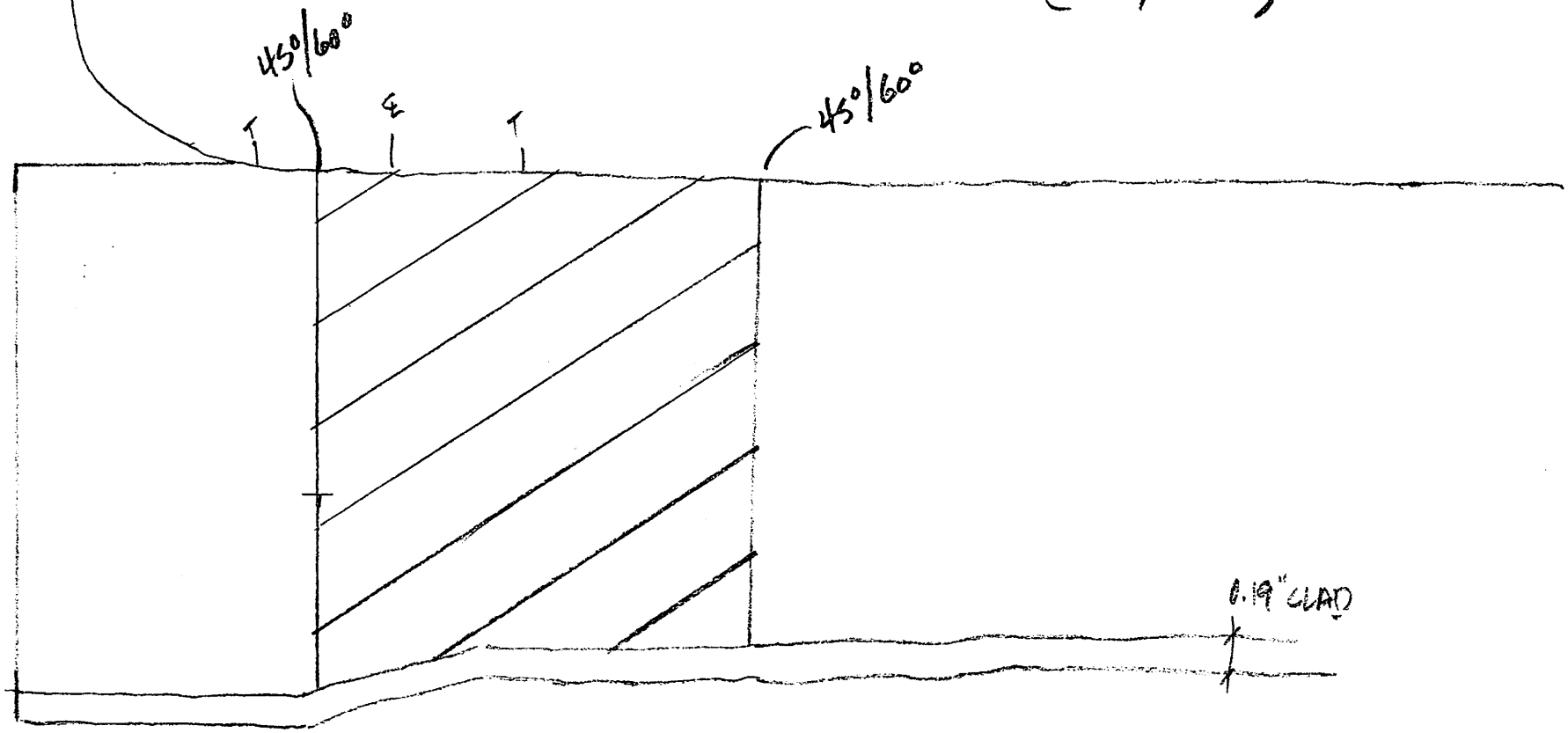
WP-13

45° AND 60° SCAN COVERAGE

R-P1284

PS 10/14

- TWO DIRECTION COVERAGE (SCAN 3 & 4)
  CIRCUMFERENTIAL (CW/CCW)



R.P1584

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Measured Fields	Calculated Fields

Worksheet Version 1.0 dated 07/01/09

WELD NUMBER WP-13 (45 Deg)

Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.7	11.88	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			47.52	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2219.184	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	10.23	46.7	477.741	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	3.24	46.7	151.308	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	6.48	46.7	302.616	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	6.48	46.7	302.616	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1234.281	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**55.62**	%

Scan limitation due to Nozzle configuration

Initials JA

Date 10/25/2010

~~8 of 10~~ 11/14
mb 10/20/11

R.P 584

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-13 (60 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.7	11.88	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			47.52	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2219.184	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	10.3225	46.7	482.06075	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	0.365	46.7	17.0455	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	6.48	46.7	302.616	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	6.48	46.7	302.616	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1104.3383	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**49.76**	%

Scan limitation due to Nozzle configuration

Initials
JA

Date
10/25/2010

12/14

~~2 of 2~~
in 4/20/17

R.P1284

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-13 (0 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.7	11.88	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			47.52	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2219.184	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	8.64	46.7	403.488	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	8.64	46.7	403.488	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	8.64	46.7	403.488	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	8.64	46.7	403.488	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1613.952	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			72.73	%

Scan limitation due to Nozzle configuration

Initials JA

Date 10/25/2010

13/14

R-P1284

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: N/A 6/20/17

Reports: R-P1014/W0809, R-P1280/WP-15, R-P1281/WP-14, R-P1282/WP-12, R-P1283/WP-11 AND R-P1284/WP-13.

Scan directions provided for clarity.

Scan directions defined for W08-09:

- Scan 1 is axial from the flange surface.
- Scan 2 is axial from the RPV head surface.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan directions defined for WP-11 through WP-15:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan direction figures submitted and added to applicable reports for:

- W08-09 (R-P1014)
- WP-11 (R-P1283)
- WP-12 (R-P1282)
- WP-13 (R-P1284)
- WP-14 (R-P1281)
- WP-15 (R-P1280)

Matt Welch 6/20/17
MATT WELCH LEVEL III

PS 14/14

Enclosure 3

Scan Directions Reports for W08-09, WP-11, WP-12, WP-13, WP-14, WP-15

Scan Directions Report for WP-14

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-P1281

PROJECT: *WBN* UNIT: *2*	CYCLE *00*	COMPONENT ID: *WP-14*	
EXAMINATION METHOD		SYSTEM: PZR	ISI DWG NO: *ISI-2068C-E-01*
MT ☐ PT ☐ UT ☑ VT ☐		CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-19*	REV 17 TC: N/A	*NOZ TO SHL*	*B-D*

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
Jose Alejandro	SEAN Sullivan	N A	N A
LEVEL: II	LEVEL: Trainee	LEVEL:	LEVEL:

Total coverage calculated to be approximately 59.05 %

An ultrasonic examination was performed on this Nozzle to Shell Configuration. This examination was performed to meet the requirements of ASME Section XI preservice Inspection.

A 0° longitudinal wave and 45° and 60° Shearwave were Calibrated and used to perform this examination.

Examination scans were limited due Nozzle Configuration.

No recordable Indications observed.

59.05 % ~~Examination~~ JA 10-28-10 Examination Volume coverage achieved

0° lamination Scan was performed PSI NRI

RESOLUTION BY:	REVIEWED BY:	ANII:
LEVEL II DATE: 10-22-10	LEVEL: II DATE: 10-31-10	DATE: 1-6-11
		Page: 1 OF 14

ACCESS: FORMS DATABASE R-10/04/01

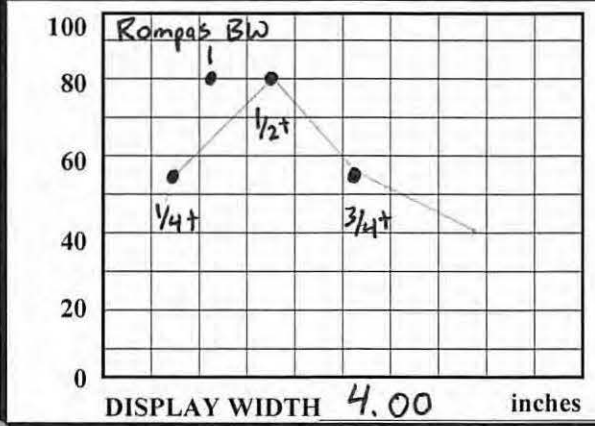
1/6/11

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P 1081

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC KBA MODEL: Gamma HP
ELEMENTS: 1 SHAPE: Round
S/N F16128 SIZE: .750 FREQ: 2.25 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☐ SHEAR ☒ LONG ☐ RL

DAC



DISPLAY WIDTH 4.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 0° ACTUAL ANGLE 0 °

INSTRUMENT
MANUFACTURER: Kraut Kramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	43.0 dB	0°-Noz-Sh
CIRC.	☐	☐ A	dB N / A	

RANGE: 4.00 inches *FREQ: 2.25 MHz
PROBE DELA 1.2531 msec *RECTIFY: Fullwave
VELOCITY .2333 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☒ Peak ☐ Flank
*PRR/PRF: Auto high TCG: ☐ ON ☒ OFF
ANGLE: 0 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas BW GAIN: 21.5 dB
AMPLITUDE: 80 % METAL PATH: 1.00

CALIBRATION TIMES
INITIAL TIME: 0847 FINAL TIME: 1307

VERIFICATION TIMES	1) 0955	2) 1120	3) 1130	4) 1230	5) 1247	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	WP-14

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Sean Sullivan LVL.: TRN
REVIEWER: Darlene Owsley LVL.: III DATE: 10-31-10

ANII:
DATE: 1-6-11
PAGE 2 OF 14

ACCESS: FORMS DATABASE 07-25-07

6/20/19

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER RP1281

PROJECT: WBN UNIT/CYCLE: 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

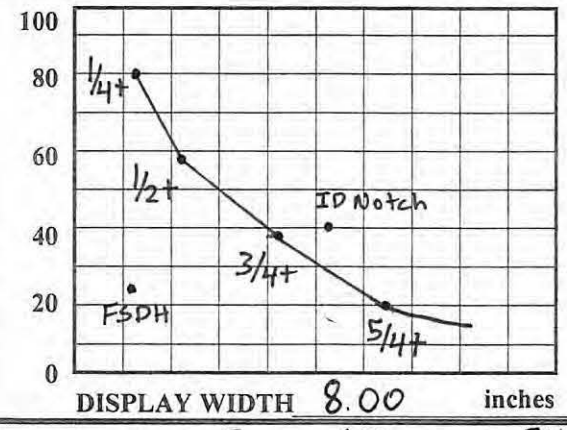
TRANSDUCER
MANUFAC: KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N: J10237 SIZE: .5x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE: RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO.: WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE: Rompas S/N: 967717
NOMINAL ANGLE: 45° ACTUAL ANGLE: 45 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

DAC



DISPLAY WIDTH: 8.00 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	54.2 dB	45-Noz-SH
CIRC.	☐	☐ A	54.2 dB	45-Noz-SH

RANGE: 8.00 inches *FREQ: 1 MHz
PROBE DELA: 13.3066 msec *RECTIFY: Fullwave
VELOCITY: .1272 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 45 deg
ZERO: N/A msec *PULSER: Single

REF. REFLECTOR: Rompas SDH GAIN: 54.2 dB
AMPLITUDE: 25 % METAL PATH: 1.05

CALIBRATION TIMES
INITIAL TIME: 0834 FINAL TIME: 1306

VERIFICATION TIMES	1) 1010	2) 1100	3) 1139	4) 1220	5) 1248	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS	WELD / ITEMS EXAMINED
4.9 db difference 3/4, 5/4	WP-14

EXAMINER: Jose Alejandro Mel Reynoso LVL.: II
EXAMINER: SEAN Sullivan Sean Sullivan LVL.: TRN
REVIEWER: Darlene Dulaney LVL.: III DATE: 10-31-10

ANII:
DATE: 11-6-11
PAGE 3 OF 14

ACCESS: FORMS DATABASE 07-25-07

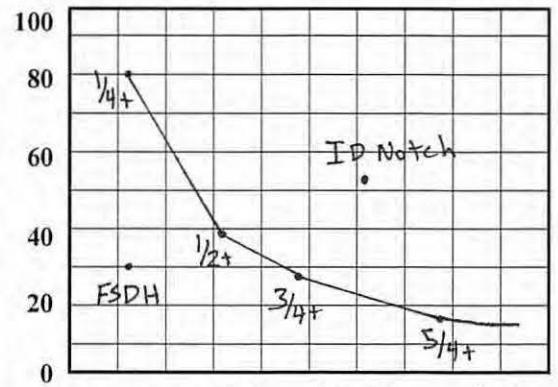
11/6/2017

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-PD81

PROJECT: WBN UNIT/CYCLE: 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC: KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N: J10239 SIZE: .5x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE: RG174 LENGTH: 6' # CNT: 0
CONFIG: ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH: 10.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO.: WB-55 TEMP: 76.7°F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE: Rompas S/N: 967717
NOMINAL ANGLE: 60° ACTUAL ANGLE: 60°

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	50.5 dB	60-Noz-SH
CIRC.	☐	☐ A	50.5 dB	60-Noz-SH

RANGE: 10.00 inches *FREQ: 1 MHz
PROBE DELA: 16.9716 msec *RECTIFY: Fullwave
VELOCITY: .1260 msec DUAL: ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 60 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 50.5 dB
AMPLITUDE: 30 % METAL PATH: 1.5

CALIBRATION TIMES
INITIAL TIME: 0815 FINAL TIME: 1305

VERIFICATION TIMES	1) 1026	2) 1037	3) 1149	4) 1217	5) 1255	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
6.6 db difference 3/4, 5/4	WP-14

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: SEAN Sullivan LVL.: TRN
REVIEWER: Darlene Dulay LVL.: II DATE: 10-31-10

ANII:
DATE: 1-6-11
PAGE 4 OF 14

ACCESS: FORMS DATABASE 07-25-07

1/6/2011

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- R-P1281

PROJECT: WBN UNIT: 2
SYSTEM: Pressurizer
WELD I.D.: WP-14
CONFIG: Nozzle TO: Shell
PROCEDURE: N-UT- 19 REV. 17 TC: N/A

Wo REFERENCE: ℄ of Weld
Lo REFERENCE: TDC TO Nozzle
SURFACE TEMP: 77.7 F
PYRO. SERIAL NO. E44479

EXAMINATION DATE: 10-21-10
START TIME: 0957 END TIME: 1127

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
N	0	51.5 dB
A	45	AX 62.9 Circ. 62.9dB
	60	AX 60.5 Circ. 65.0dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N	N	N	N															

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
			0				NO Recordable Indications																	
		1	45				NO Recordable Indications																	
		2	45				NO Recordable Indications																	
		3	45				No Recordable Indications																	
		4	45				No Recordable Indications																	
		1	60				No Recordable Indications																	
		2	60				No Recordable Indications																	
		3	60				No Recordable Indications																	
		4	60				No Recordable Indications																	

REMARKS/LIMITATIONS: Examination limited on Nozzle side due to configuration. Scans were performed maintaining 5-20% I.D. Noise on base metal and on weld. Zero degree Scanned at 80% backwall.

EXAMINER: Jose Alejandro LEVEL: II
EXAMINER: Sean Sullivan LEVEL: TRN

REVIEWED BY: Darlene Darley
LEVEL: III DATE: 10-31-10

ANII Andrew Triplett * 2-143

* Reviewed by ANII Ronald Roberts on 1/6/2011, verified review in Bound Diary. AOT 2-143

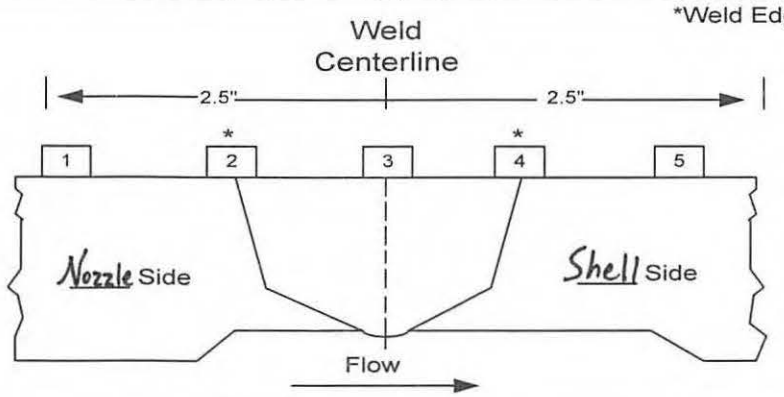
TVA — Wall Thickness Profile Sheet

Report No. WBN-2-RPI-081

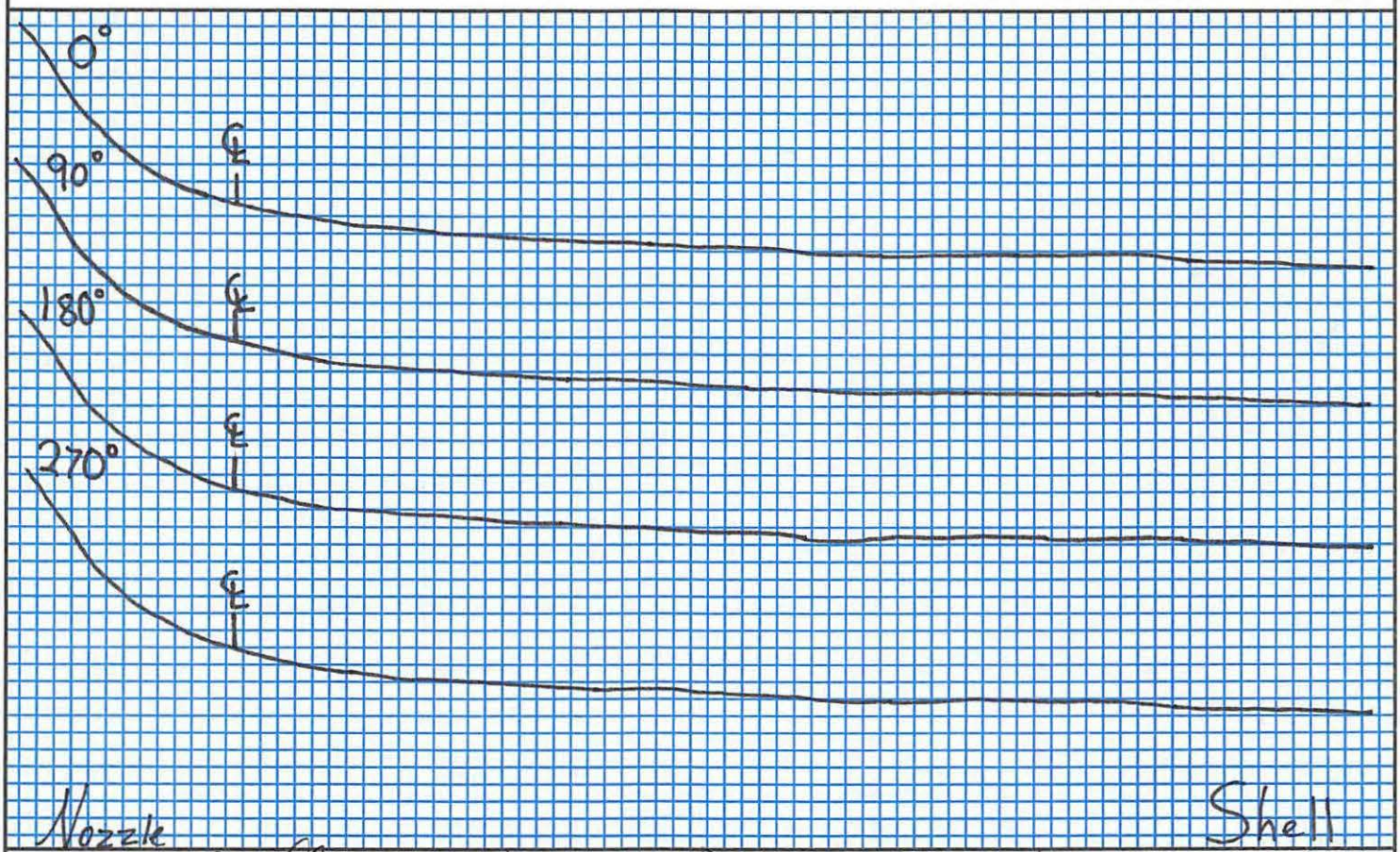
Project: WBN
Unit: 2
Weld No.: WP-14
System: PZR

Record thickness measurements as indicated, including weld width, edge-to-edge at 0*.

Position	0*	90*	180*	270*
1	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A
3	3.34	3.24	3.24	3.34
4	3.21	3.15	3.15	3.27
5	2.92	3.07	3.12	3.09



Crown Height: Flush
Crown Width: 1.6"
Diameter: 6"
Weld Length: 46.7"

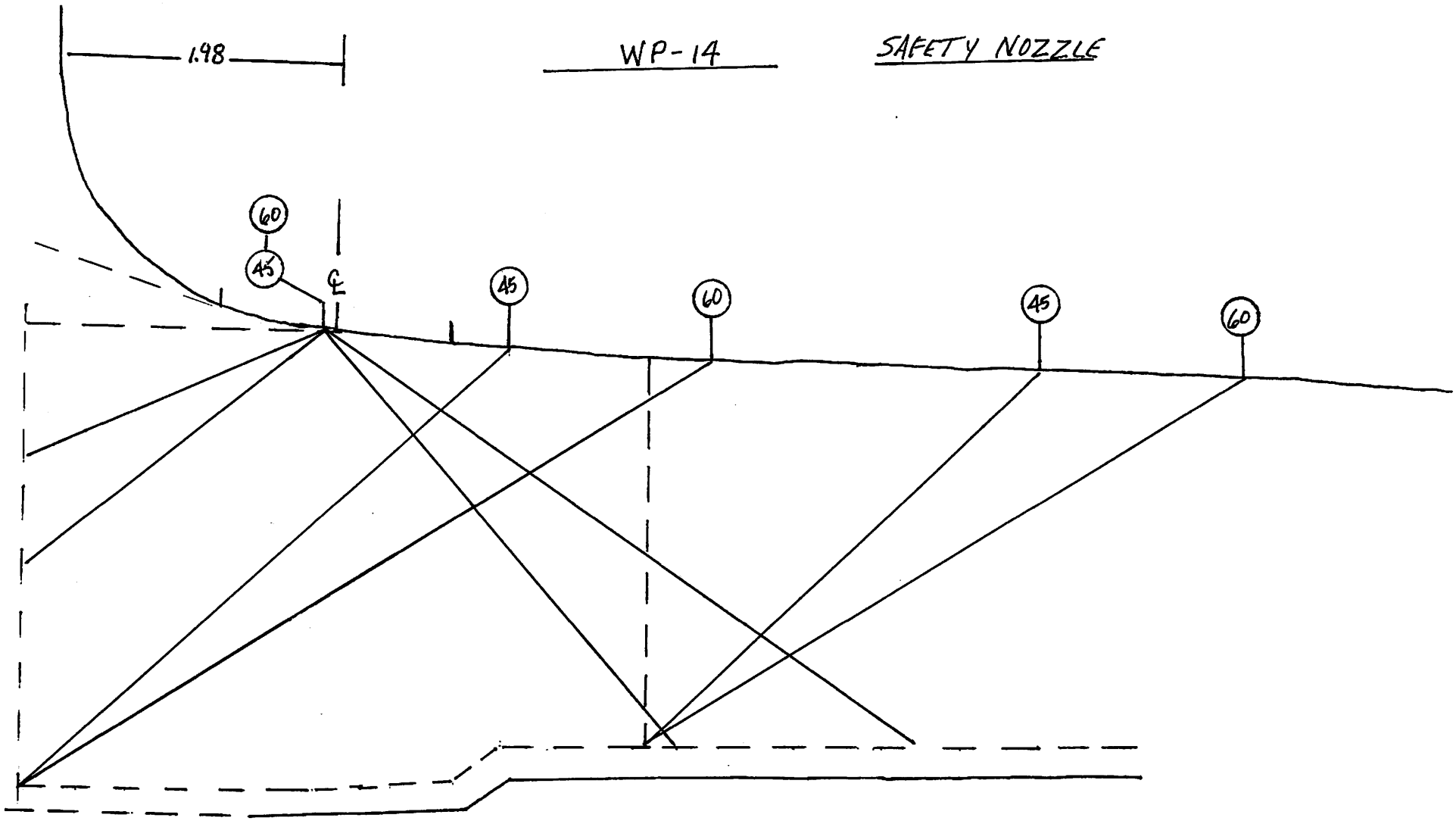


Examiner: Jim Reynolds	**Reviewed By:** Darlene Dudley	**ANII:** [illegible]
Level: II	**Level:** III	
Date: 10-19-10	**Date:** 10-31-10	**Date:** 1-6-11

R.P1281

WELD 2 PZR

WP-14 SAFETY NOZZLE



Enc 4/20/17

0

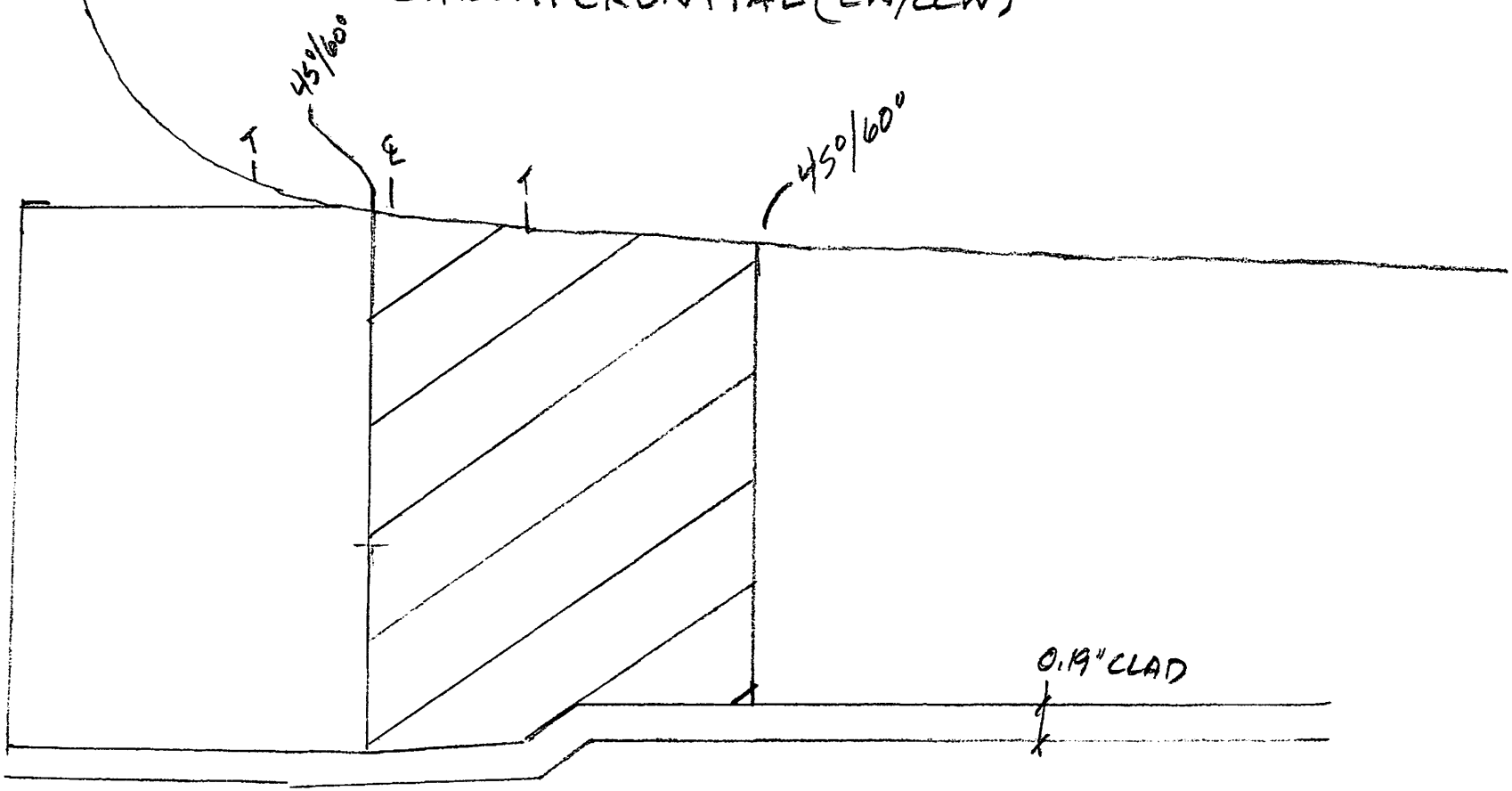
WP-14

45° AND 60° SCAN COVERAGE

R-P1281

pg 8/14

- TWO DIRECTION COVERAGE (SCANS 3 & 4)
CIRCUMFERENTIAL (CW/CCW)



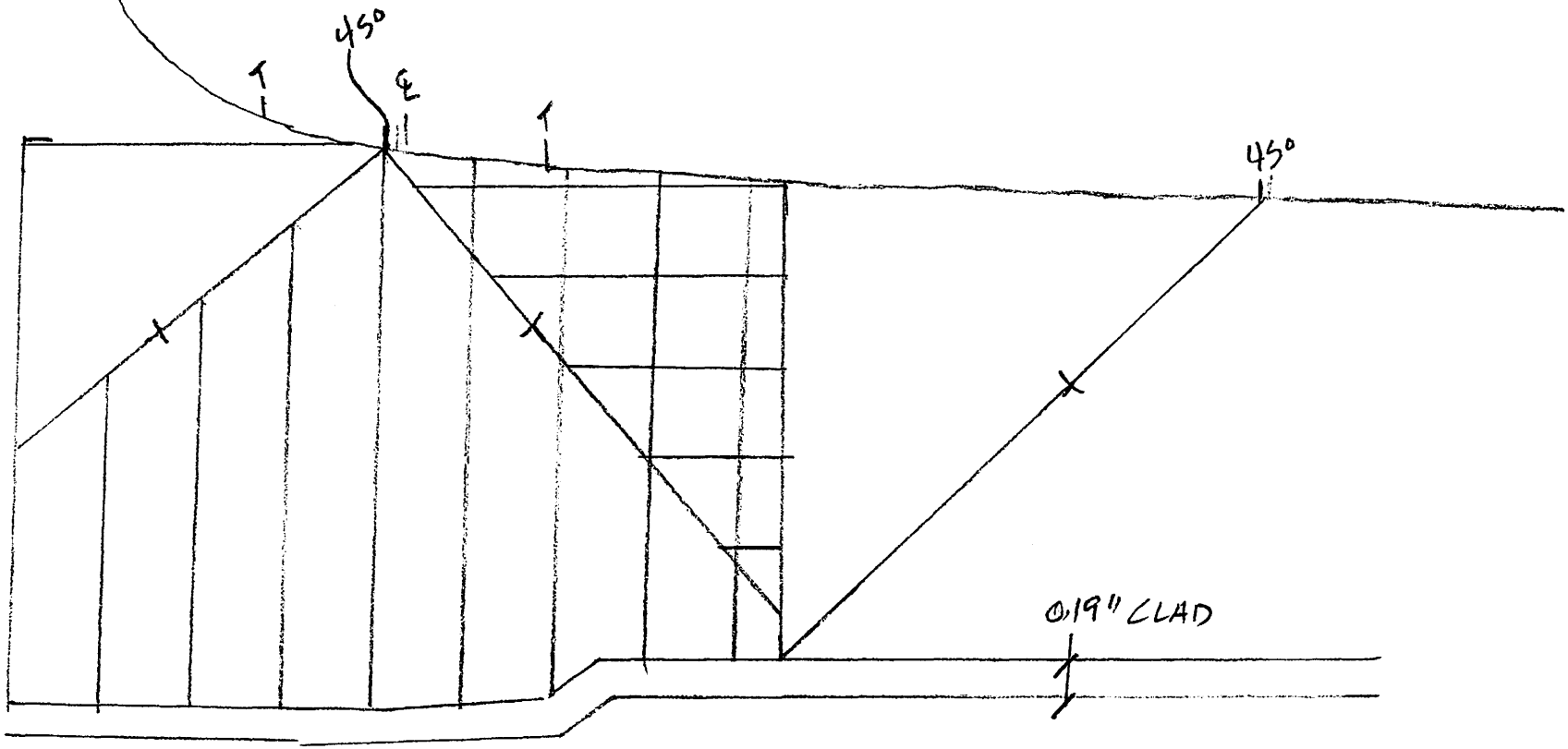
R-P1281

WP-14

45° SCANS 1 : 2 COVERAGE RADIAL DIRECTION

- SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE

- SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE

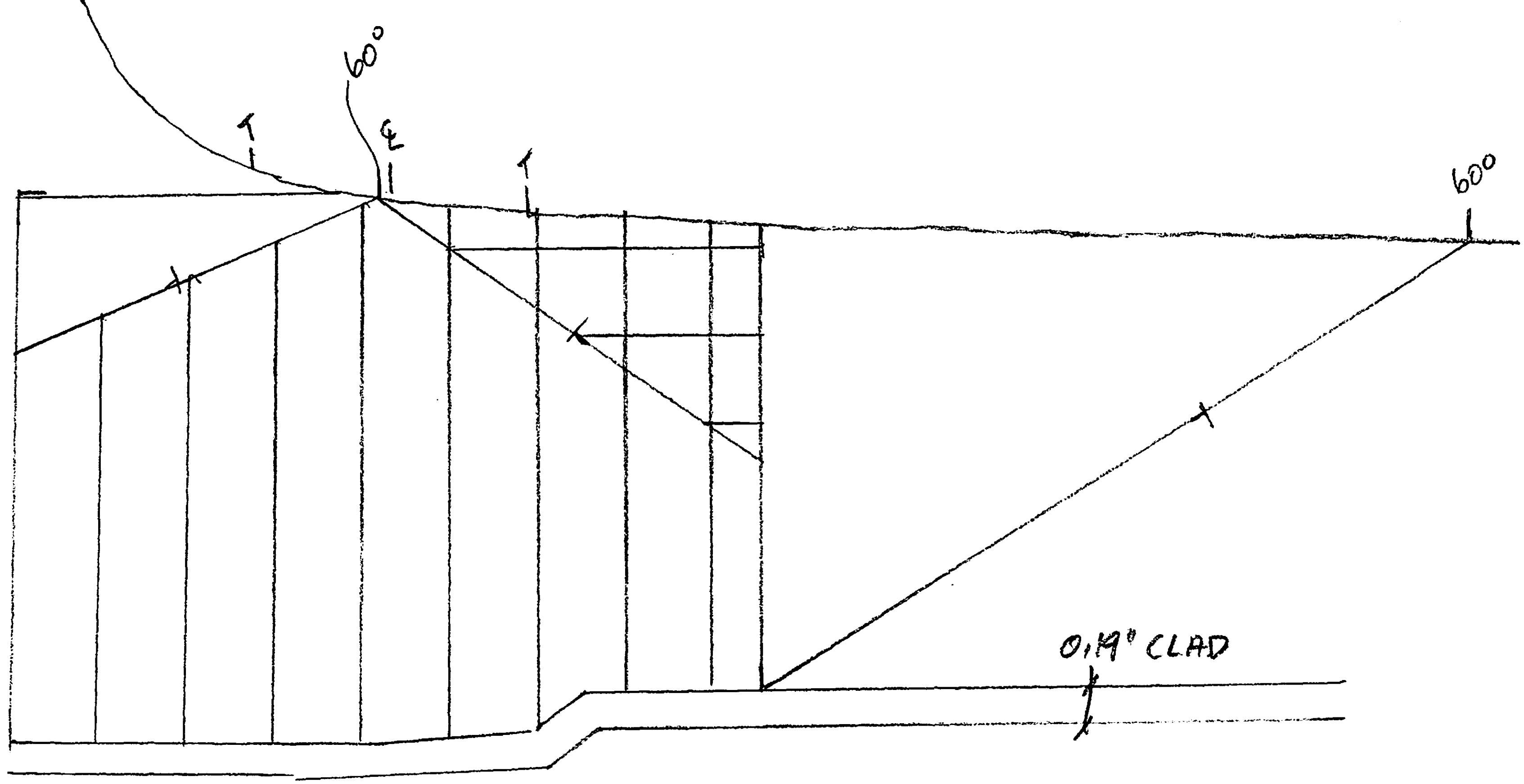


pg 14

WP-14

60° SCANS 1 & 2 COVERAGE RADIAL DIRECTION

- SCAN 1 COVERAGE (ONE DIRECTION) TOWARD NOZZLE
- SCAN 2 COVERAGE (BI-DIRECTIONAL) AWAY FROM NOZZLE



R. P1281

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-14 (45 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.3	2.7	11.61	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			46.44	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2168.748	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	9.93	46.7	463.731	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	5.1525	46.7	240.62175	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	6.075	46.7	283.7025	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	6.075	46.7	283.7025	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1271.7578	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**58.64**	%

Scan limitation due to Nozzle configuration

Initials
JA

Date
10/25/2010

11/14

R. P1281

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-14 (60 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.3	2.7	11.61	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			46.44	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2168.748	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	10.665	46.7	498.0555	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	2.53425	46.7	118.34948	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	6.075	46.7	283.7025	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	6.075	46.7	283.7025	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1183.81	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**54.58**	%

Scan limitation due to Nozzle configuration

Initials JA

Date 10/25/2010

12/14

8 of 10

w-6/27/11

R.P1581

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Measured Fields | Calculated Fields

Worksheet Version 1.0 dated 07/01/09

WELD NUMBER WP-14 (0 Deg)

Item 1	Required examination Volume in sq. in. **(width x height)**	4.3	2.7	11.61	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			46.44	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2168.748	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	7.425	46.7	346.7475	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	7.425	46.7	346.7475	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	7.425	46.7	346.7475	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	7.425	46.7	346.7475	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1386.99	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**63.95**	%

Scan limitation due to Nozzle configuration

Initials JA

Date 10/25/2010

13/14

R-P1281

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: N/A w 6/20/17

Reports: R-P1014/W0809, R-P1280/WP-15, R-P1281/WP-14, R-P1282/WP-12, R-P1283/WP-11 AND R-P1284/WP-13.

Scan directions provided for clarity.

Scan directions defined for W08-09:

- Scan 1 is axial from the flange surface.
- Scan 2 is axial from the RPV head surface.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan directions defined for WP-11 through WP-15:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan direction figures submitted and added to applicable reports for:

- W08-09 (R-P1014)
- WP-11 (R-P1283)
- WP-12 (R-P1282)
- WP-13 (R-P1284)
- WP-14 (R-P1281)
- WP-15 (R-P1280)

Matt Welch 6/20/17
MATT WELCH LEVEL III

PS 14/14

Enclosure 3

Scan Directions Reports for W08-09, WP-11, WP-12, WP-13, WP-14, WP-15

Scan Directions Report for WP-15

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-P1280

PROJECT: *WBN* UNIT: *2* CYCLE *00*				COMPONENT ID: *WP-15*	
EXAMINATION METHOD				SYSTEM: PZR	ISI DWG NO: *ISI-2068C-E-01*
MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-19*		REV 17	TC: N/A	*NOZ TO SHL*	*B-D*
EXAMINER: Jose Alejandro LEVEL:		EXAMINER: Brandon Calvery LEVEL: IIL		EXAMINER: N/A LEVEL:	EXAMINER: N/A LEVEL:

mw 6/20/17

Total coverage calculated to be approximately ~~61.22%~~ 60.49% 00

An ultrasonic examination was performed on this nozzle to shell weld configuration. This examination was performed to meet the requirements of ASME Section XI preservice inspection.

A 0° longitudinal wave and a 45° and 60° shearwave were calibrated and used to performed this examination.

Examination scans were limited due to nozzle configuration.

No recordable indications observed.

~~61.22%~~ examination volume coverage achieved. 60.49% mw 6/20/17

0° lamination scan was performed for PSI.

Ø See page 14 of 15. Matt Welch 6/20/17
MATT WELCH 6/20

RESOLUTION BY: Jose Alejandro LEVEL II DATE: 10-22-10	REVIEWED BY: Darlene Dewey LEVEL: II DATE: 10-31-10	ANII: ~~Matt~~ DATE: 1-5-11
		Page: 1 OF 15

ACCESS: FORMS DATABASE R-10/04/01

15 mw 6/20/17

TENNESSEE VALLEY AUTHORITY

DIGITAL ULTRASONIC CALIBRATION DATA SHEET

REPORT NUMBER R.P1080

PROJECT *WBN* UNIT/CYCLE *2/ 00*
PROCEDURE: *N-UT-19* REV: 17 TC: N/A

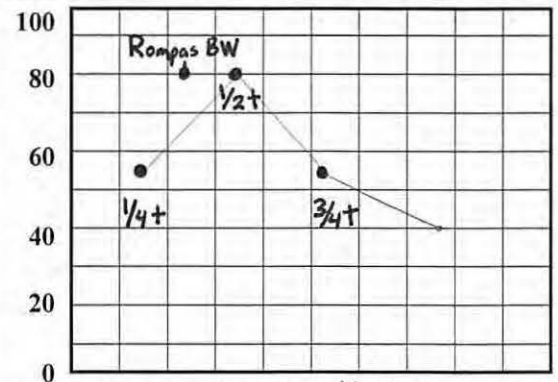
TRANSDUCER
MANUFAC KBA MODEL: Gamma HP
ELEMENTS: 1 SHAPE: Round
S/N F16128 SIZE: .750 FREQ: 2.25 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☐ SHEAR ☒ LONG ☐ RL

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 0° ACTUAL ANGLE 0 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

DAC



DISPLAY WIDTH 4.00 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	N/A	☒	43.0 dB	0°-Noz-Sh
CIRC.	N/A	N/A	N/A dB	N/A

RANGE: 4.00 inches *FREQ: 2.25 MHz
PROBE DELA 1.253 msec *RECTIFY: Fullwave
VELOCITY .2333 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1K ohms DET: ☒ Peak ☐ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 0 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas BW GAIN: 21.5 dB
AMPLITUDE: 80 % METAL PATH: 1.00

CALIBRATION TIMES
INITIAL TIME: 0847 FINAL TIME: 1307

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)
	0955	1120	1130	1230	1247	N/A	N/A	N/A	N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	WP-15

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II
REVIEWER: Darrin Dailey LVL.: III DATE: 10-31-10

ANII: [signature] DATE: 1-5-11 1/6/11

ACCESS: FORMS DATABASE 07-25-07

10-31-10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-P1280

PROJECT: WBN UNIT/CYCLE: 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

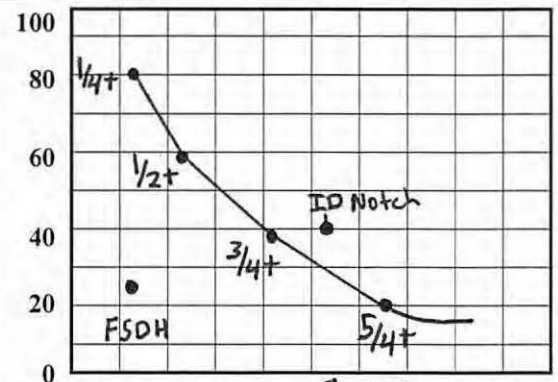
TRANSDUCER
MANUFAC: KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N: J10237 SIZE: .50x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE: RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO.: WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE: Rompas S/N: 967717
NOMINAL ANGLE: 45° ACTUAL ANGLE: 45 °

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN 60 S/N: E34779

DAC



DISPLAY WIDTH: 8.00 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	N	☒	54.2 dB	45-Noz-SH
CIRC.	☐	A	54.2 dB	45-Noz-SH

RANGE: 8.00 inches *FREQ: 1 MHz
PROBE DELA: 13.3066 msec *RECTIFY: Fullwave
VELOCITY: 1272 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: IP
*DAMPING: 1k ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 45 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 54.2 dB
AMPLITUDE: 25 % METAL PATH: 1.05

CALIBRATION TIMES
INITIAL TIME: 0834 FINAL TIME: 1306

VERIFICATION TIMES	1) 1010	2) 1100	3) 1139	4) 1220	5) 1248	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN SET		-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
4.9 db difference 3/4, 5/4	WP-15

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II
REVIEWER: Darlene Dewey LVL.: III DATE: 10-27-10

ANII:
DATE: 1-5-11 w/report
PAGE 3 OF 9 pgs 15

ACCESS: FORMS DATABASE 07-25-07

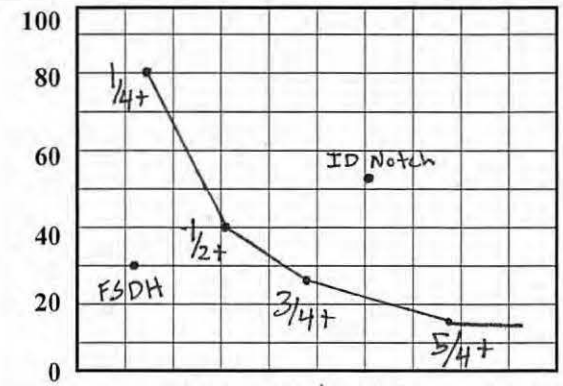
10-31-10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P1280

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 17 TC: N/A

TRANSDUCER
MANUFAC KBA MODEL: Gamma
ELEMENTS: 1 SHAPE: Rect.
S/N J10239 SIZE: .5x1.0 FREQ: 1 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG174 LENGTH: 6' # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 10.00 inches

CALIBRATION DATE: 10-21-10
CALIBRATION BLOCK NO. WB-55 TEMP: 76.7 °F
SIMULATOR BLOCK: 967717
THERMOMETER S/N: E44479 DUE DATE: 02-03-11
COUPLANT: Ultragel II BATCH: 07225E

ANGLE VERIFICATION
BLOCK TYPE Rompas S/N: 967717
NOMINAL ANGLE: 60° ACTUAL ANGLE 60°

INSTRUMENT
MANUFACTURER: Krautkramer DUE DATE: 06-22-11
MODEL NO.: USN60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☒	50.5 dB	60-Noz-SH
CIRC.	☐	☐ A	50.5 dB	60-Noz-SH

RANGE: 10.00 inches *FREQ: 1 MHz
PROBE DELA 16.9716 msec *RECTIFY: Full wave
VELOCITY .1260 msec DUAL ☐ ON ☒ OFF
DISP DELAY: 0.000 *REJECT: 0 %
*ENERGY: High *DISP. START: I P
*DAMPING: 1K ohms DET: ☐ Peak ☒ Flank
*PRR/PRF: Autohigh TCG: ☐ ON ☒ OFF
ANGLE: 60 deg *PULSER: Single
ZERO: N/A msec

REF. REFLECTOR: Rompas SDH GAIN: 50.5 dB
AMPLITUDE: 30 % METAL PATH: 1.5

CALIBRATION TIMES
INITIAL TIME: 0815 FINAL TIME: 1305

VERIFICATION TIMES	1) 1026	2) 1037	3) 1149	4) 1217	5) 1255	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
6.6 db difference 3/4, 5/4	WP-15

EXAMINER: Jose Alejandro Yael Alejandro LVL.: II
EXAMINER: Brandon Calvery LVL.: II L
REVIEWER: Darlene Tuley LVL.: III DATE: 10-27-10

ANII:
DATE: 1-5-11
PAGE 4 OF 9 15

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- R.P 1280

PROJECT: WBN UNIT: 2
SYSTEM: PRESSURIZER
WELD I.D.: WP-15
CONFIG: NOZZLE TO: SHELL
PROCEDURE: N-UT- 19 REV. 17 TC: N/A

Wo REFERENCE: ℄ OF WELD
Lo REFERENCE: TDC OF NOZZLE
SURFACE TEMP: 77.7 F
PYRO. SERIAL NO. E44479

EXAMINATION DATE: 10-21-10
START TIME: 0957 END TIME: 1033

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
N/A	0	49.0 dB
	45	AX 64.1 CIRC 64.1 dB
	60	AX 60.3 CIRC 60.3 dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N	N	N	N															

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
			0				No Recordable Indications																	
		1	45				No Recordable Indications																	
		2	45				No Recordable Indications																	
		3	45				No Recordable Indications																	
		4	45				No Recordable Indications																	
		1	60				No Recordable Indications																	
		2	60				No Recordable Indications																	
		3	60				No Recordable Indications																	
		4	60				No Recordable Indications																	

REMARKS/LIMITATIONS: Examination limited on nozzle side due to configuration. Scans were performed maintaining 5-20% I.D. noise on base metal and on weld. Zero degree scanned at 80% backwall.

EXAMINER: Jose Alejandro LEVEL: II
EXAMINER: Braden Calvery LEVEL: IIL

REVIEWED BY: Darlene Tousley
LEVEL: IIL DATE: 10.27.10

ANII Andrew Triplett for 2-14-13
ANII Ronald Roberts * 1-5-11
2-14-13

PAGE 5 OF 15

TVA 19670B (NP 7/92)

* Reviewed by ANII Ronald Roberts on 1/5/2011 verified in Round Diary. Act 2-14-13

10-31-10

TVA

WALL THICKNESS PROFILE SHEET

REPORT NO: R-P1280

PROJECT: WBN

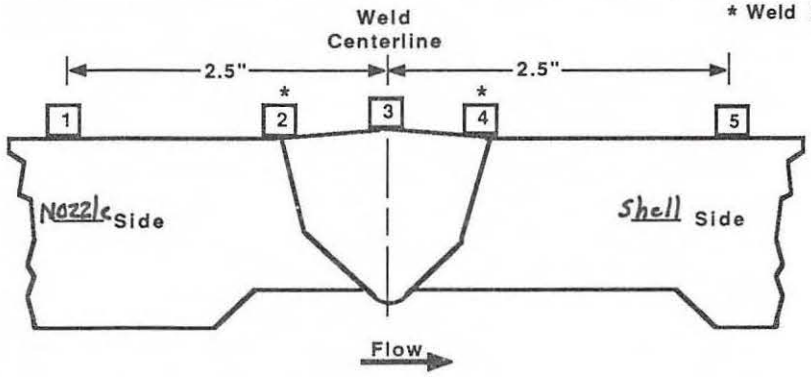
UNIT: 2

WELD NO: WP-15

SYSTEM: PZR

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	3.24	3.37	3.30	3.23
5	2.92	3.21	3.22	3.08

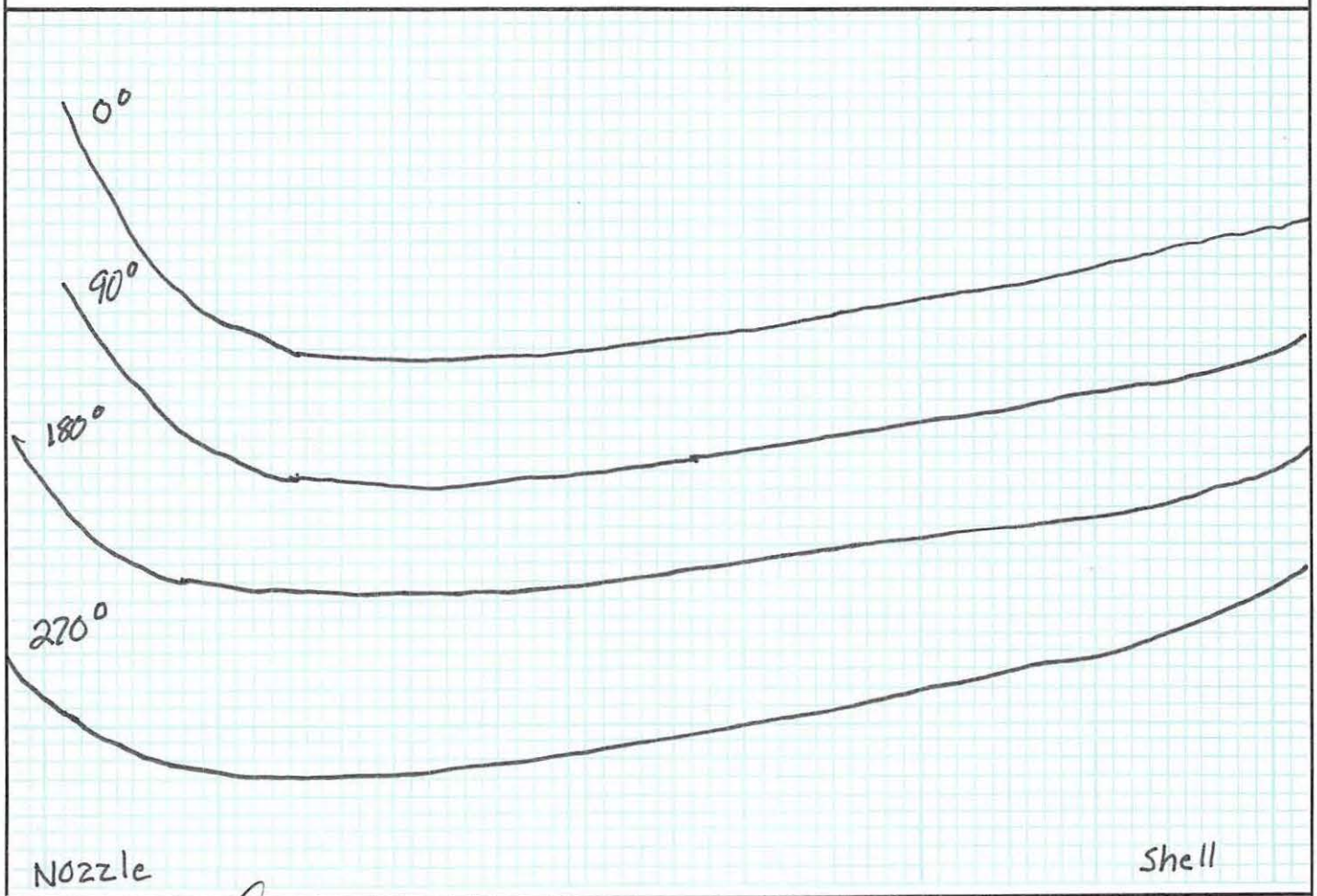


CROWN HEIGHT: Flush

CROWN WIDTH: 1.6"

DIAMETER: 6"

WELD LENGTH: 46.7"



EXAMINER: [signature] II

LEVEL:

DATE: 10-19-10

REVIEWED BY: [signature]

LEVEL: III DATE: 10-27-10

ANII: [signature]

DATE: 1-5-11

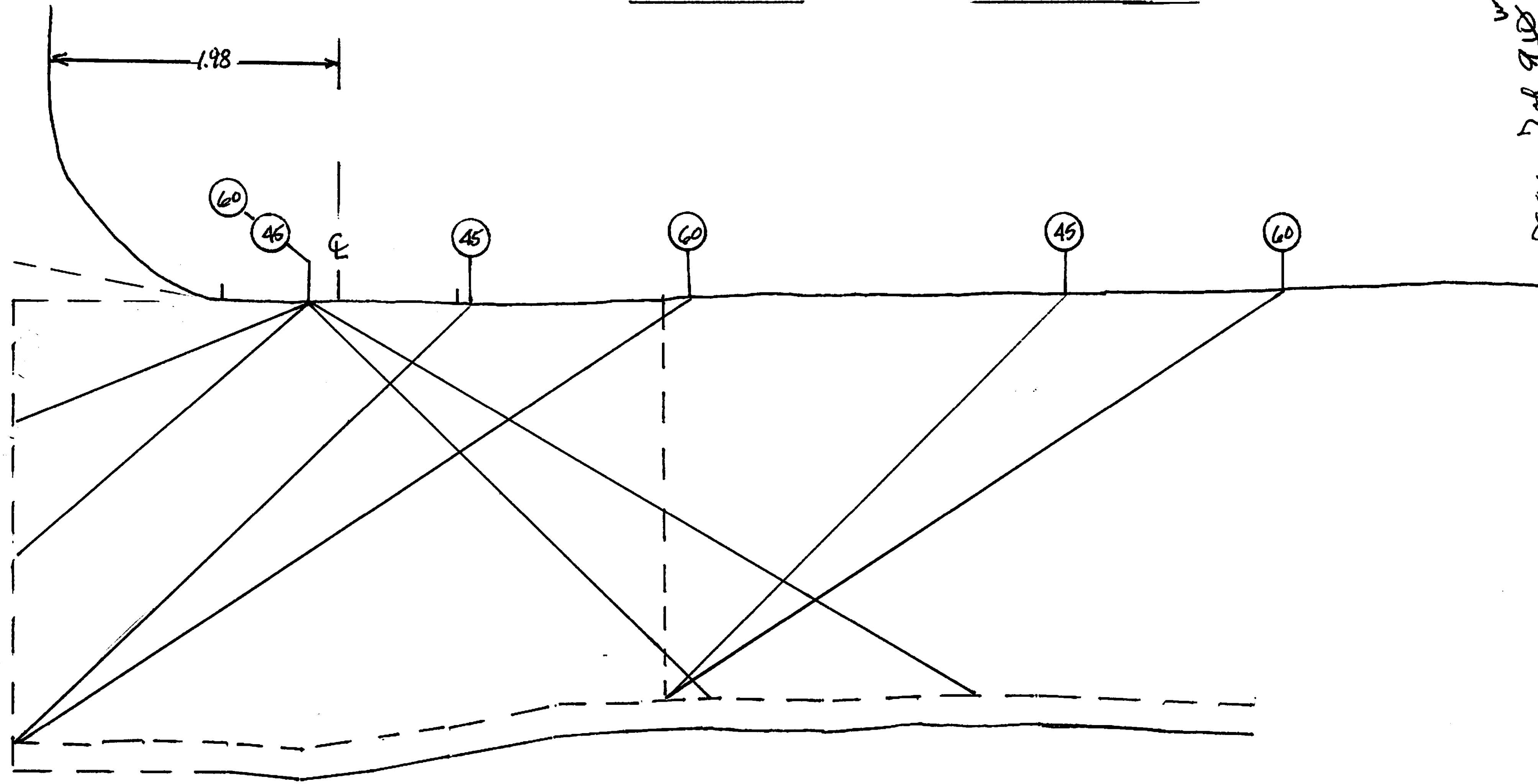
PAGE 6 OF 15

ADD 10-31-10

R. P080

WBN 2 PZR

WP-15 SAFETY NOZZLE



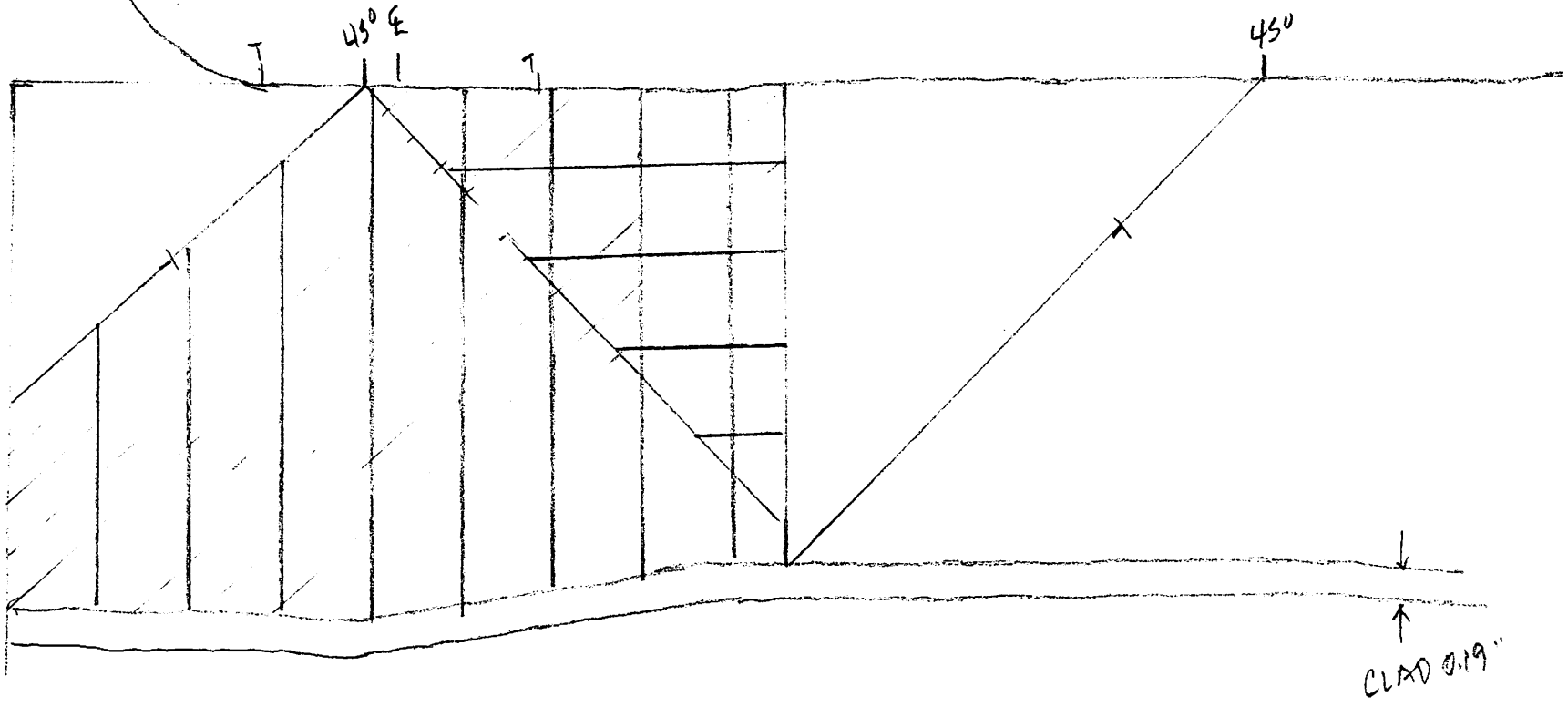
WP-15

45° SCAN COVERAGE SCANS 1 & 2 RADIAL DIRECTION

- ONE DIRECTION COVERAGE (SCAN 1) TOWARD NOZZLE

- BI-DIRECTIONAL COVERAGE (SCAN 2) AWAY FROM NOZZLE.

R-P1280



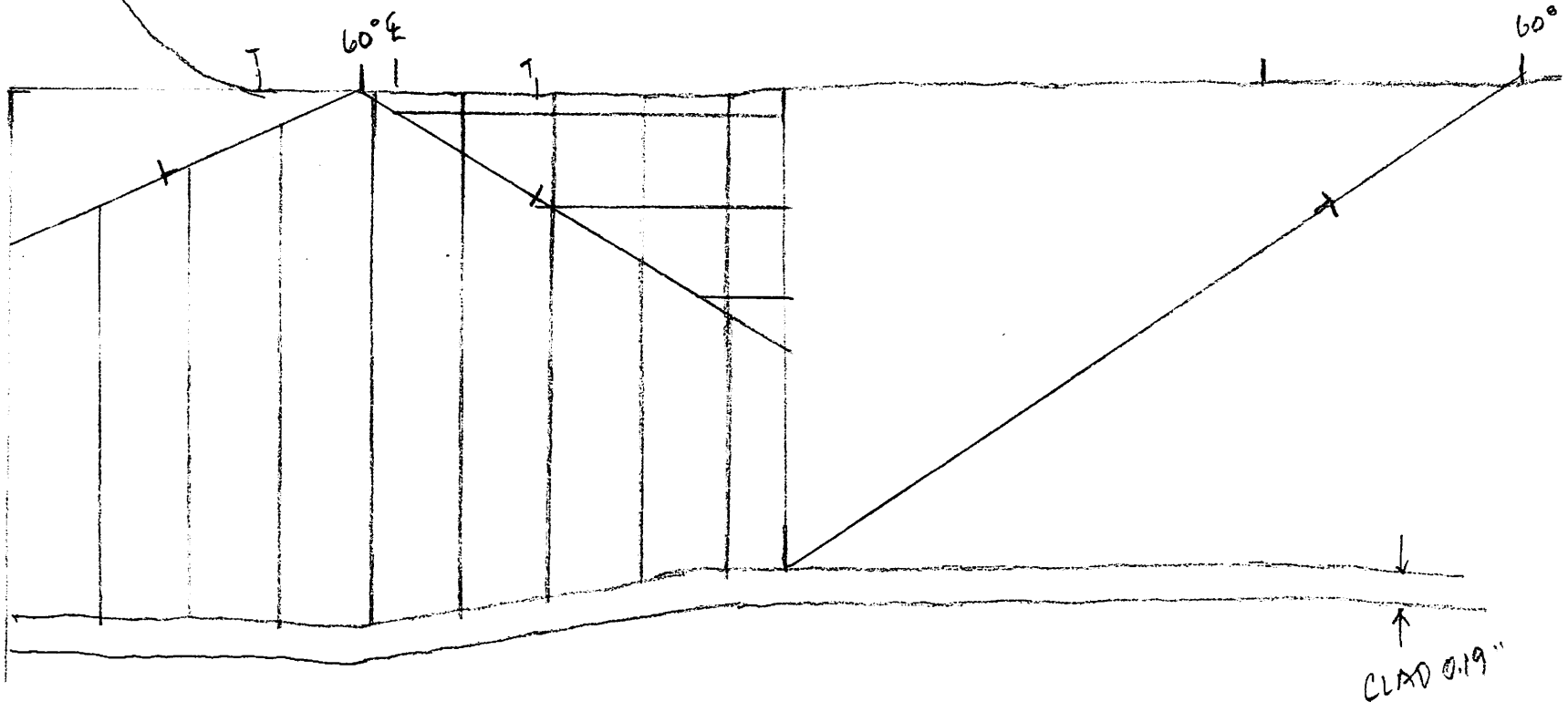
R-P1280

WP-15

60° SCAN COVERAGE SCANS 1 & 2 RADIAL DIRECTION

- ONE DIRECTION COVERAGE (SCAN 1) TOWARD NOZZLE

- TWO DIRECTION COVERAGE (SCAN 2) AWAY FROM NOZZLE

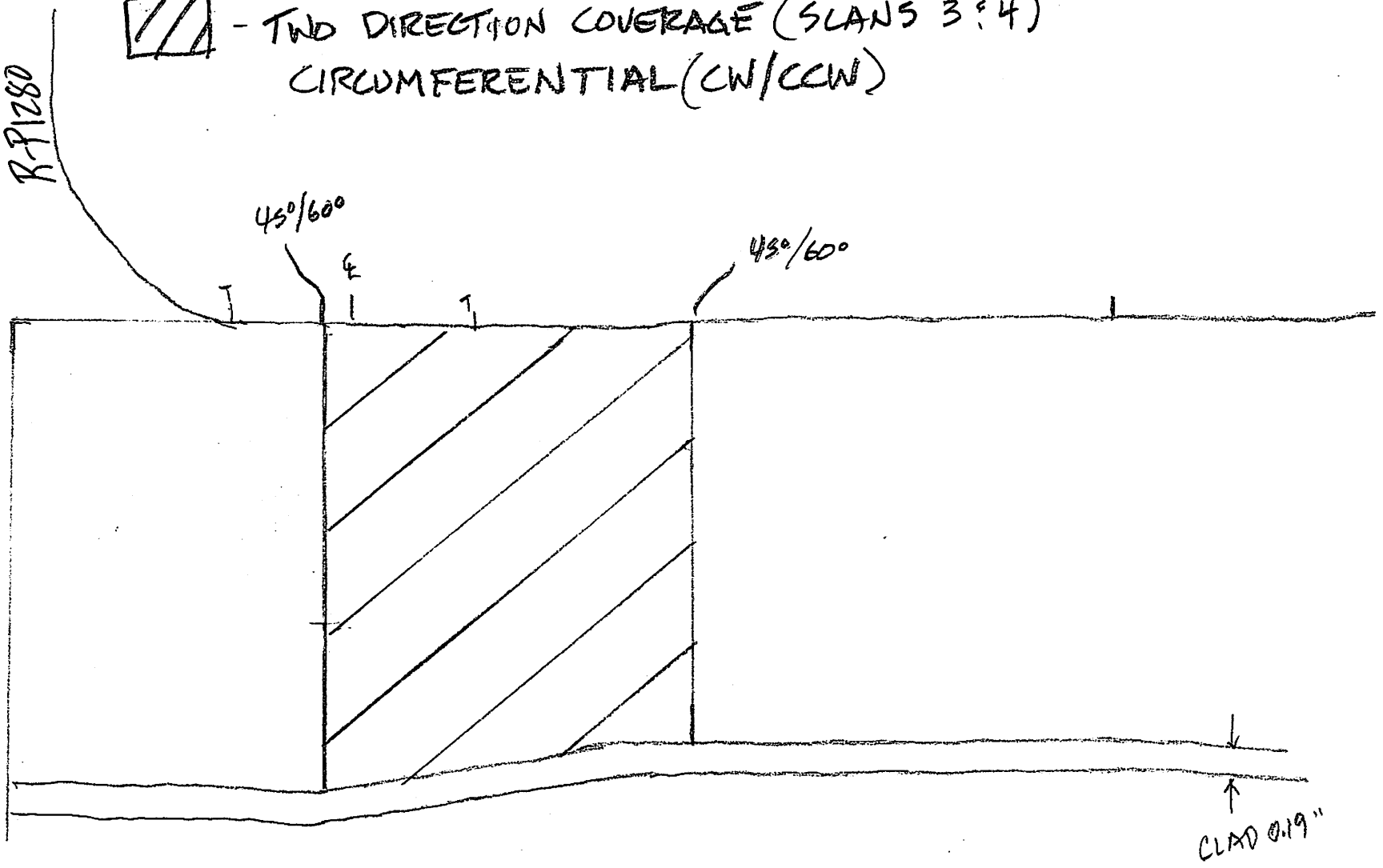


pg 9 of 15

WP-15
45 AND 60 SCAN COVERAGE

11/15/95

- TWO DIRECTION COVERAGE (SCANS 3 & 4)
CIRCUMFERENTIAL (CW/CCW)



Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-15 (45DEG) REV.1				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.75	12.1	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			48.4	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2260.28	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	10.35	46.7	483.345	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	3	46.7	140.1	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	6.6	46.7	308.22	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	6.6	46.7	308.22	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1239.885	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**54.86**	%

SCAN LIMITATION DUE TO NOZZLE CONFIGURATION

Initials	Date
MCW	6/13/2017
pg 11/15	

R.P1280

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-15 (60 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.75	12.1	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			48.4	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2260.28	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	11.5	46.7	537.05	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	4.49	46.7	209.683	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	6.6	46.7	308.22	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	6.6	46.7	308.22	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1363.173	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**60.31**	%

Scan limitation due to Nozzle configuration

Initials JA

Date 10/25/2010

12/15

Page 8 of 10 w/pol/7

DD 10-31-11

R.P D80

Watts Bar Unit 2

TVA Procedure N-GP-31
Attachments 3 & 4

Worksheet Version 1.0 dated 07/01/09

		Measured Fields		Calculated Fields	
WELD NUMBER	WP-15 (0 Deg)				
Item 1	Required examination Volume in sq. in. **(width x height)**	4.4	2.75	12.1	sq. in.
Item 2	Number of **scan directions**			4	directions
Item 3	Total Scan **volume** in sq. in.			48.4	sq. in.
Item 4	Total **length** of weld			46.7	inches
Item 5	Total required **exam volume** in cubic inches			2260.28	cu. in.
Item 6	**Exam volume acheived** (sq. in.) in direction 1 X **length of weld achieved**	8.0025	46.7	373.71675	cu. In.
Item 7	**Exam volume acheived** (sq. in.) in direction 2 X **length of weld achieved**	8.0025	46.7	373.71675	cu. In.
Item 8	**Exam volume acheived** (sq. in.) in direction 3 X **length of weld achieved**	8.0025	46.7	373.71675	cu. In.
Item 9	**Exam volume acheived** (sq. in.) in direction 4 X **length of weld achieved**	8.0025	46.7	373.71675	cu. In.
Item 10	Determined the **acheived exam volume** add 6, 7, 8 & 9			1494.867	cu. In.
Item 11	Exam **volume percentage** item 10/item 5 x 100			**66.14**	%

Scan limitation due to Nozzle configuration

Initials JA

Date 10/25/2010

~~to of 10~~ 13/15
cm 6/20/12

R-P1280

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: 1309817

Report: R-P1280/WP-15

Coverage changed to 60.4%. 45 degree coverage sheet changed.

- WP-15 - Please explain how the same coverage was obtained for item 6 (directions 1) in both the 60 and 45 degree exams considering the transducers have two different angles but seem to have the same examination limitations.

The calculated coverage for the 45 degree scan performed toward the nozzle is incorrect (calculation sheet item 6). Using the scan coverage depicted on page 8 of R-P1280, the following values were calculated.

- 45 degree, item 6, exam volume achieved is 10.35"square.
  - Changes the total value achieved to 483.34 cubic inches.
  - Changes final obtained coverage from 61.22% to 60.4%

Report R-P1280 has been corrected to reflect the adjusted values and obtained coverage.

PS 14/15

R-P1280

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1 and RAI-2.

Reference CR: N/A 6/20/11

Reports: R-P1014/W0809, R-P1280/WP-15, R-P1281/WP-14, R-P1282/WP-12, R-P1283/WP-11 AND R-P1284/WP-13.

Scan directions provided for clarity.

Scan directions defined for W08-09:

- Scan 1 is axial from the flange surface.
- Scan 2 is axial from the RPV head surface.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan directions defined for WP-11 through WP-15:

- Scan 1 is radial toward the nozzle.
- Scan 2 is radial away from the nozzle.
- Scan 3 is circumferential (clockwise) around the exam volume.
- Scan 4 is circumferential (counter clockwise) around the exam volume.

Scan direction figures submitted and added to applicable reports for:

- W08-09 (R-P1014)
- WP-11 (R-P1283)
- WP-12 (R-P1282)
- WP-13 (R-P1284)
- WP-14 (R-P1281)
- WP-15 (R-P1280)

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Enclosure 4

Revised Coverage Report for BIT-2 (drawing R-P2183)

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R-P2183

PROJECT: *WBN* UNIT: *2* CYCLE *00*				COMPONENT ID: *BIT-2*	
EXAMINATION METHOD				SYSTEM: SIS	ISI DWG NO: *ISI-2063A-E-01*
MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-19*		REV *18*	TC: *11-01 12-01*	*HD TO SHL*	*C-A*

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
Jose Alejandro	Jonathan Keeton	N/A	N/A
LEVEL: II	LEVEL: IIL	LEVEL:	LEVEL:

Total coverage calculated to be approximately 61.18 %

An ultrasonic examination was performed on this Bottom Head to shell weld. This examination was performed to meet the requirements of ASME Section XI preservice inspection.

A 0 degree longitudinal wave technique was calibrated and used to performed a weld and base metal baseline lamination scans.
A 45 degree and a 60 dregree shearwave technique were calibrated and used to performed the angle beam scans.
A 60 refracted longitudinal technique was calibrated and used to supplement the scans from the Bottom Head side of weld.

Examination was limited to one side due to material of centrifically cast stainless steel on the shell side.

Examination was obstructed due to proximity of welded thermowells in exam area at 0° and 180° locations.

No recordable indications observed

61.18% examination volume coverage achieved

Code item: C1.10

Added page 13 of 13. Matt Welch 6/20/17
MATT WELCH LIII

RESOLUTION BY:	REVIEWED BY: MATT WELCH	ANII: Joe C. Hair
LEVEL II DATE: 07-28-14	LEVEL: III DATE: 8/12/14	DATE: 05/22/2015
		Page: 1 OF 13

ACCESS: FORMS DATABASE R-10/04/01

mw 6/20/17

TENNESSEE VALLEY AUTHORITY — DIGITAL ULTRASONIC CALIBRATION DATA SHEET — REPORT NUMBER R-PZ183

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 18 TC: 11-01, 12-01

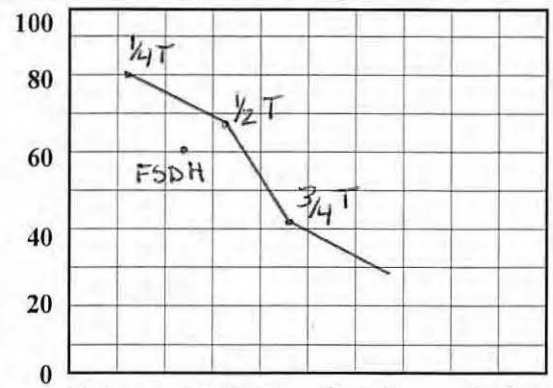
TRANSDUCER
MANUFAC HARISONIC MODEL: CM0112-S
ELEMENTS: 1 SHAPE: ROUND
S/N 90B100 SIZE: .750" FREQ: 1.0 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG-174 LENGTH: 72" # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☐ SHEAR ☒ LONG ☐ RL

CALIBRATION DATE: 5-29-14
CALIBRATION BLOCK NO. WB44 TEMP: 74.1 °F
SIMULATOR BLOCK: 790390
THERMOMETER S/N: 562779 DUE DATE: 6-24-14
COUPLANT: ULTRAGEL II BATCH: 11125

ANGLE VERIFICATION
BLOCK TYPE ROMPAS S/N: 790390
NOMINAL ANGLE: 0° ACTUAL ANGLE: 0 °

INSTRUMENT
MANUFACTURER: KRAUTKRAMER DUE DATE: 7-11-14
MODEL NO.: USN 60 S/N: E34779

DAC



DISPLAY WIDTH 3.00 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐ N	☐	27.4 dB	0° BIT TANK
CIRC.	☐	☐ A	N A dB	N A

RANGE: 3.00 inches
PROBE DELAY: 2.0066 msec
VELOCITY: .2212 msec
DISP DELAY: 0
ENERGY: HIGH
*DAMPING: 1K ohms
*PRR/PRF: AUTO HIGH
*ANGLE: 0 deg
ZERO: N/A msec
VOLTAGE: N/A

* FREQ: 1 MHz
* RECTIFY: FULLWAVE
DUAL: ☐ ON ☒ OFF
* REJECT: 0 %
* DISP. START: IP
DET: ☒ Peak ☐ Flank
TCG: ☐ ON ☒ OFF
* PULSER: SPIKE
PULSE WIDTH: N/A

REF. REFLECTOR: ROMPAS FSDH GAIN: 27.4 dB
AMPLITUDE: 60 % METAL PATH: .753

CALIBRATION TIMES
INITIAL TIME: 0815 FINAL TIME: 1409

VERIFICATION TIMES 1) 1127 2) N A 3) N A 4) N A 5) N A 6) N A 7) N A 8) N A 9) N A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	BIT-2

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Jonathan W Keeter LVL.: ~~FRN~~ JWK 6-11-14 IIL
REVIEWER: MATT WELCH LVL.: III DATE: 8/12/14

ANII: Joe C. Hair DATE: 05/22/2015

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ACCESS: FORMS DATABASE 06-14-11

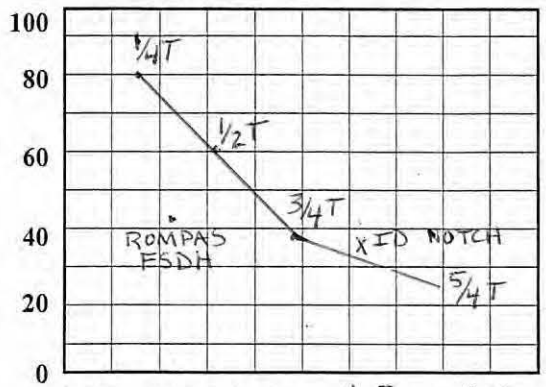
6/20/17

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-P2183

PROJECT WBN UNIT/CYCLE 2/00
PROCEDURE: N-UT-19 REV: 18 TC: 11-01, 12-01

TRANSDUCER
MANUFAC KBA MODEL: COMP G
ELEMENTS: 1 SHAPE: ROUND
S/N 00DNKX SIZE: .5" FREQ: 1-5 MHz
CONTOUR: N/A FOCUS: N/A
CABLE TYPE RG-174 LENGTH: 72" # CNT: 0
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH 4.5 inches

CALIBRATION DATE: 5-29-14
CALIBRATION BLOCK NO. WB44 TEMP: 74.1 °F
SIMULATOR BLOCK: 790390
THERMOMETER S/N: 562779 DUE DATE: 6-24-14
COUPLANT: ULTRAGEL II BATCH: 11125

ANGLE VERIFICATION
BLOCK TYPE ROMPAS S/N: 790390
NOMINAL ANGLE: 45° ACTUAL ANGLE: 46°

INSTRUMENT
MANUFACTURER: KRAUTKRAMER DUE DATE: 7-11-14
MODEL NO.: USN 60 S/N: E34779

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	35.4 dB	45° BIT TANK
CIRC.	☐	☒	35.4 dB	45° BIT TANK

RANGE: 4.500 inches
PROBE DELAY: 9.3144 msec
VELOCITY: .1231 msec
DISP DELAY: 0
ENERGY: HIGH
*DAMPING: 1K ohms
*PRR/PRF: AUTO HIGH
*ANGLE: 45 deg
ZERO: N/A msec
VOLTAGE: N/A

* FREQ: 2 MHz
* RECTIFY: FULLWAVE
DUAL: ☐ ON ☒ OFF
* REJECT: 0 %
* DISP. START: IP
DET: ☒ Peak ☐ Flank
TCG: ☐ ON ☒ OFF
* PULSER: SPIKE
PULSE WIDTH: N/A

REF. REFLECTOR: ROMPAS FSDH GAIN: 35.4 dB
AMPLITUDE: 42 % METAL PATH: 1.072

CALIBRATION TIMES
INITIAL TIME: 0834 FINAL TIME: 1413

VERIFICATION TIMES	1) 1130	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS	WELD / ITEMS EXAMINED
	BIT-2

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Jonathan W Keeton JWK 6-11-14 LVL.: FRM III
REVIEWER: MATT WELCH LVL.: III DATE: 8/12/14

ANII: Joe C. HAIR Joe C. Hair
DATE: 05/22/2015
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ACCESS: FORMS DATABASE 06-14-11

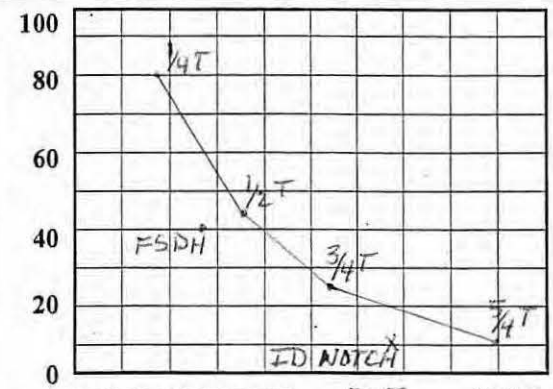
mw 6/20/14

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-P2183

PROJECT *WBN* UNIT/CYCLE *2/ 00*
PROCEDURE: *N-UT-19* REV: *19* TC: *11-01, 12-01*

TRANSDUCER
MANUFAC *KBA* MODEL: *COMP 6*
ELEMENTS: *1* SHAPE: *ROUND*
S/N *01FH9M* SIZE: *.5"* FREQ: *1.5* MHz
CONTOUR: *N/A* FOCUS: *N/A*
CABLE TYPE *RG-174* LENGTH: *72"* # CNT: *0*
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

DAC



DISPLAY WIDTH *5-5* inches

CALIBRATION DATE: *5-29-14*
CALIBRATION BLOCK NO. *WB 44* TEMP: *74.1* °F
SIMULATOR BLOCK: *790390*
THERMOMETER S/N: *562779* DUE DATE: *6-24-14*
COUPLANT: *ULTRAGEL II* BATCH: *11125*

ANGLE VERIFICATION
BLOCK TYPE *ROMPAS* S/N: *790390*
NOMINAL ANGLE: *60°* ACTUAL ANGLE: *60 °*

INSTRUMENT
MANUFACTURER: *KRAUTKRAMER* DUE DATE: *7-11-14*
MODEL NO.: *USN 60* S/N: *E34779*

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTC	SDH		
AXIAL	☐	☒	*36.7* dB	*60° BIT TANK*
CIRC.	☐	☒	*36.7* dB	*60° BIT TANK*

RANGE: *5-5* inches
PROBE DELAY: *9.3144* msec
VELOCITY: *.1231* msec
DISP DELAY: *0*
ENERGY: *HIGH*
*DAMPING: *1K* ohms
*PRR/PRF: *AUTO HIGH*
*ANGLE: *60* deg
ZERO: *N/A* msec
VOLTAGE: *N/A*

* FREQ: *2.0* MHz
* RECTIFY: *FULL WAVE*
DUAL: ☐ ON ☒ OFF
* REJECT: *0* %
* DISP. START: *IP*
DET: ☒ Peak ☐ Flank
TCG: ☐ ON ☒ OFF
* PULSER: *SPIKE*
PULSE WIDTH: *N/A*

REF. REFLECTOR: *ROMPAS FSDH* GAIN: *36.7* dB
AMPLITUDE: *40* % METAL PATH: *1.498*

CALIBRATION TIMES
INITIAL TIME: *0831* FINAL TIME: *1411*

VERIFICATION TIMES	1) *1128*	2) *N/A*	3) *N/A*	4) *N/A*	5) *N/A*	6) *N/A*	7) *N/A*	8) *N/A*	9) *N/A*

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS	WELD / ITEMS EXAMINED
	BIT-2

EXAMINER: *Jose Alejandro* LVL.: *II*
EXAMINER: *Jonathan W Keeton* LVL.: ~~*TRN*~~ *JWK 6-11-14* *III*
REVIEWER: *MATT WELCH* LVL.: *III* DATE: *8/12/14*

ANII: *Joe C. Hair* *Joe C. Hair*
DATE: *05/22/2015*
PAGE *4* OF *12 13*

ACCESS: FORMS DATABASE 06-14-11

mb 6/20/11

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-PZ183

PROJECT WBN UNIT/CYCLE 2/ 00
PROCEDURE: N-UT-19 REV: 18 TC: 11-01, 12-01

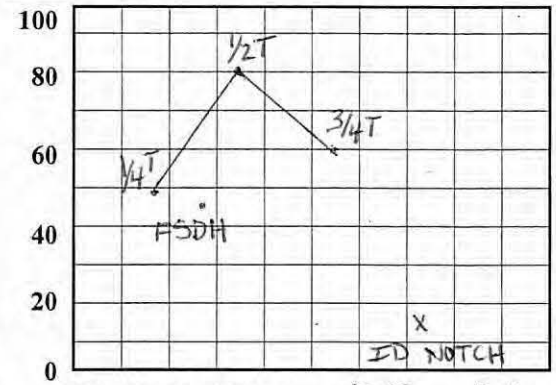
TRANSDUCER
MANUFAC RTD MODEL: TRL2-AUST
ELEMENTS: 2 SHAPE: RECTANGLE
S/N 10-1997 SIZE: 2(15x25) FREQ: 2 MHz
CONTOUR: N/A FOCUS: 50 FS
CABLE TYPE RG-174 LENGTH: 72" # CNT: 0
CONFIG ☒ D-SBS ☐ D-TANDEM ☐ SINGLE
MODE: ☐ SHEAR ☐ LONG ☒ RL

CALIBRATION DATE: 5-29-14
CALIBRATION BLOCK NO. WB 44 TEMP: 74.1 °F
SIMULATOR BLOCK: 790390
THERMOMETER S/N: 562779 DUE DATE: 6-24-14
COUPLANT: ULTRAGEL II BATCH: 11125

ANGLE VERIFICATION
BLOCK TYPE ROMPAS S/N: 790390
NOMINAL ANGLE: 60 RL ACTUAL ANGLE: 60 RL°

INSTRUMENT
MANUFACTURER: KRAUTKRAMER DUE DATE: 7-11-14
MODEL NO.: USN 60 S/N: E34779

DAC



DISPLAY WIDTH 5-5 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	57.6 dB	2IN 60 RL
CIRC.	☐	☒	57.6 dB	2IN 60 RL

RANGE: 5-5 inches
PROBE DELAY: 11.0322 msec
VELOCITY: .2238 msec
DISP DELAY: 0
ENERGY: HIGH
*DAMPING: 1K ohms
*PRR/PRF: AUTO HIGH
*ANGLE: 60 RL deg
ZERO: N/A msec
VOLTAGE: N/A

* FREQ: 2 MHz
* RECTIFY: FULLWAVE
DUAL: ☒ ON ☐ OFF
* REJECT: 0 %
* DISP. START: IP
DET: ☒ Peak ☐ Flank
TCG: ☐ ON ☒ OFF
* PULSER: SPIKE
PULSE WIDTH: N/A

REF. REFLECTOR: ROMPAS FSDH GAIN: 57.6 dB
AMPLITUDE: 45 % METAL PATH: 1.498

CALIBRATION TIMES
INITIAL TIME: 0842 FINAL TIME: 1402

VERIFICATION TIMES 1) 1132 2) N/A 3) N/A 4) N/A 5) N/A 6) N/A 7) N/A 8) N/A 9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1		100	90	80	70	60	50	40	30	20
	SIGNAL 2		50	45	40	35	30	25	20	15	10
ATTENUATOR	GAIN	SET	-6 dB		-12dB		SET		+12	SET	+6
	AMP	80%	32 TO 48		16 TO 24		20%		64 TO 96	40%	64 TO 96
			40		20				80		80

COMMENTS	WELD / ITEMS EXAMINED
	BIT-2

EXAMINER: Jose Alejandro Jose Alejandro LVL.: II
EXAMINER: Jonathan W Keeton JWK 6-11-14 Jonathan W Keeton LVL.: ~~TRN~~ II
REVIEWER: MATT WELCH Matt Welch LVL.: III DATE: 8/12/14

ANII: Joe C. Hair Joe C. Hair
DATE: 05/22/2015
PAGE 5 OF PZ13

mb 6/2/15

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- PZ183

PROJECT: WBN UNIT: 2
SYSTEM: SIS (063)
WELD I.D.: BIT 2
CONFIG: BOTTOM HEAD TO: SHELL
PROCEDURE: N-UT- 19 REV. 18 TC: 11-01, 12-01

Wo REFERENCE: ℄ OF WELD
Lo REFERENCE: VESSEL ID
SURFACE TEMP: 74-1 F
PYRO. SERIAL NO. 562779

EXAMINATION DATE: 5-29-14
START TIME: 0949 END TIME: 1155

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
N / A	60 RL	A-73.3 C-73.3 dB
	N / A	N / A dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N	N/A	N	N							N/A								

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
		1	60 RL				NO RECORDABLE INDICATIONS																	
		3	60RL				NO RECORDABLE INDICATIONS																	
		4	60RL				NO RECORDABLE INDICATIONS																	

REMARKS/LIMITATIONS: NO EXAM ON SHELL SIDE DUE TO CCSS MATERIAL. EXAMINATION WAS LIMITED AT L1-160 TO L2-2 AND L1-78 TO L2-~~83~~ 82 JA 6-24-14 DUE TO PROXIMITY OF THERMO WELL. SEE DRAWING ATTACHMENT.

EXAMINER: [signature] LEVEL: II
EXAMINER: [signature] LEVEL: IIL

MATT WELCH REVIEWED BY: [signature]
LEVEL: III DATE: 8/12/14

ANII JOEL C. HAIR [signature] 08/22/2015

TVA 19670B (NP 7/92)

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- P2183

PROJECT: WBN UNIT: 2
SYSTEM: SIS (063)
WELD I.D.: BIT 2
CONFIG: BOTTOM HEAD TO: SHELL
PROCEDURE: N-UT- 19 REV. 18 TC: 11-01, 12-01

Wo REFERENCE: ℄ OF WELD
Lo REFERENCE: VESSEL ID
SURFACE TEMP: 74.1 F
PYRO. SERIAL NO. 562779

EXAMINATION DATE: 5-29-14
START TIME: 0949 END TIME: 1155

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
N / A	45	A-45·4 C-49·4 dB
	60	A-45 C-49·8 dB
	N / A	N / A dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N	N/A	N	N	—	—	—	—	—	—	N/A		—						

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX) Mp1	W1	L1	50% Mp1	W1	L1	20% Mp1	W1	L1	MAX Mp	W	L	20% Mp2	W2	L2	50% Mp2	W2	L2	100% (1/2 MAX) Mp2	W2	L2
			0				NO RECORDABLE INDICATIONS																	
		1	45				NO RECORDABLE INDICATIONS																	
		3	45				NO RECORDABLE INDICATIONS																	
		4	45				NO RECORDABLE INDICATIONS																	
		1	60				NO RECORDABLE INDICATIONS																	
		3	60				NO RECORDABLE INDICATIONS																	
		4	60				NO RECORDABLE INDICATIONS																	

REMARKS/LIMITATIONS: 0° SCAN SENSITIVITY - 41·4 dB BASELINE LAMINATION SCAN.
NO EXAM ON SHELL SIDE DUE TO CCSS MATERIAL. EXAMINATION WAS LIMITED AT L1-160 TO L2-2 AND L1-78 TO L2-~~83~~ 82 DUE TO PROXIMITY OF THERMO WELL. SEE DRAWING ATTACHMENT.
JA 07-25-14

EXAMINER: [signature] LEVEL: II
EXAMINER: [signature] LEVEL: II L

MATT WELCH
REVIEWED BY: [signature]
LEVEL: III DATE: 8/12/14

ANII Joe. Hair
Joe C. Hair 08/12/2015

PAGE 7 OF 13

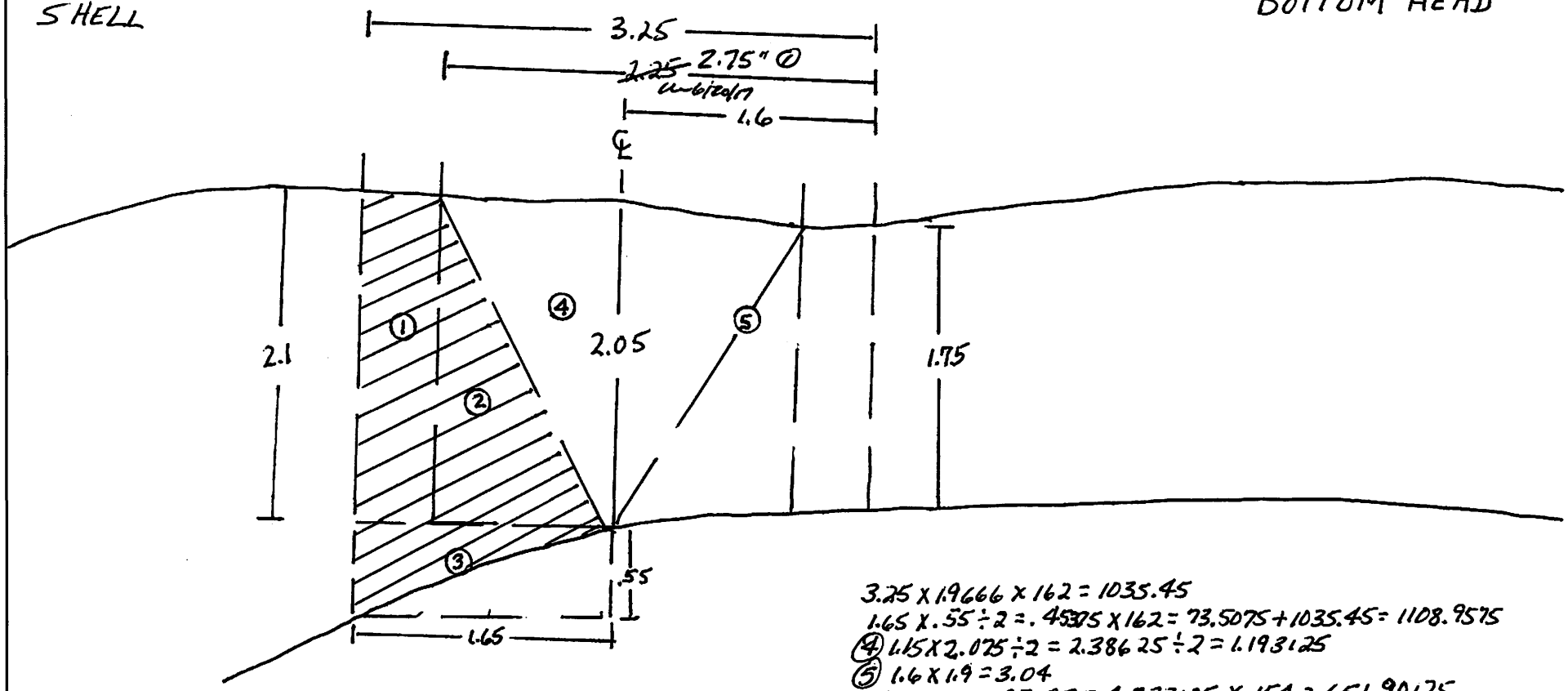
TVA 19670B (NP 7/92)

8/24/17

TVA Office of Nuclear Power	PROJECT: WBN SYSTEM: SIS (063) UNIT: 2 WELD NO: BIT-2	REPORT NO.: R-PZ183

SHELL

BOTTOM HEAD



No coverage

3.25 X 1.9666 X 162 = 1035.45
1.65 X .55 ÷ 2 = .45375 X 162 = 73.5075 + 1035.45 = 1108.9575
④ 1.15 X 2.075 ÷ 2 = 2.38625 ÷ 2 = 1.193125
⑤ 1.6 X 1.9 = 3.04
3.04 + 1.193125 = 4.233125 X 154 = 651.90125
651.90125 + 26.56 = 678.46125 ÷ 1108.9575 = .6118
.6118 X 100 = 61.18 %

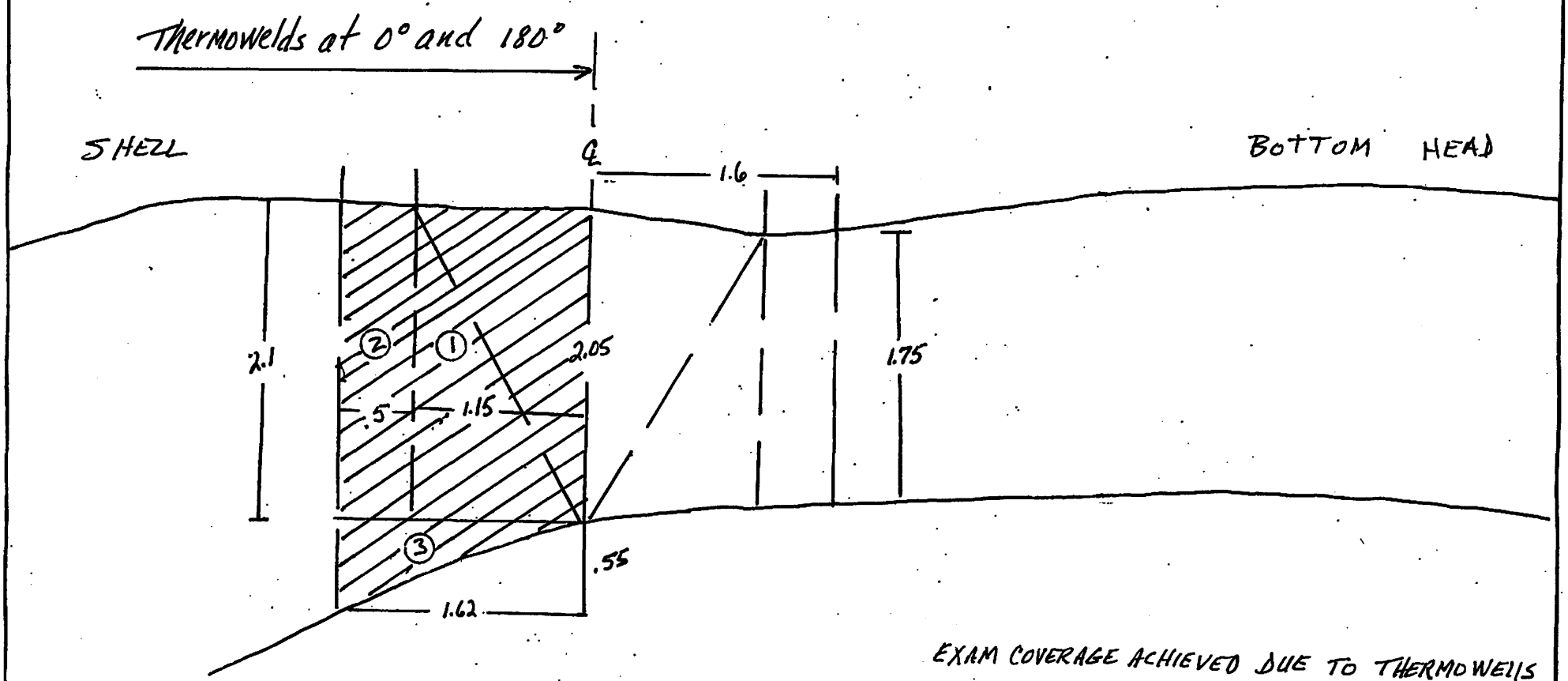
MATT WELCH LIII

& See page 13 of 13. 6/20/17

ANII for C. Hair waterless 6/20/17

BY: _____ LEVEL: II DATE: 6-11-14 PAGE 8 OF 13

TVA Office of Nuclear Power	PROJECT: WBN SYSTEM: SIS (063) UNIT: 2 WELD NO: BIT-2	REPORT NO.: R-PZ183



EXAM COVERAGE ACHIEVED DUE TO THERMOWELLS

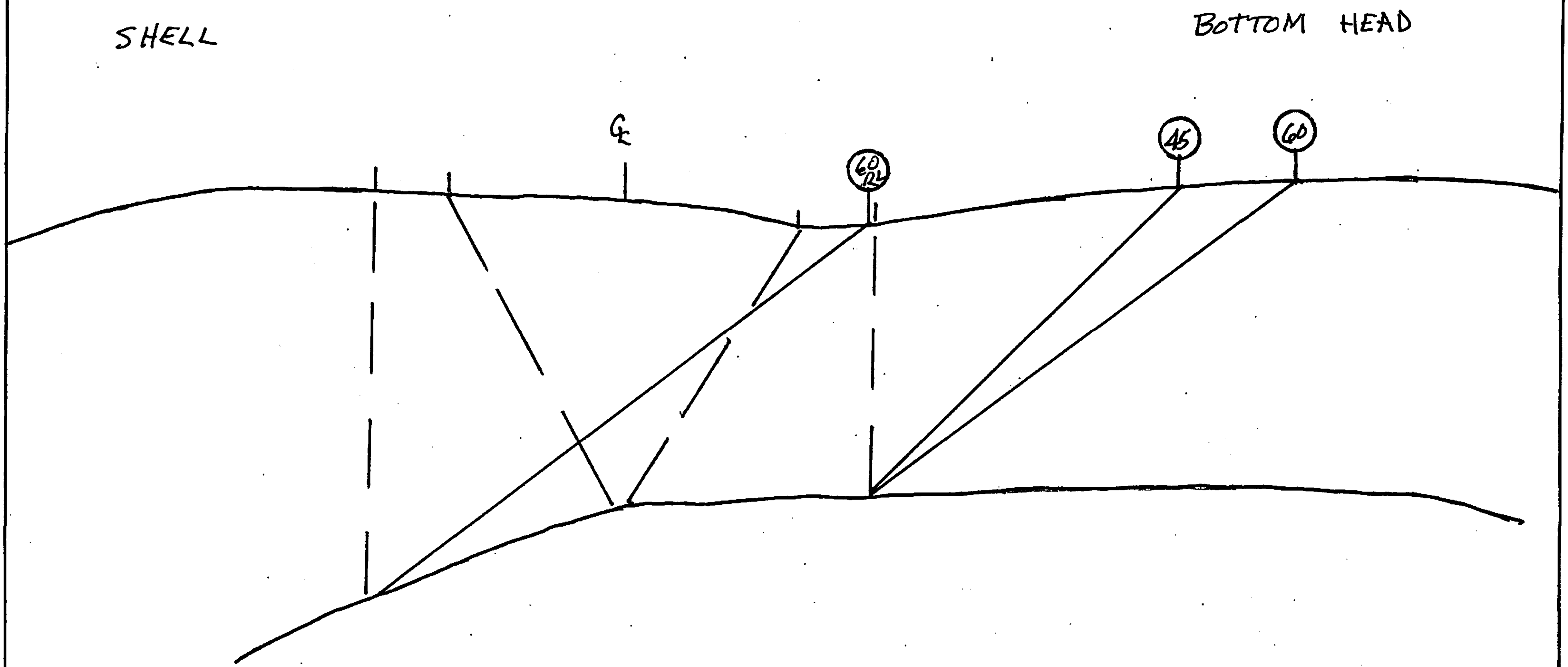
1.6 X 2.075 = 3.32 X 8 = 26.56

No coverage

ANII Joe C. Hair 6/22/15

BY:	LEVEL: II	DATE: 6-11-14	PAGE 9	OF 13

TVA Office of Nuclear Power	**PROJECT:** WBN **SYSTEM:** SIS (063) **UNIT:** 2 **WELD NO:** BIT-B2	**REPORT NO.:** R-P2183

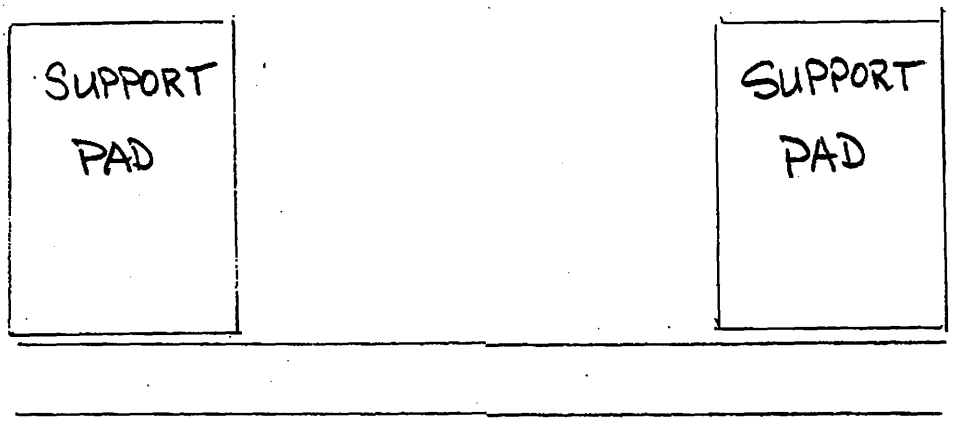


ANII Joe C. HAIR Joe C. Hair 05/22/2015

BY: [signature] **LEVEL:** II **DATE:** 6-11-14 **PAGE** 10 **OF** ~~18~~ 13

R-P2183

SHELL



BOTTOM HEAD

WELD WIDTH: 2.25"
WELD LENGTH: 162"

ANII Joe C. Hair Joe C. Hair 05/22/2015

Lv II 06-11-14 pg 13

TVA

WALL THICKNESS PROFILE SHEET

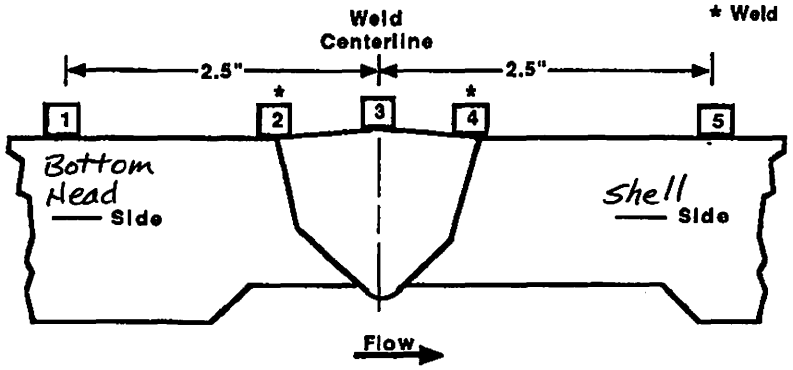
REPORT NO: R-PZ183

PROJECT: WBN
UNIT: 2

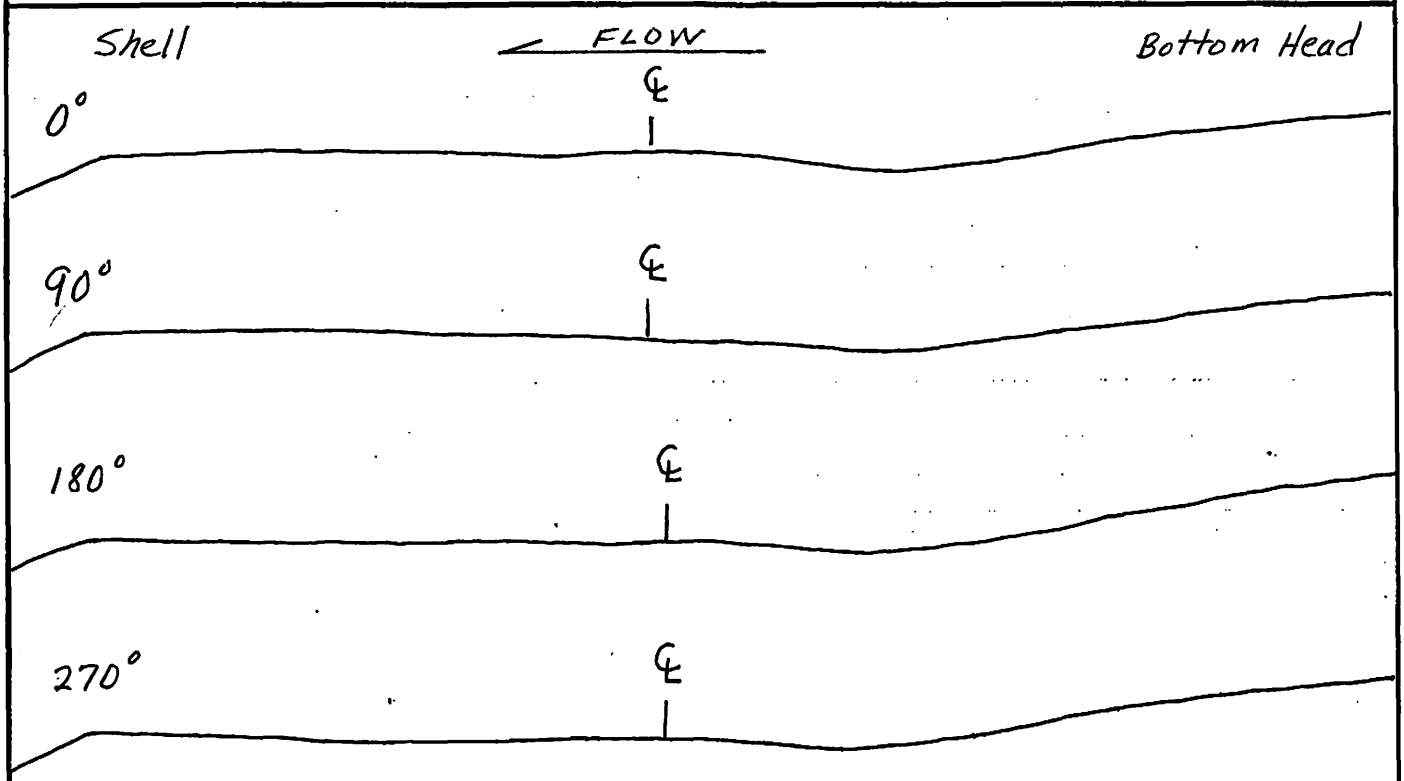
WELD NO: BIT 2
SYSTEM: SIS (063)

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	1.93	1.94	1.97	1.97
2	1.78	1.77	1.82	1.82
3	2.0	2.0	2.0	2.0
4	2.4	2.4	2.4	2.4
5	3.07	3.0	3.04	3.07



CROWN HEIGHT: FLUSH
CROWN WIDTH: 2.25
DIAMETER: 52
WELD LENGTH: 162



EXAMINER: [signature]
LEVEL: II
DATE: 06-10-14

MATT NEICH [signature]
REVIEWED BY:
LEVEL: III DATE: 6/12/14

ANII: JOE C. HAIR
Joe C. Hair
DATE: 05/22/2015

PAGE 12 OF 13

mbk 6/17

R-P2183

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1.

Reference CR: ~~1308~~ 1309817 6/12/17

Report: R-P2183/BIT-2

Corrected dimension on page 8.

RAI 3

Regarding component ID BIT-2, the rectangle labeled 1 on page 8 of 12 of R-P2183 lies between the 3.25 inch and 2.25 inch measurements corresponding to a width of 1 inch. Additionally, this would correspond to a width of 0.65 inches from the centerline to the near edge of this rectangle. On page 9 of 12, the rectangle labeled 2, which corresponds to rectangle 1 on the previous page, shows a width of 0.5 inches and the width between the rectangle and the weld centerline as 1.15 inches. Lastly, in accordance with figure IWC-2500-1 of ASME Code Section XI, the required examination volume extends half an inch from the end of the weld which would be in line with the measurements on page 9 of 12. Please verify that rectangle 1 on page 8 of 12 is in fact 0.5 inches in width and that the width labeled as 2.25 inches is actually 2.75 inches.

The 2.25"dimension on page 9 of 12 described above is incorrect. The correct dimension should be 2.75"and measures as such. This is supported through the coverage calculations shown on the referenced page. Review of these calculations show the correct value was used.

The report will be corrected to reflect the correct dimension of 2.75".

Matt Welch 6/20/17
MATT WELCH LIII

PG 13/13

Enclosure 5

Revised Coverage Report for SWIFLTR-62-96 (drawing R-P2373)

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: RP2373

PROJECT: *WBN* UNIT: *2* CYCLE *00*				COMPONENT ID: SWIFLTR-62-96	
EXAMINATION METHOD				SYSTEM: CVCS	ISI DWG NO: ISI-2062C-E-01
MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION:	CATEGORY
PROCEDURE: *N-UT-18*		REV 30	TC: N/A	HEAD TO SHELL	C-A

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
Jose Alejandro	Jonathan W Keeton	N	N
LEVEL: II	LEVEL: IIL	LEVEL: A	LEVEL: A

Total coverage calculated to be approximately ~~50%~~ 75% ①

AN ULTRASONIC EXAMINATION WAS PERFORMED ON THIS WELD CONFIGURATION TO MEET THE REQUIREMENTS OF ASME SECTION XI PRESERVICE INSPECTION.

A 45 DEGREE SHEARWAVE MODE WAS CALIBRATED AND USED TO PERFORM THE AXIAL SCANS AND CIRCUMFERENTIAL SCANS.

A 60 DEGREE REFRACTED LONGITUDINAL WAVE MODE WAS CALIBRATED AND USED TO PERFORM THE AXIAL SCANS FROM THE SHELL SIDE.

EXAMINATION WAS LIMITED TO ONE SIDE DUE TO COMPONENT CONFIGURATION.

NO RECORDABLE INDICATIONS OBSERVED.

~~50%~~ 75% EXAMINATION VOLUME COVERAGE CODE CREDITED.

6/20/17

CODE ITEM: C1.20

① See page 10 of 10. Matt Welch 6/20/17
MATT WELCH LIII

RESOLUTION BY:	REVIEWED BY:	ANII: Joe C. Hair
Jose Alejandro	Damon Priestley	Joe C. Hair
LEVEL II DATE: 10-22-14	LEVEL: III DATE: 11-11-14	DATE: 05/30/2015
		Page: 1 OF 10

ACCESS: FORMS DATABASE R-10/04/01

6/20/17

TENNESSEE VALLEY AUTHORITY

DIGITAL ULTRASONIC CALIBRATION DATA SHEET

REPORT NUMBER RP2373

PROJECT *WBN* UNIT/CYCLE *2/ 00*

PROCEDURE: *N-UT-* 18 REV: 30 TC: N/A

TRANSDUCER

MANUFAC KBA MODEL: COMP G

ELEMENTS: 1 SHAPE: ROUND

S/N 00DPPN SIZE: .25" FREQ: 2.25 MHz

CONTOUR: N/A FOCUS: N/A

CABLE TYPE RG-174 LENGTH: 72" # CNT: 0

CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE

MODE: ☒ SHEAR ☐ LONG ☐ RL

CALIBRATION DATE: 10-22-14

CALIBRATION BLOCK NO. WB 13 TEMP: 73.2 °F

SIMULATOR BLOCK: ROMPAS 790390

THERMOMETER S/N: E44481 DUE DATE: 12-18-14

COUPLANT: ULTRAGEL II BATCH: 11125E

ANGLE VERIFICATION

BLOCK TYPE ROMPAS S/N: 790390

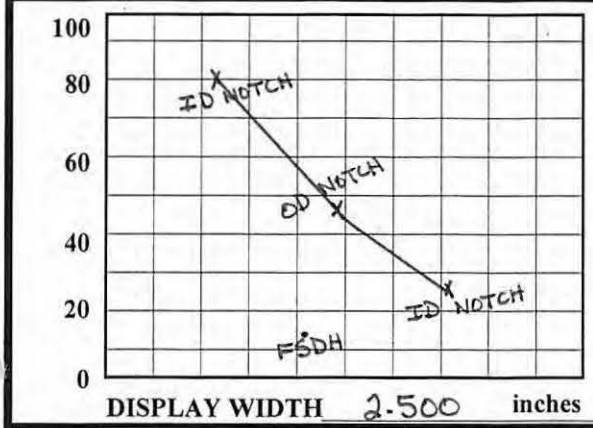
NOMINAL ANGLE: 45° ACTUAL ANGLE: 45 °

INSTRUMENT

MANUFACTURER: KRAUTKRAMER DUE DATE: 1-3-15

MODEL NO.: USN 60 S/N: E36305

DAC



DISPLAY WIDTH 2.500 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	32.4 dB	45° 25IN
CIRC.	N/A	N/A	N/A dB	N/A

RANGE: 2.500 inches

PROBE DELAY: 3.7516 msec

VELOCITY: .1207 msec

DISP DELAY: 0.000

ENERGY: HIGH

*DAMPING: 1K ohms

*PRR/PRF: AUTO HIGH

*ANGLE: 45 deg

ZERO: N/A msec

VOLTAGE: N/A

* FREQ: 2.25 MHz

* RECTIFY: FULLWAVE

DUAL: ☐ ON ☒ OFF

* REJECT: 0 %

* DISP. START: IP

DET: ☒ Peak ☐ Flank

TCG: ☐ ON ☒ OFF

* PULSER: SPIKE

PULSE WIDTH: N/A

REF. REFLECTOR: ROMPAS FSDH GAIN: 32.4 dB

AMPLITUDE: 14 % METAL PATH: 1.064

CALIBRATION TIMES

INITIAL TIME: 0850 FINAL TIME: 1132

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)
	1028	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS	WELD / ITEMS EXAMINED
	SWIFLTR-62-96

EXAMINER: Jose Alejandro LVL.: II

EXAMINER: Jonathan W. Keeton LVL.: II

REVIEWER: Damon Priestley LVL.: III DATE: 11-11-14

ANII: Joe C. Hair

DATE: 05/30/15

PAGE 2 OF 910

ACCESS: FORMS DATABASE 06-14-11

6/20/17

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R.P.2373

PROJECT *WBN* UNIT/CYCLE *2 / 00*
PROCEDURE: *N-UT-18* REV: 30 TC: N/A

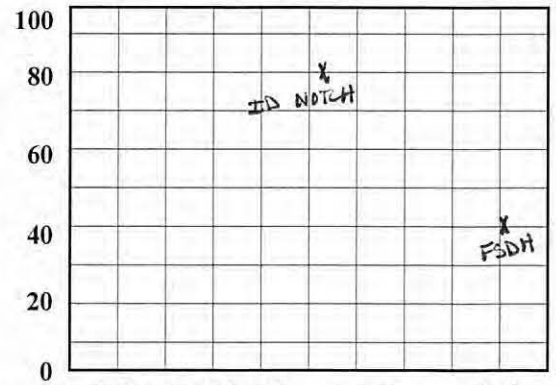
TRANSDUCER
MANUFAC KBA MODEL: COMP G
ELEMENTS: 1 SHAPE: ROUND
S/N 00DPPN SIZE: .25" FREQ 2.25 MHz
CONTOUR: N/A FOCUS N/A
CABLE TYPE RG-174 LENGTH: 72" # CNT:
CONFIG ☐ D-SBS ☐ D-TANDEM ☒ SINGLE
MODE: ☒ SHEAR ☐ LONG ☐ RL

CALIBRATION DATE: 10-22-14
CALIBRATION BLOCK NO. WB 13 TEMP: 73.2 °F
SIMULATOR BLOCK: ROMPAS 790390
THERMOMETER S/N: E44481 DUE DATE 12-18-14
COUPLANT: ULTRAGEL II BATCH: 11125E

ANGLE VERIFICATION
BLOCK TYPE ROMPAS S/N: 790390
NOMINAL ANGLE: 45° ACTUAL ANGLE 45 °

INSTRUMENT
MANUFACTURER KRAUTKRAMER DUE DATE 1-3-15
MODEL NO.: USN 60 S/N: E36305

DAC



DISPLAY WIDTH 1.150 inches

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	N	A	N A dB	N A
CIRC.	X		43.4 dB	CIRC 45

RANGE: 1.150 inches
PROBE DELAY: 3.7516 msec
VELOCITY: .1207 msec
DISP DELAY: 0.000
ENERGY: HIGH
*DAMPING: 1K ohms
*PRR/PRF: AUTO HIGH
*ANGLE: 45 deg
ZERO: N/A msec
VOLTAGE: N/A

* FREQ: 2.25 MHz
* RECTIFY: FULLWAVE
DUAL: ☐ ON ☒ OFF
*REJECT: 0 %
*DISP. START: IP
DET: ☒ Peak ☐ Flank
TCG: ☐ ON ☒ OFF
* PULSER: SPIKE
PULSE WIDTH: N/A

REF. REFLECTOR: ROMPAS FSDH GAIN: 43.4 dB
AMPLITUDE: 40 % METAL PATH: 1.0161

CALIBRATION TIMES
INITIAL TIME: 0904 FINAL TIME 1130

VERIFICATION TIMES 1) 1020 2) N A 3) N A 4) N A 5) N A 6) N A 7) N A 8) N A 9) N A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	SWIFLTR-62-96

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Jonathan W Keeton LVL.: II
REVIEWER: Damon Priestley LVL.: III DATE: 11-11-14

ANII: Joe C. Hair JOE C. HAIR
DATE: 05/30/2015
PAGE 3 OF 10

ACCESS: FORMS DATABASE 06-14-11

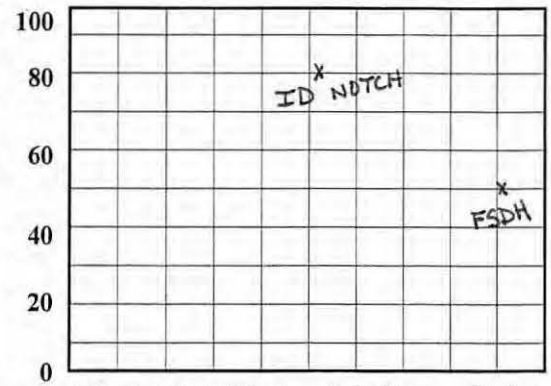
6/20/17

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R-P2373

PROJECT *WBN* UNIT/CYCLE *2/ 00*
PROCEDURE: *N-UT-* 18 REV: 30 TC: N/A

TRANSDUCER
MANUFAC RTD MODEL: TRL2-AUST
ELEMENTS: 2 SHAPE: RECTANGLE
S/N 99-431 SIZE: 2 (8X14) FREQ: 2 MHz
CONTOUR: N/A FOCUS: FS-20
CABLE TYPE RG-174 LENGTH: 72" # CNT: 0
CONFIG ☒ D-SBS ☐ D-TANDEM ☐ SINGLE
MODE: ☐ SHEAR ☐ LONG ☒ RL

DAC



DISPLAY WIDTH 1.600 inches

CALIBRATION DATE: 10-22-14
CALIBRATION BLOCK NO. WOB 13 TEMP: 73.2 °F
SIMULATOR BLOCK: ROMPAS 790390
THERMOMETER S/N: E44481 DUE DATE: 12-18-14
COUPLANT: ULTRAGEL II BATCH: 11125E

ANGLE VERIFICATION
BLOCK TYPE ROMPAS S/N: 790390
NOMINAL ANGLE: 60 RL ACTUAL ANGLE: 60RL°

INSTRUMENT
MANUFACTURER: KRAUTKRAMER DUE DATE: 1-3-15
MODEL NO.: USN 60 S/N: E36305

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTC	SDH		
AXIAL	☒	☐	65.9 dB	60RL 2 MHZ
CIRC.	N/A ☐	☐ A	N / A dB	N / A

RANGE: 1.600 inches
PROBE DELAY: 8.9062 msec
VELOCITY: .2286 msec
DISP DELAY: 0.000
ENERGY: HIGH
*DAMPING: 1K ohms
*PRR/PRF: AUTO HIGH
*ANGLE: OFF deg
ZERO: N/A msec
VOLTAGE: N/A

* FREQ: 2.0 MHz
* RECTIFY: FULLWAVE
DUAL: ☒ ON ☐ OFF
* REJECT: 0 %
* DISP. START: IP
DET: ☒ Peak ☐ Flank
TCG: ☐ ON ☒ OFF
* PULSER: SPIKE
PULSE WIDTH: N/A

REF. REFLECTOR: ROMPAS FSDH GAIN: 50.8 dB
AMPLITUDE: 50 % METAL PATH: 1.470

CALIBRATION TIMES
INITIAL TIME: 0924 FINAL TIME: 1135

VERIFICATION TIMES	1) 1015	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

***PDI QUALIFIED INSTRUMENT SETTINGS:**
VERIFY INSTRUMENT SETTINGS AND CALIBRATION SEQUENCE ARE IN ACCORDANCE WITH TABLE 2 OF THE APPLICABLE PDI QUALIFICATION IMPLEMENTATION PROCEDURE!

LINEARITY CHECK

VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	

ATTENUATOR	GAIN	SET	-6 dB	-12dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20%	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS	WELD / ITEMS EXAMINED
	SWIFLTR-62-96

EXAMINER: Jose Alejandro LVL.: II
EXAMINER: Jonathan W Keeton LVL.: II
REVIEWER: Damon Priestley LVL.: III DATE: 11-11-14

ANII: Joe C. Hair Joe C. HAIR
DATE: 05/30/2015
PAGE 4 OF 9/10

ACCESS: FORMS DATABASE 06-14-11

6/20/17

TENNESSEE VALLEY AUTHORITY

MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET

REPORT NO. R- P2373

PROJECT: WBN UNIT: 2
SYSTEM: CVCS (062)
WELD I.D.: SWIFLTR-62-96
CONFIG: HEAD TO: SHELL
PROCEDURE: N-UT- 18 REV. 30 TC: N/A

Wo REFERENCE: WELD ℄
Lo REFERENCE: IN LINE 3/4" VENT LINE
SURFACE TEMP: 76.7 F
PYRO. SERIAL NO. E44481

EXAMINATION DATE: 10-22-14
START TIME: 1016 END TIME: 1026

CAL. SHT. NO.	ANGLE	SCAN SENSITIVITY
N	45°	Ax-43.4 CIRC-49.4 dB
A	60 RL	Ax-65.9 dB
	N/A	N/A dB

RESULTS: (SCAN NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDICATION RECORDED (Y/N)	N/A	N	N	N															

IND NO	MAX AMP	SCAN NO	ANG	100% (1/2 MAX)			50%			20%			MAX			20%			50%			100% (1/2 MAX)		
				Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
		2	45°			NO	RECORDABLE INDICATIONS																	
		3	45°			NO	RECORDABLE INDICATIONS																	
		4	45°			NO	RECORDABLE INDICATIONS																	
		2	60RL			NO	RECORDABLE INDICATIONS																	

REMARKS/LIMITATIONS: NO SCAN 1 DUE TO CONFIGURATION. 60 RL SCANNED WITH BASELINE NOISE AT 10% FSH. NO RECORDABLE INDICATIONS.

EXAMINER: Jose Alejandro LEVEL: II
EXAMINER: Jonathan W Keeton LEVEL: IIL

REVIEWED BY: Damon Priestley
LEVEL: III DATE: 11-11-14

ANII Joe C. Hair 05/30/2015

PAGE 5 OF 10

TVA 1961 (NP 7/92)

4/24/2015

TVA

WALL THICKNESS PROFILE SHEET

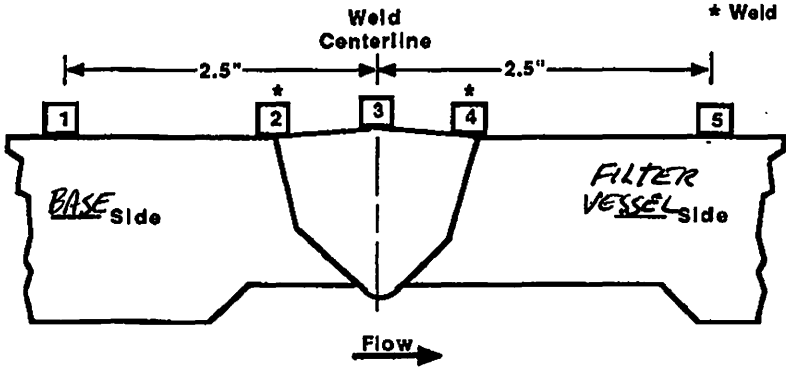
REPORT NO: R-P2373

PROJECT: WBN
UNIT: 2

WELD NO: CVCS-SWIFLTR-62-96 (2B)
SYSTEM: CVCS

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	.432	.439		
2	.470	.444	N	A
3	.525	.526		
4	*	*		
5	*	*		

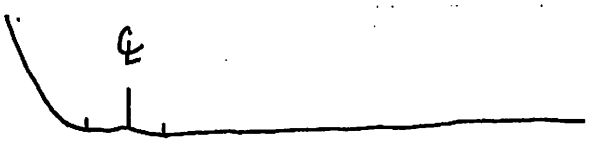


CROWN HEIGHT: .0625
CROWN WIDTH: .40
DIAMETER: 4.0
WELD LENGTH: 13.375

BASE BOTTOM HEAD — FLOW → — FILTER VESSEL

.75 inch socket weld vent side profile

2.0 inch outlet/inlet side profile



* No thickness reading taken due to bottom head configuration

EXAMINER: [signature] II
LEVEL:
DATE: 10-22-14

REVIEWED BY: [signature]
LEVEL: III DATE: 11-11-14

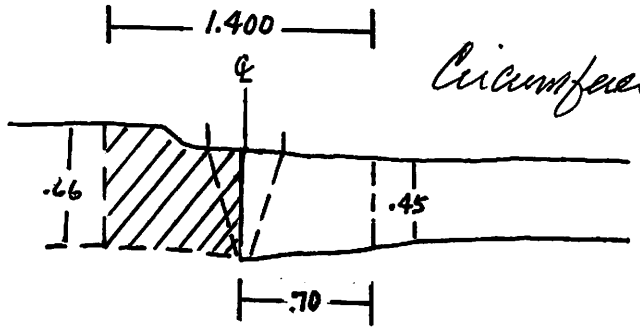
ANII: Joe C. Hair
Joe C. Hair
05/30/2015
DATE:

PAGE 6 OF 9 10

mb 12/17

TVA Office of Nuclear Power	PROJECT: WBN SYSTEM: CVCS (062) UNIT: 2 WELD NO: CVCS-SWIFLTR-62-96-2B	REPORT NO.: RPJ373

BASE HEAD — FLOW → — FILTER (VESSEL)



Circumferential coverage in 6/20/17 ①

W X H X L

1.4 X .55 X 13.375 = 10.29875 X 4 = 41.195

.7 X .55 X 13.375 = 5.149375 X 4 = 20.5975

20.5975 ÷ 41.195 = .5 X 100 = 50% CODE COVERAGE

.77 x 13.375 = 10.29875

10.298

10.298

~~5.70~~ 5.149

~~5.70~~ 5.149

~~31.996 ÷ 41.195 = .7775 = 77.75% EXAM COVERAGE SCANS~~ in 6/20/17

① 30.894/41.195 = .7499 = 74.99%

Matt Welch 6/20/17
MATT WELCH (TTE

① See page 10 of 10

ANII: Joe C. Hair Joe C. Hair 05/30/2017

BY: Joe Clayton LEVEL: II DATE: 10-22-14 PAGE 7 OF 10

Rev 6/20/17

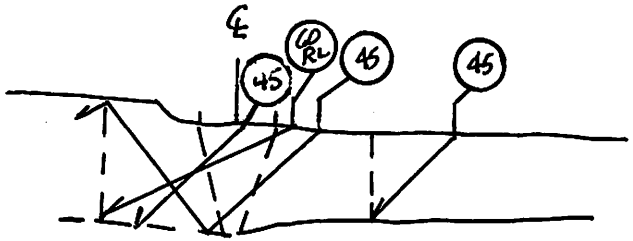
TVA Office of Nuclear Power	PROJECT: WBN SYSTEM: CVCS (062) UNIT: 2 WELD NO: CVCS-SWIFLTR-62-96-2B	REPORT NO.: R-P2373

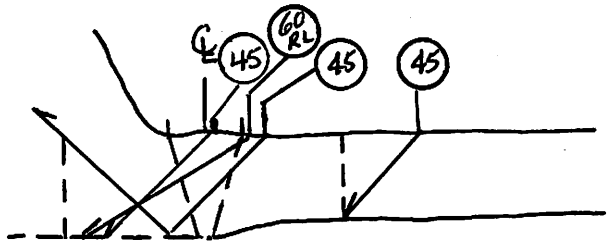
BASE HEAD

FLOW →

FILTER (VESSEL)

AXIAL Coverage w 6/20/17①





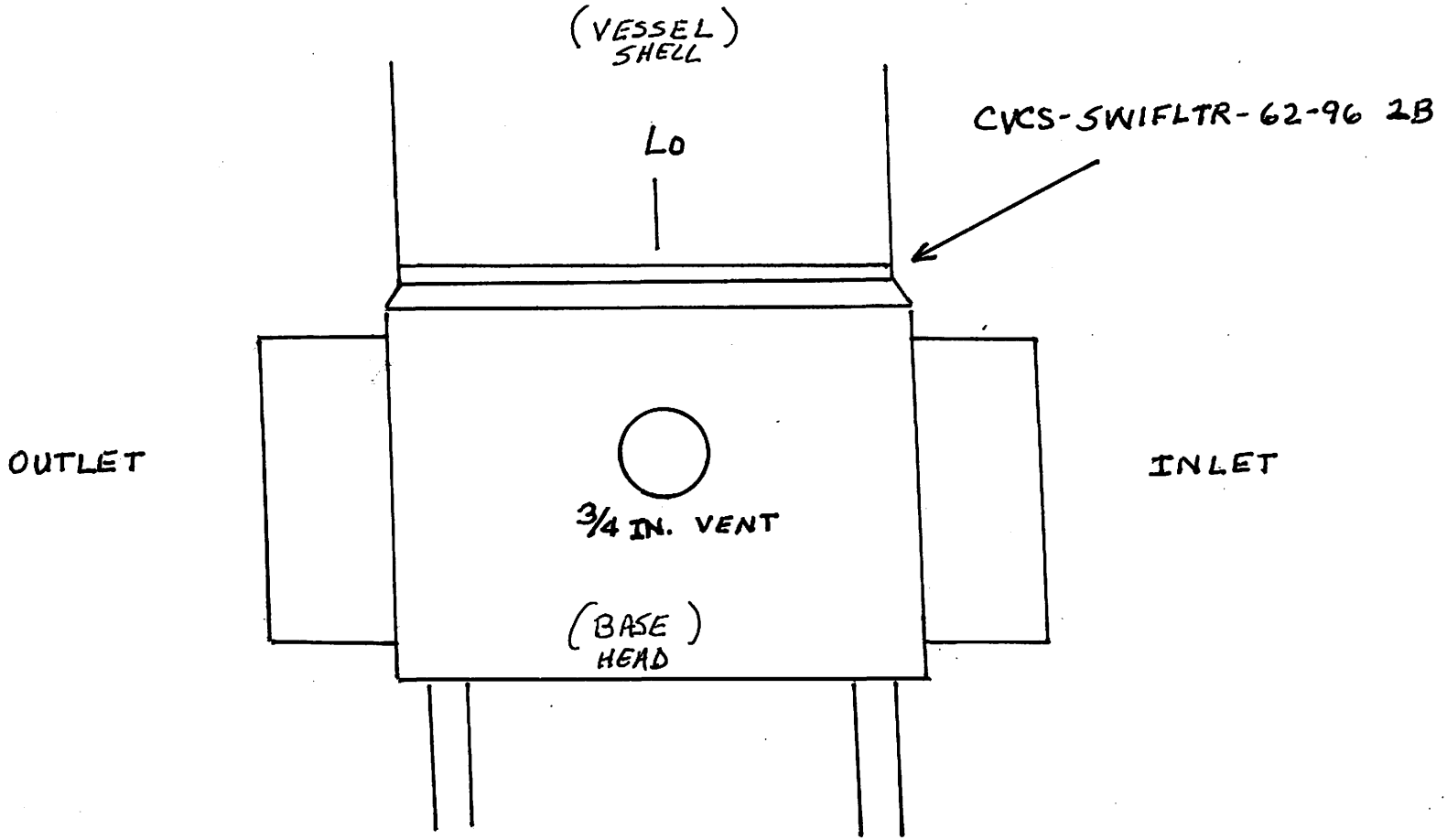
① See page 10/10

ANII: Joe S. Hall Joe S. Hall 05/30/2015

BY: [signature] LEVEL: II DATE: 10-22-14 PAGE 8 OF 10

w 6/20/17

TVA Office of Nuclear Power	PROJECT: WBN SYSTEM: CVCS (062) UNIT: 2 WELD NO: CVCS-SWIFLTR-62-96 2B	REPORT NO.: R.P0373



ANDE: Joe C. Hair Joe C. Hair 05/30/2015

BY: (_____ LEVEL: (II DATE: 10-22-14 PAGE 9 OF (10

w-6/24/15

R-P2373

This report was amended due to NRC RAIs associated with Relief Request WBN-1/PSI-1 Revision 1.

Reference CR: 1309817

Report: R-P2373/SWFILTR-62-96

Changed coverage to 75%. Amended pages 7 and 8.

Regarding component ID SWIFLTR-62-96, the figure and associated calculations on page 7 of 9 of R-P2373 depict 50% coverage of the ASME code required examination area. The final calculations on that page report 77.75% exam coverage and that is what was reported in Table 1 of the licensee's submittal. Please confirm if 50% of the required exam coverage was examined using a qualified procedure and if the reported 77.75% coverage refers to additional exam coverage obtained but cannot be credited due to the qualification of the examinations.

The 50% value shown on page 7 of ~~9~~ 10 w-6/20/17 represents the circumferential examination coverage obtained during the examination. This examination was conducted in accordance with ASME Section XI, 2007 Edition/2008 Addenda, Mandatory Appendix III.

The calculated coverage provided is in error. Actual coverage should be 75%.

The calculations resulting in the obtained coverage of 75% are obtained as follows:

- Taking 100% calculated examination volume for scan in the axial directions (i.e. 10.298 cubic inches).
    - Coverage obtained through the use of bi-directional coverage using the 1/2 Vee and full Vee sound paths in accordance with ASME Section XI, 2007 Edition/2008 Addenda, Mandatory Appendix III, III-4420. Reference page 8 of 9 for axial coverage

- Taking 50% calculated examination volume coverage for scan in the circumferential directions (i.e. 5.15 cubic inches)
    - One half of the required examination volume obtained in the clockwise and counterclockwise directions.

Documentation will be corrected to reflect corrected values and for clarification of the circumferential and axial scans depictions.

Matt Welch 6/20/17
MATT WELCH LEO

pg 10/10

Enclosure 6

Drawing ISI-2001-E-01, Revision 3

REFERENCE DRAWINGS

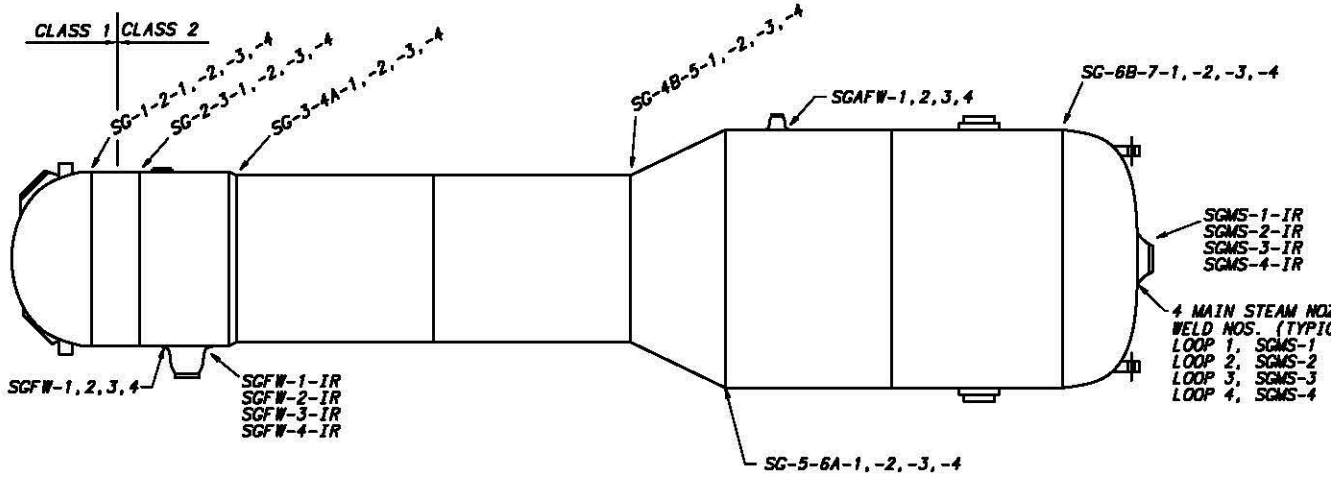
47W813-1
VENDOR MANUAL - WBN-VTM-W120-0640
717J362
1099J32
1099J34
1099J36
1100J81
1101J50
1102J82 (LOOP 4)
1102J83 (LOOP 3)
1102J84 (LOOP 2)
1102J85 (LOOP 1)
ISI-2068-W (REACTOR COOLANT PIPING)

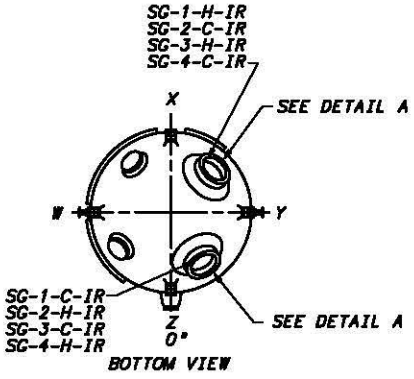
MATERIAL SPECIFICATIONS

CHANNEL HEAD
SA-216 GR. WCC
SHELL
SA-533 GR. A CL. 2
SHELL INCLUDES:
ELIPTICAL HEAD
UPPER SHELL
TRANSITION CONE
LOWER SHELL

NOTE:
FOR ACTUAL HEAD AND SHELL THICKNESS SEE BASELINE DATA.

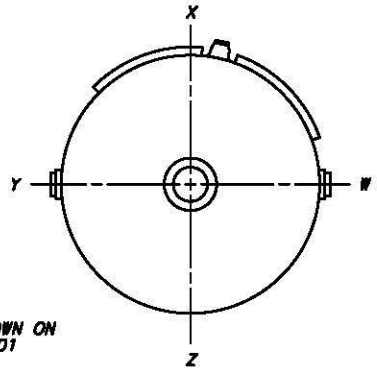
ASME CC-1, CC-2 (EQUIVALENT)



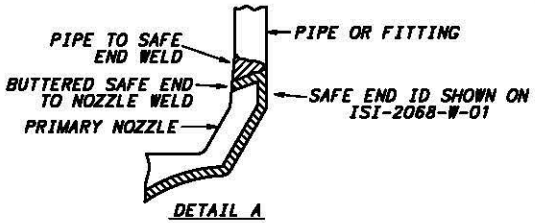


BOTTOM VIEW

LOOPS 1&3 AS SHOWN
LOOPS 2&4 OPPOSITE HAND



TOP VIEW



DETAIL A

THE PIPE TO SAFE END WELD AND SAFE END TO NOZZLE WELD IS IDENTIFIED AS ONE WELD AND CATEGORIZED AS ASME SECTION XI EXAM CATEGORY B-F, DISSIMILAR METAL WELD

NOTES:
1. THIS ISI DRAWING IS BASED ON THE DESIGN AND CLASSIFICATION OF THE BOUNDARIES OUTLINED ON THE WBN UNIT 2 FLOW DIAGRAMS TO ESTABLISH THE BASIS FOR THE INTERRELATIONSHIP WITH TVA CLASSIFICATION OF COMPONENTS AND ASME SECTION XI INSPECTION ACTIVITIES AS DESCRIBED IN TECHNICAL POSITION TP-1, OF WBN-2 PRESERVICE INSPECTION PROGRAM PLAN.
2. LONGITUDINAL SEAMS ARE EXEMPT FROM EXAMINATION, AND ARE EXCLUDED FROM THIS DRAWING FOR CLARITY.

REV.	BY	CHECKED	SUBMITTED	APPROVED	DATE
03	PHB	N/A			
ADD REFERENCE DRAWINGS					
02	PHB	N/A	ERB	BTM	10-30-14
RELOCATE CLASS 1/2 BREAK					
01	PHB	N/A	JTL	DT	6-4-10
ADD REFERENCE DRAWINGS					

TENNESSEE VALLEY AUTHORITY

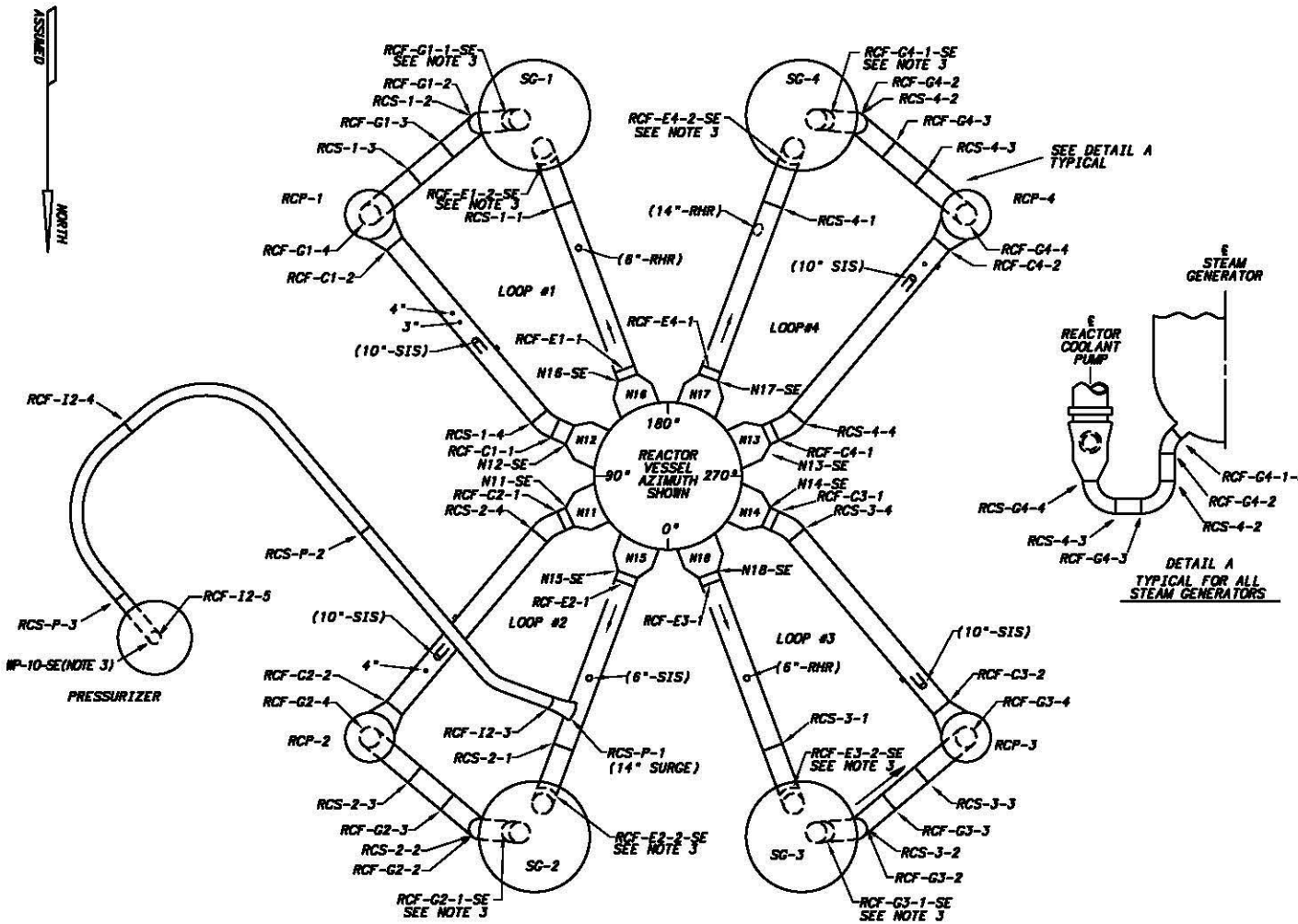
WATTS BAR NUCLEAR PLANT UNIT 2

STEAM GENERATOR

DRAWN: PHB	DATE: 04-12-2010	SCALE: NOT TO SCALE	
CHECKED: N/A	APPROVED: DT	CAD MAINTAINED DRAWING	REV
SUBMITTED: JTL	ISI-2001-E-01		03

Enclosure 7

Drawing ISI-2068-W-01, Revision 6



TYPICAL COLD LEG 45° BRANCH CONNECTION

NOTES:
1. THIS ISI DRAWING IS BASED ON THE DESIGN AND CLASSIFICATION OF THE BOUNDARIES OUTLINED ON THE WBN UNIT 2 FLOW DIAGRAMS TO ESTABLISH THE BASIS FOR THE INTERRELATIONSHIP WITH TVA CLASSIFICATION OF COMPONENTS AND ASME SECTION XI INSPECTION ACTIVITIES AS DESCRIBED IN TECHNICAL POSITION TP-1, OF WBN-2 PRESERVICE INSPECTION PROGRAM PLAN.
2. FOR BRANCH CONNECTION WELDS SEE SHEET 2.
3. SEE REFERENCE DRAWING ISI-2001-E-01 (6) FOR DETAILS OF STEAM GENERATOR SAFE-END WELDS.
4. FOR NXX-SE & RCF-XX-1 WELD DETAILS SEE DRAWINGS ISI-2068A-E-16 (OUTLET) AND ISI-2068A-E-17(INLET)

REFERENCE DRAWINGS

SK.304-2 SHEETS 1 THRU 12

30738.1510 SH.2

AD-21401, 21404, 21405, 21406, 21407

FSK-M-1758
FSK-M-1759
FSK-M-1760
FSK-M-5420
FSK-M-6308
FSK-M-6483

Ⓦ WBT2281-1 THRU -13

CHM-2566-SERIES (OLD DRAWING)

MATERIAL SPECIFICATIONS

PRESSURIZER SURGE LINE
NOM. PIPE SIZE-14"
SCH. 160 SA-376 SML'S

HOT LEG
29"ID, 2.33" M.W.
SA351 CF-8A

CROSSOVER LEG
31"ID, 2.48" M.W.
SA-351 CF-8A

COLD LEG
27.5"ID, 2.21" M.W.
SA-351 CF-8A

BRANCH CONNECTIONS
8" SCH. 160 SA 403 WP 304S
10" SCH. 140 SA 403 WP 316 W/S
14" SCH. 140 SA 403 WP 316 S

ASME CC-1 (EQUIVALENT)

REV.	BY	CHECKED	SUBMITTED	APPROVED	DATE
06	PHB	N/A			
REVISE NOTE 3 CORRECTING SHEET NUMBER					
05	PHB	N/A	SN	JMH	6-8-17
REVISE NOTE 3, CLARIFY SAFE-END WELD ID'S, ADD NOTES TO SG -SE'S					
04	PHB	N/A	ERB	BTM	8-7-15
REVISE REFERENCE DRAWINGS					
03	PHB	N/A	ERB	BTM	6-12-14
ADD VESSEL ORIENTATION SHOWN, ASSUMED NORTH DIRECTION AND CHANGE RCF-F4-1-SE TO -G4-					
02	PHB	N/A	ERB	BTM	3-20-14
ADD REFERENCE DWGS, AZIMUTH LOCATIONS, NOTE 4, CORRECT NOTE 3					
01	PHB	N/A	LMC	DT	5-8-09
CHANGE RCF-E4-2-SE TO RCF-E3-2-SE, RCF-E5-2-SE TO RCF-E4-2-SE					

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT UNIT 2

REACTOR COOLANT SYSTEM PIPING 068(RCS) - WELD LOCATIONS

DRAWN: PHB	DATE: 1-22-09	SCALE: NOT TO SCALE	
CHECKED: N/A	APPROVED: DT	CAD MAINTAINED DRAWING	REV
SUBMITTED: ELM	ISI-2068-W-01		06

Enclosure 8

Procedure N-UT-33

NPG Nondestructive Examination Procedure	**MANUAL ULTRASONIC EXAMINATION OF STATIC AND CENTRIFUGALLY CAST STAINLESS STEEL PIPING WELDS** W47 150313 001	**N-UT-33** **Rev. 0013** **Page 1 of 14** Quality Related ☑ Yes ☐ No Effective Date 03-16-2015

Level of Use: Reference Use

Prepared by: Frank C. Leonard

Reviewed by:	Jason M. Barrick for Matt Welch Matt Welch, NDE LIII UT	03-13-2015 Date
Approved by:	Jane M. Lockwood Jane Lockwood, Prog. Mgr. Ops/ISO	03-13-2015 Date

Revision or Change Number	Approval Date	Description of Revision/Change
0	1/10/89	Initial Issue.
1	6/1/89	General revision to incorporate PCRs 89-21 and 89-39 and editorial changes.
2	8/1/89	Change in code year for WBN; change exam volume requirements.
3	8/27/90	Revised to incorporate TC 90-35; updated references; added Exhibit D.
4	6/3/91	Revised paragraph 2.3 and Figure 2
5	5/27/92	Title change; updated to ASME XI 1986 Edition requirements; removed generic requirements now contained in N-GP-18, incorporated TC 92-03.
6	11/22/93	Revised to incorporate TC 93-32.
7	2/20/96	Revised to update to the 1989 edition of ASME Section XI; incorporated TC 95-30.
8	8/15/97	Incorporate TC 96-08.
9	1/24/03	Revised to update to the 1995 Edition with 1996 Addenda of ASME Section XI.
10	09/01/06	Revised to update to the 2001 Edition through 2003 Addenda Section XI. Incorporate TC 03-05.
11	7/31/08	General revision to incorporate TC 06-28, and converted to TVA Procedure Template. EDMS W47 080801 010
12	03/11/14	General Revision to incorporate 2004 Edition of Section XI and the 2010 Edition of Section V. EDMS W47 140310 001
13	03/16/15	Revised to incorporate PER 892287 action. Added introductory paragraph to Section 9.0 and deleted note in 9.0A. EDMS W47 150313 001

Table of Contents

1.0 SCOPE

A. This procedure defines the methods, equipment, and technique requirements for manual contact ultrasonic examination of static or centrifugally cast stainless steel piping welds, heat affected zone (HAZ), and base material.

B. Non-cast adjoining base material (e.g., ferritic, stainless steel) shall be examined utilizing an Appendix VIII qualified procedure.

C. The requirements of this procedure are limited to full penetration welds in piping systems having a nominal wall thickness of 0.50 to 4.0 inches with an outside diameter greater than 20 inches.

D. The types of welds which may be examined using this procedure include, but are not limited to, circumferential welds in piping systems, including pipe to pipe, pipe to valve, pipe to fitting, pipe to pump, pipe to nozzle, pipe to safe end, and pipe to branch connection.

E. Examinations shall be performed from the outside surface of the component(s) utilizing longitudinal wave search units.

F. This procedure shall be used in conjunction with Reference 2.0C.

2.0 REFERENCES

A. Section XI of the ASME Code, 2001 Edition through the 2004 Edition as amended by 10CFR50.55a.

B. Section V of the ASME Code, 2010 Edition.

C. N-GP-18, “Ultrasonic Testing Supplements”.

D. N-GP-21, “Evaluation and Resolution of Ultrasonic Data”.

E. N-GP-8, “Weld Reference System”.

F. N-GP-31, “Calculation of ASME Code Coverage for Section XI”.

G. N-GP-6, “Preparation of NDE Data Sheets”.

NOTE

Supplement 9 of Appendix VIII of ASME Section XI cites the qualification requirements for Cast Austenitic Piping as being “in the course of preparation”. Based on this status, the procedure is written to comply with the requirements of Appendix III, as supplemented by Table I-2000-1.

3.0 PERSONNEL

Personnel qualification requirements are contained in Reference 2.0C.

4.0 EQUIPMENT

A. Ultrasonic Instrument

A pulse echo ultrasonic instrument shall be used. The instrument shall be equipped with a stepped gain control calibrated in units of 2 dB or less. Analog or digitized units may be utilized. Krautkramer-Branson models USN-50, USN-52, USN-60, USK-7D, and Phasor meet these requirements. Other instruments may be used provided they meet the requirements of a satisfactory calibration.

B. Angle Beam Search Units

1. A nominal frequency of 1.0 megahertz (MHz) shall normally be used. The frequency shall be selected based on optimum sensitivity and resolution of the ID notch.

2. The maximum sized search unit sizes for circular, square, or rectangular active elements shall not exceed those listed in Table 4.0. Larger search unit sizes may be used with Level III approval for wall thicknesses greater than 2-inches provided successful calibration is achieved in accordance with paragraph 6.0.

TABLE 4.0

MAXIMUM NOMINAL SEARCH UNIT SIZES

Wall Thickness Nominal, in.	Maximum Nominal Size, in.
.5 to 2.0	.5

NOTE

For dual element search units used in the pulse receiver mode, the dimension applies to each individual element.

3. A beam angle at the opposite surface of the basic calibration block shall be at least 35 degrees.

4. Search units with contoured wedges may be used to aid ultrasonic coupling. Calibration shall be accomplished with the same search unit and wedges to be used during examination. The use of contoured wedges shall be documented on the calibration data sheet.

5. Transducer bandwidth, damping, and center frequency certification documentation shall be maintained for each transducer utilized.

4.0 EQUIPMENT (continued)

6. The focal depth (FD) or focal sound distance (FS) of the dual element transducers shall be selected to maximize the converging sound beam at the ID surface within 25%. Other transducer FD/FS may be used provided the angle is verified from a signal at the thickness being examined and as approved by a Level III.

> **EXAMPLE**
>
> For a 3-inch thick pipe, the FD should be between 2.25 and 3.75-inches or for a 45-degree the FS should be between 3.25 and 5.25 inches.

7. Longitudinal waves are limited to a 1/2 Vee path technique.

8. Search units wedges or shoes may be either integral or non-integral in design.

C. Coaxial Cables

The maximum length of cable shall be 25 feet, types RG-174 or RG-58 with no more than 1 intermediate connector.

D. Standard Reference Block

Reference blocks (i.e., Rompus, IIW, and DSC) utilized for sweep range calibration should be of similar (i.e., austenitic) metallurgical structure as the component under examination.

5.0 BASIC CALIBRATION BLOCKS

A. Requirements

1. The basic calibration block shall be made from material of the same wall thickness within 25% of the component to be examined. As a minimum, the block thickness shall be of a size sufficient to contain the entire examination path.

2. For calibration blocks for examination surfaces with diameters greater than 20 in., one of the following shall be applied

   a. A calibration block of essentially the same curvature as the examination surface; or

   b. A single curved calibration block to calibrate the examination for surfaces in the range of curvature from 0.9 to 1.5 times the calibration block diameter; or

3. Similar metal weld calibration blocks shall be fabricated from one of the materials being joined. Material of similar chemical analysis, tensile properties and metallurgical structure may be used if material of the same specification is not available.

5.0 BASIC CALIBRATION BLOCKS (continued)

NOTE

Where the examination is to be performed from only one side of the joint, the calibration block material shall be of the same specification as the material on that side of the joint.

4. Surface finish of the block shall be representative of the surface finish on the component to be examined.

5. Basic calibration blocks shall contain circumferential and longitudinal notches whose sides are perpendicular to the surface, at least 1.0 in. long, on the ID surface with a depth of 10% t. Block design shall generally conform to the design shown in Reference 2.0C.

6.0 CALIBRATION

A. Instrument Calibration

1. Instrument calibration for screen height and amplitude control linearity shall be verified and recorded at the beginning and end of the weld examinations performed during one outage. The technique for evaluating screen height and amplitude control linearity is contained in Reference 2.0C.

2. Reject of clipping controls shall be set in the off or minimum position for calibration and examination.

B. System Calibration

1. General Requirements

a. Calibration shall include the complete ultrasonic examination system. Any change in search units, shoes, couplants, cables, ultrasonic instruments, recording devices, or other parts of the examination system shall be cause for calibration check. The original calibration shall be performed on the basic calibration block. Calibration checks may be performed on either the basic calibration block or a simulator block, but must include a check of the entire examination system.

b. The maximum calibration indications shall be obtained with the sound beam oriented essentially perpendicular to the axis of the calibration reflector. The centerline of the search unit shall be as least 3/4 inch (19 mm) from the nearest side of the block or pipe. Block corner (edge) reflectors shall not be used for calibration.

c. Complete ultrasonic examination system calibration shall be performed within one day prior to use of the system for examination of those welds for which the calibration is applicable, and at least once each week during the examination.

6.0 CALIBRATION (continued)

d. The temperature difference between the examination and basic calibration block surfaces shall not exceed 25-degrees F. The temperature of the calibration block and the component temperature shall not exceed 125-degrees F. The calibration block temperature shall be recorded on the ultrasonic calibration data sheet.

e. Obtain the angle beam paths as required to detect reflectors parallel and transverse to the weld per paragraphs 7.0F1 and 7.0F2 respectively, on the sweep display. Variables such as weld preparation, weld crown width, or physical interference may preclude obtaining two beam path direction coverage of the complete examination volume with half-V examination from two sides.

NOTE

Interference may be eliminated or reduced by: 1) reducing the dimension of the wedge edge-to-beam entry point; 2) reducing search unit size; 3) increasing the beam angle; 4) conditioning the weld surface.

C. System Calibration Checks

A system calibration check, which is the verification of the instrument sensitivity and sweep range calibration, shall be performed:

1. at the start and finish of each examination;

2. at intervals not to exceed 12 hours;

3. With any change in examination personnel, except when using automated equipment

4. An unsatisfactory system calibration check requires corrective action as identified in Reference 2.0C.

D. Angle Beam Sweep Reference Sensitivity Calibration

As a minimum, a 45-degree (+/- 3 degrees) nominal refracted longitudinal wave examination shall be conducted; other angles may be utilized to enhance the examination process. The search unit beam exit point shall be determined and the beam angle shall be measured using the basic calibration block.

1. <u>Sweep</u>

a. Position the search unit on a reference block or the basic calibration block. Maximize the responses from the applicable reflectors. Adjust these responses on the screen to represent the desired linear sound path in inches.

6.0 CALIBRATION (continued)

b. The desired linear sound path shall be such that the ID notch reflector is displayed at approximately five horizontal screen divisions on the screen. Record the calculated screen range.

2. Reference Sensitivity

a. Primary reference sensitivity is established by setting the maximum response to 80% FSH from the circumferential ID notch for an axial scan.

b. Primary reference sensitivity is established by setting the maximum response to 80% FSH from the axial ID notch for a circumferential scan.

7.0 EXAMINATION

A. Preliminary Requirements

1. Surface Condition

a. Examination surfaces shall be free of irregularities, loose foreign material, or coatings which interfere with sound transmission to the point of test degradation. The weld crown should be ground flush where practical to provide adequate search unit coupling for maximum examination coverage.

b. Thickness measurements and ID/OD profiles should be performed on each weld prior to examination. This information shall be recorded on the wall thickness profile sheet.

B. Scanning Sensitivity

Scanning shall be performed, as a minimum, at twice the primary reference sensitivity (+6 dB) unless test variables beyond the control of the operator, e.g., material noise levels causing signal-to-noise ratios of less than two, preclude meaningful results. In general, a material noise level of 10-25 percent is optimum for proper sensitivity adjustment. In no case shall the average baseline noise level exceed 30 percent FSH and shall not be less than 10 percent FSH.

C. Scanning Speed

Scanning speed shall not exceed three inches per second.

D. Scan Path Overlap

The required examination volume shall be scanned with beam overlap. While scanning, the search unit shall be oscillated approximately $\pm$ 20 deg. If oscillation is not possible, the search unit shall be overlapped at least 50%.

Enclosure 9

Procedure ISwT-PDI-AUT11

AUTOMATED INSIDE SURFACE ULTRASONIC EXAMINATION OF PIPING WELDS USING PHASED ARRAY

Revision 1

Change 0

Supersedes Previous Revision/Changes? [X] Yes [ ] No

Prepared by: Jesse R. Delgado Date: 4/24/08

Technical Review: Date: 4/24/08

Approved by: Director of Operations Date: 29 April 2008

LIST OF EFFECTIVE PAGES

Pages	Revision/Change	Date
ii	1/0	April 2008
1 - 29	1/0	April 2008

AUTOMATED INSIDE SURFACE ULTRASONIC EXAMINATION OF PIPING WELDS USING PHASED ARRAY

1. SCOPE

(1) This procedure is applicable for automated examination of austenitic and dissimilar metal (DM), full penetration piping welds, and adjacent base material from the inside surface utilizing a phased array contact technique.

(2) The objective of examinations performed in accordance with this procedure is to accurately detect and length size service-induced discontinuities within the specified volume from the inside surface of the component.

(3) This procedure is applicable to the diameter and thickness ranges listed below in Table 1.

Table 1
Range of Application

Configuration	Material	Demonstrated	Ranges
Nozzle to safe end (DM)	low alloy carbon steel nozzle forging clad with stainless steel/Ni-Cr-Fe alloy or stainless steel weld/forged stainless steel safe end	Min. Dia.: 27.5" (699mm) Max. Dia.:29" (737mm)	Min. Dia.: 24" (610mm) Max. Dia.: None
		Min. Thick.: 2.40" (61mm) Max. Thick.: 2.93" (74mm)	Min. Thick.: 1.80" (46mm) Max. Thick.: 3.66" (93mm)
Nozzle to pipe (DM)	low alloy carbon steel nozzle forging clad with stainless steel/Ni-Cr-Fe alloy or stainless steel buttering/Ni-Cr-Fe alloy or stainless steel weld/statically cast stainless steel elbow, or centrifugally cast stainless steel pipe	Min. Dia.: 27.5" (699mm) Max. Dia.: 29" (737mm)	Min. Dia.: 24" (610mm) Max. Dia.: None
		Min. Thick.: 2.40" (61mm) Max. Thick.: 2.93" (74mm)	Min. Thick.: 1.80" (46mm) Max. Thick.: 3.66" (93mm)
Safe end to pipe end (austenitic)	Forged stainless steel safe end/statically cast stainless steel elbow, or centrifugally cast stainless steel pipe	Min. Dia.: 27.5" (699mm) Max. Dia.: 29" (737mm)	Min. Dia.: 24" (610mm) Max. Dia.: None
		Min. Thick.: 2.34" (59mm) Max. Thick.: 2.54" (65mm)	Min. Thick.: 2.24" (45mm) Max. Thick.: 3.04" (81mm)

(4) This procedure has been demonstrated in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, Appendix VIII, Supplements 2 and 10, as modified by the Performance Demonstration Initiative (PDI) program description. This demonstration was also conducted in accordance

with the requirements of the Federal Register, Part II, Nuclear Regulatory Commission, 10 CFR Part 50, Industry Codes and Standards; Amended Requirements; For the latest approved revision see: www.epriq.com / program status.

(5) This procedure has been demonstrated by scanning the inside surface of both field and shop weld configurations containing inside surface counter-bore, weld root, and smooth surface conditions.

(6) This procedure is qualified for dual side access only. Examinations shall be performed from both sides of the flaw when access is available. When access is limited, the examination shall be performed from the accessible side to the extent possible.

(7) This procedure is not qualified for detection or sizing of flaws from the cast side of dissimilar metal welds. This is covered under Supplement 9 of Appendix VIII and it is presently in course of preparation.

(8) This procedure is not qualified for length sizing of axial flaws.

(9) This procedure is not qualified for depth sizing of ID connected flaws.

(10) This procedure has not been demonstrated to detect, size, or characterize embedded flaws; however, guidance is provided in Paragraph 7.8.

2. REFERENCES

(1) ASME Boiler & Pressure Vessel Code, Section XI, Appendix VIII. For the latest code year references see: www.epriq.com/program status.

(2) Federal Register, Part II, Nuclear Regulatory Commission, 10 CFR Part 50, Industry Codes and Standards; Amended Requirements. For the latest approved revision see: www.epriq.com / program status.

(3) Code Case N-696 Qualification Requirements for Appendix VIII Piping Examinations Conducted from the Inside Surface

(4) ISwT Quality Assurance Program Manual

(5) ISwT Examination Plan (As developed for each specific site)

(6) ISwT OP 2.0-NDES-001, "Nondestructive Examination Personnel Qualification and Certification"

(7) ISwT OP 9.0-NDES-002, "Control of PDI Qualified Procedures"

(8) PDI Table 1 Document

(9) ISwT OP 11.0-NDES-001, "Software Control"

(10) ISwT OP ISwT-NDE2, "Ultrasonic Linearity Measurements"

(11) 7.0-NDES-003, "Receiving Inspection of Phased Array Probes"

(12) ISwT-PDI-AUT-12, "Automated Inside Surface Ultrasonic Flaw Depth Sizing of Piping Welds Using Phased Array" (Latest Revision)

3.0 PERSONNEL

(1) The ISwT Data Analyst shall be a Level III or Level II qualified for detection and length sizing in accordance with ASME Section XI, Appendix VIII, Supplement 10 of Section XI, as implemented by PDI, and shall be certified in accordance with ISwT OP 2.0-NDES-001.

(2) The Data Analyst shall be responsible for assuring that acquired data meets the technique requirements and quality standards specified within this procedure. The Data Analyst shall be responsible for evaluating the examination results and for assuring that all analysis requirements identified in this procedure have been met. The Data Analyst shall be responsible for final verification and approval of the data acquisition system setup.

(3) UltraVision III System Data Acquisition Operators who perform data acquisition in accordance with this procedure shall be qualified and certified in accordance with ISwT OP 2.0-NDES-001.

(4) Equipment Operators, who perform scanner installations, scanner positional verifications, and scanner operation shall be qualified and certified in accordance with ISwT OP 2.0-NDES-001.

4. EQUIPMENT

Data Acquisition System

An UltraVision III PA 32/128 (T-III) automated data acquisition system having a valid manufacturer's calibration package shall be used in conjunction with UltraVision Software Release 1.1 Q5. The hardware configuration of the TOMO-III unit shall be as described in Table 2 below and the essential TOMO-III software settings are listed in Tables 4 and 5. ISwT relies on ZETEC's software and hardware configuration control processes to assure that essential variables (including essential parameters) are controlled such that future revisions of hardware and software shall not contain changes to any of the parameters, which have an adverse effect on the sensitivity and accuracy of the signal amplitude and timeout outputs, of

the software or hardware displayed, recorded, or automatically processed. Later versions of the UltraVision Software, and the TOMO III hardware may be used provided that they meet the requirements of the ZETEC hardware and software configuration control processes.

Table 2
TOMO III PA Configuration Hardware

ZETEC	Position	Description	Revision	Essential Par.
EQTX046B	N/A	voltage switcher	0	Yes
EQTX134A-001	9	analog piggy board	H12,3	Yes
EQTX159B-004	9	utomo 12 bits board	6	Yes
EQUX114D	1	pulser/receiver board	12	Yes
EQUX114D	2	pulser/receiver board	12	Yes
EQUX114D	3	pulser/receiver board	12	Yes
EQUX114D	4	pulser/receiver board	12	Yes
EQUX138B	8	tcr-500 cpu board	5	Yes
EQUX143D	8	tcr-500 mother board	10	Yes
EQUX152A	N/A	temperature sensor	1	Yes
EQUX167D	5	delay receiver board	13	Yes
EQUX167D	6	delay receiver board	13	Yes
EQUX169D	5	delay board	4	Yes
EQUX169D	6	delay board	4	Yes
EQUX203E	4	pulser/receiver board	2	Yes
EQUX203E	1,3	pulser/receiver board	2	Yes
EQUX222B	10	mim/hub/clock board	13	Yes
EQUX226A	N/A	encoder board	8	Yes
EQUX228A	N/A	backplane board	9	Yes
EQUX247A-001	N/A	reg. board ±12vdc dc output	HO,1	Yes
EQUX231B	N/A	PIM 351	1	Yes

4.2 Search Units

The search unit parameters are described in Table 3 below. The search units that have been qualified for examination in accordance with this procedure are listed in the PDI Table 1 for this procedure.

Table 3
Search Unit Parameters

ISwT Probe Model Number	PA22-001	BI-72-2FP
Examination Zone	Transverse/Circumferential Flaws	Surface Profilometry
Manufacturer and Model No.	GE 115-000-253	Britek BI-72-2FP
Array	Integral linear side by side dual search unit	Conventional
Wedge	28.5°	0° Profilometry
Roof Angle	6°	N/A
Wedge Material	Rexolite	N/A
Wedge Material Velocity	.0922/in/usec	N/A
Array Material Type	Composite	K-85
Ceramic Volume %	30 %	N/A
Number of Elements	22 (11 transmit and receive)	1
Element Size	22 ea. - 0.315" x 0.069"	.50"
Element Shape	Rectangular	Round
Pitch	0.071"	N/A
Width (Elevation)	0.315" (active) 0.365" (inactive)	N/A
Spacing (Kerf)	0.002"	N/A
Center Frequency	1.50 MHz	5.0 MHz
Bandwidth	>30%	>30%
Propagation Mode	Longitudinal	Longitudinal
Contact Surface	1.25" x 1.375"	Immersion Probe

4.3 Focal Law Acquisition File Creation

Focal laws producing sound beam angles ranging from 60° to 88° at 2° increments and the sound beams are focused at 2.0 inches in depth shall be used for these examinations. The focal laws are also integrated into Tomoscan III master data acquisition (.acq) files described in 5.1. The original focal law (.law) parameter files shall be maintained in the ISwT procedure qualification file.

4.4 Cables

The cable type(s) and maximum length(s) and the maximum number of connectors are specified in Figure 1. The maximum cable length identified may be exceeded by one foot to allow for cable manufacturer tolerances.

4.5 Reference Blocks

An IIW reference block of the same or similar material containing a 1.0" and 4.0" radius at least 2.0" wide shall be used for measuring angles, exit points, establishing system delay and reference sensitivity. The 4.0" radius shall be used to establish system delay and reference sensitivity.

4.6 Couplant

Reactor-grade water shall be used when performing data acquisition system verifications and examinations in accordance with this procedure.

4.7 Thermometer

The thermometer to be used for measuring temperatures shall display a valid calibration sticker. Many times the component to be examined is not accessible for temperature measurements. In these cases the examiner shall contact the Reactor Control Room to obtain the RPV temperature prior to examination to assure the temperature does not exceed the requirements of Paragraph 5.7.

4.8 Attenuator

A Kay Elemetric Model 860 attenuator shall be used for profilometry amplitude adjustment to assure the signal amplitude is not saturated. The attenuator shall display a valid calibration sticker. Other manufacturer attenuators may be used provided the db range is sufficient to assure the surface response is not saturated during the examination.

4.9 Scanners

An encoded scanner capable of providing accurate position information shall be utilized. The scanner shall be capable of performing scan and indexing movements as required by this procedure. In addition, the scanner shall have the ability to provide adequate force to keep the search units coupled to the component surface.

4.10 Module Configuration

Reference Figure 2 for the module configuration and Phased Array Probe search unit offset information. The zero degree profilometry probe center shall be adjusted to match the 60-degree search unit sound exit point of the towards/away probes. For transverse scanning the zero degree profilometry probe center shall be adjusted to match the geometric center of the phased array probes. This module was the actual module design used for qualification. Modifications to this model having an affect on the gimbaling of the search units are not allowed without re-demonstration.

4.11 Substitution of Equipment

Substitution of equipment is permitted provided that the equipment is of the same manufacturer and model or series as those specified. Pulsers, receivers, or search units may be replaced without re-qualification provided that they meet the requirements of ASME Section XI, Appendix VIII, and Article 4000. Additionally, replacement phased array probes shall also meet the requirements of Procedure 7.0-NDES-003, "Receiving Inspection of Phased Array Probes." This procedure contains additional receipt inspection processes and shall be used for acceptance of new replacement phased array probes.

5.0 SYSTEM OPERATION

5.1 Master Acquisition Files

The master acquisition files listed below shall be used to establish the T-III operational settings during the PDI qualification process and subsequent field examinations. These master acquisition files contain the software settings that control the system operation. These files shall be controlled under ISwT OP 11.0-NDES-001.

DM_Pipe_ID_0_CW_180_CCW_Skew.acq
DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

5.2 Phased Array Probe Active Element Verification

After equipment setup and prior to and after a series of examinations, an active element verification shall be performed on each phased array probe. The element check files, 1-128-elementcheck01.acq shall be loaded. The file will display the UT responses for TOMO_III pulser-receivers 1-128 and indicate the performance of each element. The elements in each array shall be verified as follows:

(1) The uncorrected sectorial scan should now display all 128 elements associated with this file; however, only 44 elements will display evidence of ultrasound activity from the search unit wedge because only two probes can be connected at any one time.

(2) The examiner shall manually dampen each side of the array (transmit/receive) to assure the cables are connected properly. If the examiner dampens the transmit side of the array, the responses from transmitting elements shall also dampen. This same process shall be performed for the receiving elements. If the responses are reversed, this indicates that the probe or cable connector has been wired incorrectly and the affected component shall not be used.

(3) Place the probe on a block with a known reflector. Move the probe over the reflector such as to encompass the reflector's echo dynamic range. Adjust the gain as necessary to assure adequate response for each element without signal saturation. Each element should demonstrate echo-dynamics.

Observe the UT signal characteristics from each element, on the uncorrected sectorial scan plane and A-Scan presentations. A non-active element will appear similar to focal laws 65 through 128 which is the bank of elements not used and will demonstrate no echo-dynamics. (If more than two non-active elements are observed on an individual transmitting or receiving array, then the probe shall be replaced. In addition, the examiner shall identify any elements that appear to have a reduced signal response as compared to the other elements within the array. Elements that are noted to have a 6 dB reduction in amplitude from the adjacent elements in general area of the wedge (similar metal path to wedge interface) shall be considered inactive.

(4) The active element checks shall be documented on the calibration record.

5.3 Ultrasonic Linearity Measurements

Prior to system sensitivity performance verification, screen height and amplitude control linearity shall be performed in accordance with ISwT OP ISwT-NDE2, "Ultrasonic Linearity Measurements."

5.4 Search Unit Exit Point and Angle Verification

The master PDI acquisition file shall be used for measuring the actual refracted angle. A reference block in accordance with Paragraph 4.5 shall be used.

(1) Load the appropriate data acquisition file. The file will display the ultrasonic responses for each focal law. Select the 60° focal law for verification.

(2) Maximize the signal from the 4.0 or 1.0-inch radius using the 60° focal law and set each response to 80% +/- 5% FSH.

(3) Mark the exit point on the probe casing for each angle.

(4) Measure the refracted angle for each focal law.

(5) The refracted angle shall be within 3 degrees of focal law selected or the probe shall be replaced.

5.5 Initial Time Base Verification

Prior to examination, initial time base performance verification shall be performed on a reference block reflector within examination area.

A 60 º focal law shall be used to determine the required time base in both the axial and circumferential direction utilizing the criterion specified below:

The minimum time base shall encompass the code volume in depth. The maximum time base shall be the anticipated thickness of the component for circumferential flaw detection scanning.

The maximum time base shall be 2.0 inches in true depth for transverse flaw detection scanning.

The examiner shall perform adjustments in order to establish the system delay using instructions.

(1) Set the receiver scale type to linear and the time base mode set to half path.

(2) The 60° focal law shall be used to establish system delay.

(3) Maximize the amplitude from the 4.0" radius and adjust the amplitude response to between 50% and 80% FSH.

(4) Adjust the probe delay until the system digital readout corresponds as 4.0". Slight variations in the read out are allowed within the A-Scan resolution of the system. Document the channel gain, metal path, and amplitude on the calibration record for each focal law.

(5) Set the receiver scale type to "Log" and reset the channel gain to zero.

(6) Re-measure the metal path and maximum amplitude from the 4.0"radius and record it on the calibration data sheet. This accounts for the system delay changes realized from the two different amplifiers. The recorded metal path distance, amplitude, and gain measured in this step shall be used as the basis for subsequent system performance verifications and is also the reference sensitivity for the examination.

(7) The Data Analyst shall review the measurements taken in steps 3 - 6 for accuracy. The Data Analyst shall adjust the settings as required.

5.6 Initial 0° Immersion Profilemetry Time Base and Amplitude Verification

(1) The verification shall first be performed in the "Log" mode, full screen height and in true depth. The 0° time base range shall be set to a minimum range of 3.0 inches in depth. It may be necessary to recycle the **In Wedge** field in the **Probe Tab** for accurate range and A-scan scale correlation.

(2) The 0° immersion probe shall be mounted in a 1.5 inch stand off module and placed on the calibration reference block.

(3) The measured time to the first entry surface reflection shall be 1.5 inches. The "Wedge Delay" shall be adjusted as required to read 1.5 inches. The gain setting, metal path distance (measured in depth), and amplitude shall be documented on the calibration record.

(4) The Data Analyst shall review the measurements taken in above steps for accuracy. The Data Analyst shall adjust the settings as required.

5.7 Temperature

The temperature of the reference block shall be within 25°F of the component temperature. The maximum examination temperature shall not exceed 120°F.

5.8 Calibration Record

As a minimum, the following data shall be recorded on the appropriate calibration record:

(1) Calibration record identification number and date of calibration

(2) Name of examination personnel

(3) Examination procedure number and revision

(4) TOMO-III serial number

(5) UltraVision software revision

(6) Master calibration file identification

(7) Reference block identification

(8) Couplant

(9) Initial time base readings and system sensitivity performance verification amplitude information

(10) Times of initial and subsequent performance verifications

(11) Search unit identification and information listed in Section 4.2

(12) Search unit cable type and length, and number of connectors

(13) Component and reference block temperatures

(14) Essential variable settings

(15) Beam Orientation with respect to the pipe (TWD, AWY, CCW, and CW), Angles, and mode of propagation

6.0 EXAMINATION

The specific areas to be examined and the detailed requirements for each examination will be listed in the ISwT Examination Plan (See Figure 4). The coordinate and reference system shall also be detailed in the ISwT Examination Plan. Additionally, the following general examination requirements shall be met.

6.1 Examination Volume and Coverage

(1) Figure 3 depicts the volume.

(2) The examination volumes shown in Figure 3 shall be examined from four orthogonal directions (i.e., two parallel and two perpendicular).

(3) Limitations to the examination volume shall be documented in the examination report.

(4) A scan plan shall be developed for each examination (See Figure 4). The scan plan, at a minimum, shall contain the following information:

(a) Search units to be used
(b) Offset dimensions
(c) Scan start and stop positions in both the X and Y directions
(d) Scan Identification.
(e) Acquisition set-ups to be utilized
(f) Search unit orientation with respect to the component.
(g) Additional instructions from the analyst (Supplemental data requested)

6.2 Surface Condition

The contact surface shall be free from weld spatter, coatings, roughness, or other conditions that interfere with free movement of the search unit or impair the transmission of ultrasound.

6.3 Scanning/Data Acquisition Requirements

(1) Data acquisition shall be performed in Log mode with a focal law gain of 14.0 dB.

(2) Data acquisition shall be performed with the scanner moving circumferentially and indexing axially for both axial and circumferential flaws. Beam direction will be parallel (0º, 180º) to the weld for axial flaws and perpendicular (90º, 270º) to the weld for circumferential flaws.

(3) The search unit movement rate shall not exceed 2 inches per second for circumferential flaw detection.

(4) The search unit movement rate shall not exceed 1.5 inches per second for transverse flaw detection.

(5) Scanning shall be performed bi-directionally. A unidirectional sequence type shall be performed if the data collected using a bi-directional sequence provides unsatisfactory contact or sound transmission efficiency in either the forward or backward scan directions.

(6) The maximum scanning resolution for detection of circumferential flaws shall not exceed 0.10 inch per data point.

(7) The maximum scanning resolution for detection of axial flaws shall not exceed 0.05 inch per data point.

(8) The maximum increment resolution for detection of circumferential flaws shall be 0.15 inches.

(9) The maximum increment resolution for detection of axial flaws shall be 0.05 inches.

(10) The maximum digitizer resolution shall be .04 inches.

(11) Other essential parameters and system settings are detailed in Tables 4 and 5.

6.4 Scanning Sensitivity

Data acquisition shall be performed at the system sensitivity established by the master acquisition file. The "log" mode allows the T-III acquisition system to utilize the dynamic gain range of amplifier. A "Focal Law" gain of plus 14dB shall be used for acquisition. Profilometry sensitivity shall be set to prevent saturation of signals during examinations. An inline attenuator shall be used for this purpose.

6.5 Subsequent Performance Verifications

After system performance has been initially verified and documented, subsequent system performance verifications shall be in accordance with Paragraphs 5.2 and 5.5. Subsequent system performance verifications shall be conducted:

(1) Prior to a series of examinations.

(2) After any interruption in system continuity (e.g., activation of new examination setups, search unit change outs, cables, pulser/receiver change outs, etc.).

(3) After any instance of suspected system irregularity identified by the system operator or qualified Data Analyst.

(4) Upon completion of a series of examinations.

If a time base verification shows that a reference signal has changed more than 10% of the time base:

(1) The results of the performance verification shall be noted in the data for examinations performed since the last valid verification.

(2) Any flaw indications identified since the last valid time base verification shall be re-examined.

(3) Any examinations, which failed to cover the examination volume, shall be reexamined.

If any system sensitivity verification shows that a reference signal has increased in amplitude by more than 3 dB:

(1) The results of the performance verification shall be noted in the data for the examinations performed since the last valid verification.

(2) Indications recorded since the last valid calibration verification shall be re-evaluated by the Data Analyst to determine acceptability.

(3) If the Data Analysts determines that an flaw requires re-examination, the affected area shall be reexamined.

If any system sensitivity verification shows that a reference signal has decreased in amplitude by more than 4 dB:

(1) The results of the performance verification shall be noted on the data and calibration records for the examinations performed since the last valid sensitivity verification.

(2) The data analyst will perform a 128-element check as defined in Paragraph 5.2 to determine if any of the elements have failed or degraded. If it is determined that 2 or less receiving or 2 or less pulsing elements have failed, the examination data may be accepted without further evaluation.

(3) If it is determined that the loss of sensitivity is attributed to failure of more than 2 receiving or 2 pulsing elements (or any other system parameter), then the data recorded since the last valid verification shall be re-evaluated by the Data Analyst in an attempt to determine when the loss in sensitivity occurred.

(4) If the Data Analyst can determine when the change in system sensitivity occurred and that the data recorded prior to that change has adequate sensitivity (within 7 dB of reference), that data shall be accepted.

(5) If the Data Analyst determines that any portion of the data recorded since the last valid sensitivity verification did not have adequate sensitivity (within 7 db of reference), the data shall be voided, the system sensitivity shall be corrected, and the affected areas shall be reexamined.

6.6 Supplemental Examinations

Supplemental examinations with different equipment and or instrument settings may be performed in order to facilitate evaluation or analysis of the data. The results of supplemental examinations may not be used to overturn the results obtained with the primary qualified techniques or be used to claim additional coverage.

7.0 DATA ANALYSIS FOR FLAW DETECTION AND LENGTH SIZING

7.1 Pre-Analysis Verification

Prior to analyzing data, the Data Analyst shall ensure the quality of the data by verifying the following:

(1) Load data and apply the ISwT_DM_Detection.rst. This .rst file contains the appropriate layouts and measurement tools to perform the data quality checks and length sizing measurements.

(2) Ensure all volume corrected views are in the projection mode and not linked.

(3) Activate each pane and ensure that all measurement units are set to inches, with two decimal places of precision and the Usound is set to "True Depth."

(4) Under the pane "Edit Panes Properties" icon select the "parameters" tab and verify that all parameter inputs are correct (sound velocity, delay, offsets, skew angles, etc.).

(5) In all the volume corrected displays adjust the cursors to envelop the entire scan area.

(6) Adjust the amplitude color palette range to provide resolution of the various reflectors throughout the scan in order to provide optimum image contrast and ensure that the flaw(s) are not masked with the background noise.

(7) After evaluating the overall examination data quality adjust the gates to display specific regions of the weld length or volume that contains the indications or geometric reflectors, if any.

(8) For each channel, analyze the volumetric images to observe the echo dynamic patterns from the VC (D) and VC (B) panes to determine that sufficient data is available to perform analysis.

(9) Ensure all data has been collected in accordance with requirements of this procedure and all the essential variables have been verified.

(10) Ensure all required examinations have been performed and scan limitations documented.

(11) Ensure the necessary data records and required scan area per the examination plan specified in 6.1 has been covered.

(12) The 0° profilometry data, thickness, contours, and previous data shall be utilized in the evaluation of the data.

(13) Ensure adequate search unit contact has been achieved. Isolated instances of lack of contact may be accepted provided that no more than 2 adjacent acquisition positions are void of data and the area does not contain flaws or suspected flaw indications that require evaluation.

(14) The Overall data quality shall be evaluated as described above, in addition to these requirements the data must be free from internal system or external noise in the data that may have a detrimental effect on this procedures flaw detection and sizing capabilities

(15) Areas that do not meet the acceptance criteria stated above shall be reexamined and evaluated to the requirements of this section. If a second examination does not achieve acceptable data, the amount of missed coverage shall be documented as a limitation and reported to the customer.

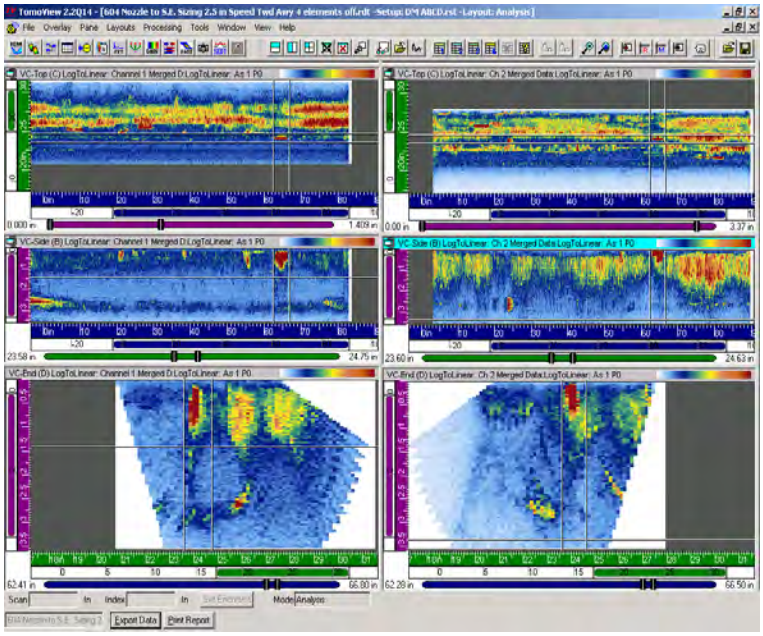
(16) The necessary data records and required scan area per the examination plan specified in 6.0 has been covered.

7.2 Data Analysis

(1) Load the appropriate data file.

(2) Load the *ISwT_DM_Detection.rst*

ISwT_DM_Detection.rst



The *"ISwT_DM_Detection.rst"* file provides real time dual channel correlation for flaws and or geometric benchmarks and should be used when analyzing merged data.

(3) Ensure that each channel has been fully merged.

(4) In all the volume corrected displays adjust the cursors to envelop the entire scan area.

(5) Adjust the amplitude color palette range to provide resolution of the various reflectors throughout the scan in order to provide optimum image contrast and ensure that indications are not masked with the background noise.

(6) After evaluating the overall examination for areas that exhibit deviation from the component geometrical or metallurgical interface responses adjust the gates to display specific regions of the weld length or volume for further pattern interpretation.

(7) For each channel, analyze the volumetric images to identify areas that exhibit deviation from the component geometrical or metallurgical interface responses. Only patterns from the VC Top (C) pane that exhibit echo-dynamics in the VC (B) pane shall be considered flaw. The following conditions should be considered for classification of flaw versus geometrical indications.

7.3 Discrimination of Geometric Benchmarks

All suspect indications, regardless of amplitude, shall be investigated to the extent necessary to determine accurate characterization of the nature of the indication. The 0° profilemetry data, thickness, contours and previous data may be utilized in analyzing the detection data.

Indications that are determined to originate from surface configurations or variations in metallurgical structure of materials may be classified as geometric indications. Such indications need not be characterized as originating from flaws and flaw sizing and comparison of reflector causing the indication with the allowable flaw standards of IWA-3000 is not required. The location of the reflector causing a geometric indication shall be recorded.

The following conditions shall be considered for determination of geometric indications due to surface conditions and/or metallurgical conditions.

(1) The indication can be seen across the entire length of the scan (either continuously or intermittently) at consistent amplitude and position responses.

(2) The indication possesses very little or no echo dynamic travel in the depth direction.

(3) The indication appears at or near one of the weld acoustic interfaces.

(4) Similar indications can be seen at varying amplitudes along the weld length intermittently.

7.4 Discrimination of Flaws

The following conditions shall be considered for determination of flaw indications:

(1) The indication has a high signal-to-noise ratio. Raising the upper and lower amplitude thresholds of the color palette and observing signal-to-noise ratio contrast across the length of the component can support this.

(2) The indication response is isolated from, or exhibits greater echo dynamics than, common geometrical benchmark responses identified in 7.3.

(3) The indication has defined start and end points.

(4) The indication possesses echo dynamic responses indicating reflector depth. Due to flaw orientation this information may be displayed as a significant pattern of response displayed below inside surface.

(5) The indication can be confirmed from the opposite direction.

(6) The indication response is repeatable during additional or supplemental scans.

(7) It may be necessary to zoom the area of interest in the VC Top View display achieve sufficient resolution of flaw locations.

(8) In areas of lift-off or geometric benchmarks, it may also be necessary to scroll through the individual scan rows using the "Single Plane", linked to Ref. Cursor" option in the "Echo Dynamics" tab.

7.5 Flaw Location

(1) After a flaw has been identified, the X and Y locations of the flaw shall be determined as follows:

(a) Axial Flaws Y Location = ((Y2 – Y1) / 2) +Y1

(b) Axial Flaws Y Location = Y Max Amplitude

(c) Axial Flaws (Oriented) X Location = ((X2 – X1) / 2) + X1

(d) Circumferential Flaws X Location = ((X2 – X1) / 2) + X1

(e) Circumferential Flaws Y Location = Y Max Amplitude

(f) Circumferential Flaws (Oriented) Y Location = ((Y2 – Y1) / 2) + Y1

(2) For axial flaws, a hysteresis correction shall be applied to locate the flaw at the proper Y- location.

(3) If the flaw is only observable from one direction, the location coordinates shall be determined from that observation.

(4) If the flaw is observable from two opposite directions, the flaw location coordinates shall be determined using an average from both observations.

7.6 DATA ANALYSIS FOR LENGTH SIZING

(1) Initial Length measurements may be obtained using the A-scan, the volume corrected (VC)-side (B-scan), VC –Top (C-scan) and the VC-End (D-scan) views. Length sizing shall be performed using the vertical or horizontal echo-dynamic curve histograms. The "Slice between Reference and Measure Cursors" shall be selected under the echo-dynamics tab. The flaw shall be completely bound using the Reference and Measure Cursors.

(2) Length Final Length measurements shall be determined by measuring the ¼ max points as determined by the;

horizontal histogram associated with the VC-Top (C-Scan) view with a full merge of angles 60° through 88° for circumferential flaws, and

vertical histogram associated with the VC-Top (C-Scan) view with a full merge of angles 60° through 88° for axial flaws.

(3) If the flaw is observable from two opposite directions, the flaw length measurement shall be the longer of the two measurements.

7.7 DEPTH SIZING

Depth sizing of inside surface connected flaws shall be performed in accordance with procedure ISwT-PDI-UT-12, "Automated Inside Surface Ultrasonic Flaw Depth Sizing of Piping Welds Using Phased Array" (Latest Revision).

7.8 Embedded Flaws

(1) This procedure has not been demonstrated to detect or size embedded flaws, which are considered fabrication related. However, indications such as lack of fusion or slag inclusions may be detected with this procedure. When significant fabrication flaws are detected and where they appear to have measurable dimension an estimate of flaw size will be made and reported using the data collected with this procedure.

(2) Using the data collected with this procedure evaluate the flaw to determine if the flaw exhibits planar characteristics the height of the flaw will be estimated with tip diffraction techniques. The examiner must determine which zone (Lower 1/3, Middle 1/3, or Upper 1/3) the embedded flaw is located. Once this zone is determined the focal law that resolves the flaw extremities the best shall be used for the measurement. If additional data is required supplemental data taken in accordance with procedure ISwT-PDI-UT-12 may be applied.

(3) If the flaw exhibits volumetric characteristic, but no tip signals are observed the height of the flaw will be estimated using the 6dB drop method.

(4) The length of the flaw will be estimated at the level at which it is detectable above the noise level.

8.0 EXAMINATION DATA RECORD(S)

All data within the specified examination volume shall be recorded using the UltraVision software regardless of time and amplitude. All examinations will be recorded on an electronic recording media (e.g., CD, internal hard drive, external hard drive, etc.). Additionally, as a minimum, the following examination data shall be recorded:

(1) Recording equipment

(2) Data sheet identification and date and time period of examination

(3) Names and certification levels of examination personnel

(4) Examination procedure and revision

(5) Calibration sheet identification

(6) Examination area identification

(7) Surface from which the examination is conducted

(8) Identification and location of the weld and volume scanned

(9) Examination results

(10) Flaw identification, location, and sizing measurements (as applicable)

9.0 DATA COMPARISON

In-service examination results shall be compared with available records from previous examinations (PSI, ISI, special examinations, etc.). As a minimum, the following steps shall be performed:

(1) Review prior data to determine the existence and location of flaw indications.

(2) Compare the location and length dimension of flaw indications.

10.0 REPORTING

Flaw location, length, and orientation shall be reported to the customer in accordance with the customer's reporting procedures. Final disposition of the flaw indication shall be the customer's responsibility.

11.0 RECORDS

Records produced in accordance with this procedure shall be provided to and stored by the customer. The electronic data shall be provided to the customer for storage and will be placed on a media specified by the customer.

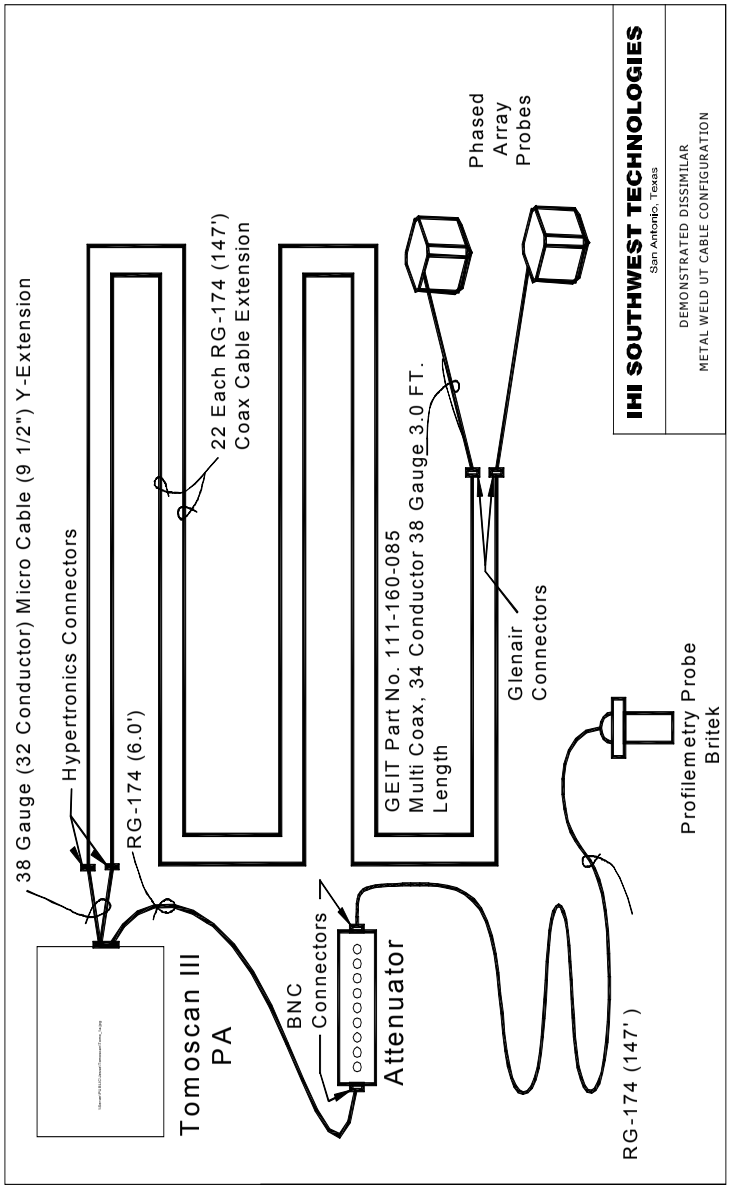


Figure 1. Cable Configuration

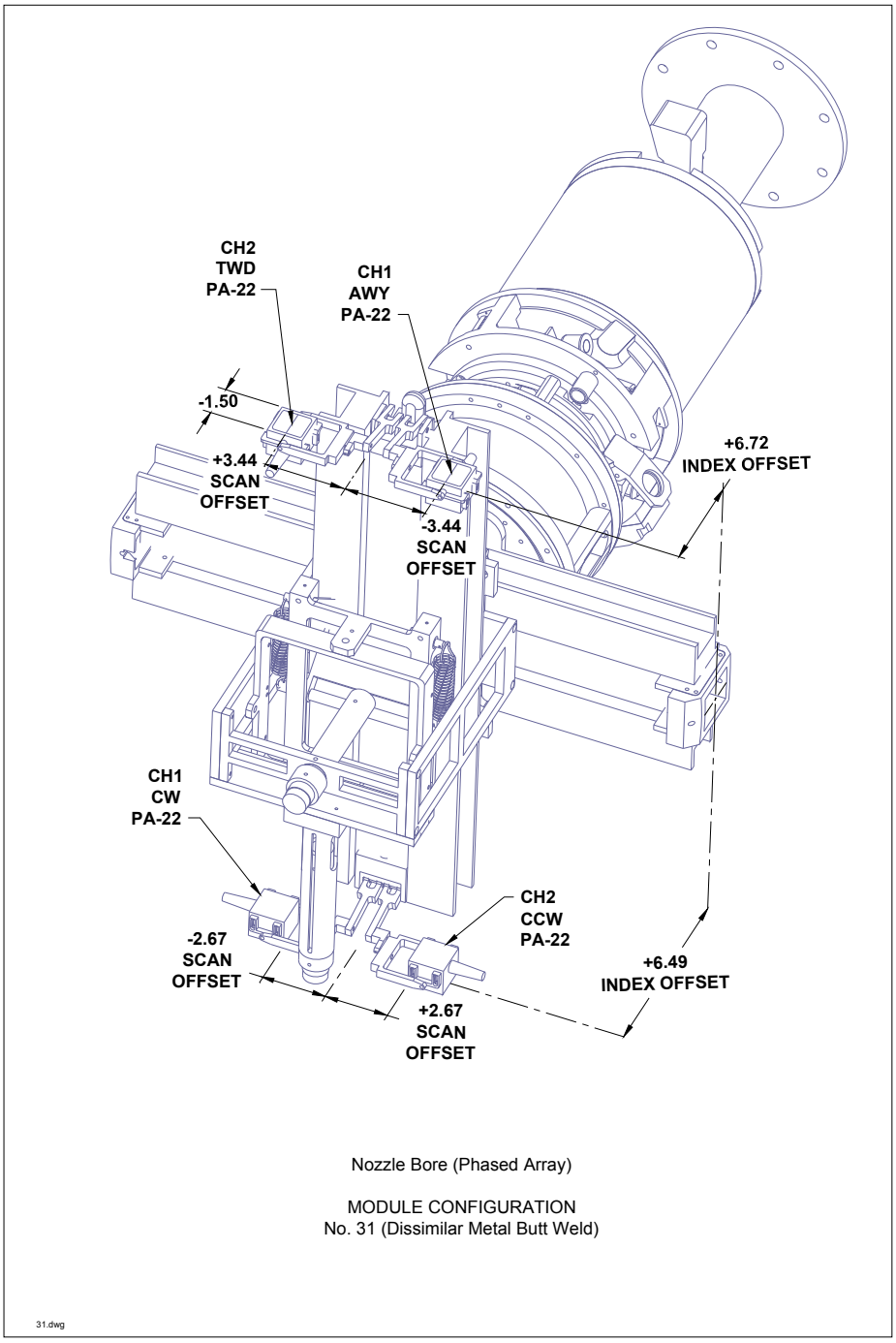
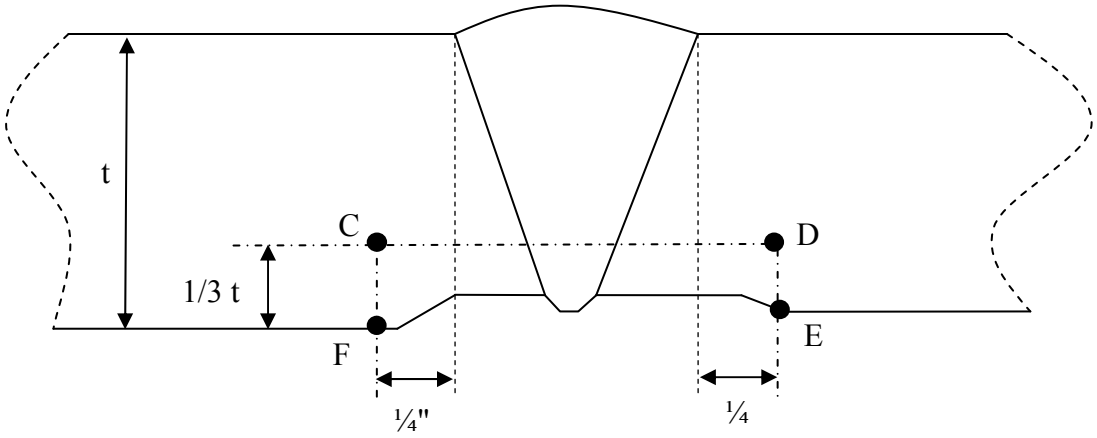
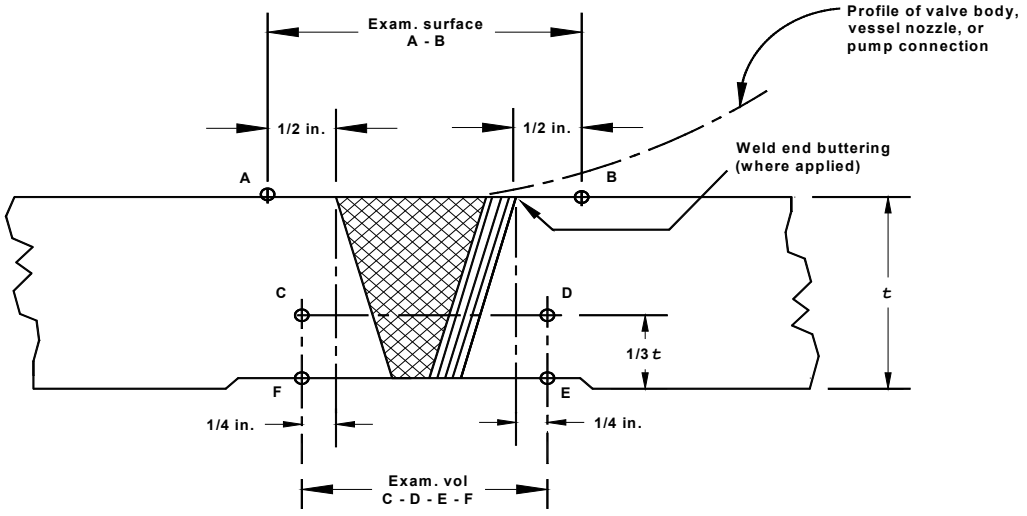


Figure 2.
Module Configuration for Circumferential and Axial Flaws



ASME Section XI Examination Volume for Similar Metal Piping Welds C-D-E-F



Note: When weld end buttering is present on both sides, the examination surface and volume shall be measured from the end of both butterings. It may include remnants of replaced welds and, may appear artificially deep on exposed surfaces due to fabrication processes. Buttering thickness may be determined from manufacture's drawings or presumed to be ½", if the true dimension is unknown.

Figure 3. Examination Volume

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

Site/Plant :		**Weld Identification:**		**Pro/Rev/Chg/ICN:**	**Examination No.:** N/A
Project No.:		**Weld Description:**		**Device Configuration:**	
Mod.Conf.:		**Scan Path Drawing:**		**Exam Date** / **Examination Time** Start / End	**Surface Temperature °F** Start / End
Data Acquisition Operator (s) / SNT Level:					

Data Acquisition

Scan Controller Parameters		**Increment Axis/Arm**	**Planned**	**Actual**	**Scan Axis/Device**	**Planned**	**Actual**	**Positional Parameters**
Controller:	TACS	Lower Limit			Lower Limit			Beam Direction:
Scan:	Drive Car	Upper Limit			Upper Limit			Index Overlap:
Increment:	Arm	Increment Interval			DCI			Number of Scans:
Mode:	Manual	Conversion Counts			Conversion Counts			
Scan Motion:	Bi-directional	Conversion Units In.			Conversion Units In.			
Correction:	N/A	O.D. Radius In.						

Module Parameters: -Y

	Status	**Angle**	**Direction**	**Scan Offset**	**Step Offset**
Channel 1	On				
Channel 2	On				
Channel 3	Off	N/A	N/A	N/A	N/A
Channel 4	Off	N/A	N/A	N/A	N/A
Channel 5	Off	N/A	N/A	N/A	N/A
Channel 6	Off	N/A	N/A	N/A	N/A
Channel 7	Off	N/A	N/A	N/A	N/A
Channel 8	Off	N/A	N/A	N/A	N/A

Calibration Records:

Examination Notes:

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop

Recordable Indications

	Yes	No	N/A
Channel 1	☐	☐	☐
Channel 2	☐	☐	☐
Channel 3	☐	☐	☐
Channel 4	☐	☐	☐
Channel 5	☐	☐	☐
Channel 6	☐	☐	☐
Channel 7	☐	☐	☐
Channel 8	☐	☐	☐

Analyst Remarks

Attachment: ☐ Yes ☐ No

Further Evaluation Required: ☐ Yes ☐ No

Archive Tape/CD No.: External HD 1 & 2

Analysis Tape/CD No.: External HD 1 & 2

Analyst / SNT Level / Date:

Figure 4. Examination Plan Sample

Table 4
T-III SETTINGS
Angle Beam Channels 1 & 2

Setup Parameter	Setting	Essential Parameter
Law Calculator:		
All Laws	Checked	Yes
Interleaved	Unchecked	Yes
Linear	Unchecked	Yes
General:		
Gain:		
Channel Gain	0	Yes
Focal Law Gain	14dB	Yes
Booster (25db)	N/A	No
Apply	14dB	Yes
Ref.	0dB	Yes
Auto Set	N/A	No
Set Reference	Not Used	Yes
Reset Focal Law	Not Used	Yes
Time Base:		
Start	0.00	Yes
Range	Reference Paragraph 5.5	Yes
Mode	Half Path for Calibration	Yes
	True Depth for Acquisition	Yes
Full Range	Not Used	Yes
Set Range	N/A	Yes
Auto Values:		
Reference Amplitude	Not Used	Yes
Full Range Start	Not Used	Yes
Full Range	Not Used	Yes
Auto Values	Not Used	Yes
Calibrate	Not Used	Yes
Gate:		
Default Settings	Not Used	Yes
DAC:		
Default Settings	Not Used	Yes
Digitizer:		
Digitizing Frequency	25 MHz	Yes
Averaging	8	Yes
Recurrence	Set to maximum allowable by the system by entering a value such as 100000	Yes
Acquisition Rate (Hz)	Press Maximum Button	Yes
Data Sample Size	12 bits	Yes
Samples	Default	Yes
Resolution	Set data compression to a maximum value that yields a resolution of 0.04 inch or less	Yes
Data:		
Syncro	Pulse	Yes
A-scan	Checked	Yes
A-scan Video	Unchecked	Yes
Multi-Peak	Unchecked	Yes
Compression	Set data compression to a maximum that yields a resolution of .04 inch or less	Yes

Table 4 (Cont.)
T-III SETTINGS (CONT.)
Angle Beam Channels 1 & 2

Setup Parameter	Setting	Essential Parameter
Multi-Peak:		
Source	N/A	No
Quantity	N/A	No
Threshold	N/A	No
Pulser Receiver:		
Configuration:	Phased Array Pulse Echo	Yes
Pulser:		
Element Number	1	Yes
Voltage (all channels)	200v	Yes
Pulse Width	333 ns for 1.50 Mhz Probe	Yes
Receiver:		
Element Number	N/A	Yes
Receiver	N/A	Yes
Pulser	Checked	Yes
Scale Type	LIN for System Ops.	
	Log for Acquisition	Yes
Rectification	Bipolar for System Ops.	
	Unsigned in log for Acquisition	Yes
Filters:		
High Pass	0.5 MHz (only in LIN)	Yes
	No filter for Acquisition	Yes
Low Pass	5.0 MHz (only in LIN)	Yes
	No filter for Acquisition	Yes
Smoothing	Digital	Yes
Probe:		
Material and Interface:		
Wave Type	Longitudinal	Yes
Sound Velocity	0.2271 in/us	Yes
Wedge Delay	As required for accurate time base	Yes
Selection:		
Show Total	Checked	No
Modify Probe	Unchecked	No
Modify Law	Unchecked	No
T and R	Information Field Only	No
Probe Name	Probe Serial Number	No
Position:		
Scan Axis Offset	As required based on Examination Plan	Yes
Index Axis Offset	As required based on Examination Plan	Yes
Adjust Resolution	N/A	No
Beam Orientation:		
Refracted Angle	Defined by Focal Law	Yes
Skew Angle	As required based on Examination Plan	Yes
Alarms:		
Default	Not Used	No
I/O:	All Boxes Unchecked (Not Used)	Yes
Sequence Parameters:		
All Entries	As required based on Examination Plan	Yes
Encoder:		
All Entries	As required based on Examination Plan	Yes

Table 5
T-III SETTINGS
0° Profilemetry Channel 3

Setup Parameter	Setting	Essential Parameter
Law Calculator:		
All Laws	Checked	Yes
Interleaved	Unchecked	Yes
Linear	Unchecked	Yes
General:		
Gain:		
Channel Gain	0	Yes
Focal Law Gain	6 dB	Yes
Booster (25db)	N/A	No
Apply	6 dB	Yes
Ref.	0dB	Yes
Auto Set	N/A	No
Set Reference	Not Used	Yes
Reset Focal Law	Not Used	Yes
Time Base:		
Start	0.00	Yes
Range	3.00 in True Depth	Yes
Mode	True Depth for Acquisition	Yes
Full Range	Not Used	Yes
Set Range	N/A	Yes
Auto Values:		
Reference Amplitude	Not Used	Yes
Full Range Start	Not Used	Yes
Full Range	Not Used	Yes
Auto Values	Not Used	Yes
Calibrate	Not Used	Yes
Gate:		
Default Settings	Not Used	Yes
DAC:		
Default Settings	Not Used	Yes
Digitizer:		
Digitizing Frequency	25 MHz	Yes
Averaging	8	Yes
Recurrence	Set to 2000 Hz	Yes
Acquisition Rate (Hz)	Press Maximum Button	Yes
Data Sample Size	12 bits	Yes
Samples	Default	Yes
Resolution	Set data compression to a maximum value that yields a resolution of 0.04 inch or less	Yes
Data:		
Syncro	Pulse	Yes
A-scan	Checked	Yes
A-scan Video	Unchecked	Yes
	Multi-Peak Unchecked	

Table 5 (Cont.)
T-III SETTINGS (CONT.)
0° Profilemetry Channel 3

Setup Parameter	Setting	Essential Parameter
Multi-Peak:		
Source	N/A	No
Quantity	N/A	No
Threshold	N/A	No
Pulser Receiver:		
Configuration:	Phased Array Pulse Echo	Yes
Pulser:		
Element Number	123	Yes
Voltage (all channels)	200v	Yes
Pulse Width	222 ns for 2.25 MHz Probe	
Receiver:		
Element Number	N/A	Yes
Receiver	N/A	Yes
Pulser	Checked	Yes
Scale Type	LIN for System Ops.	
	Log for Acquisition	Yes
Rectification	Bipolar for System Ops.	
	Unsigned in log for Acquisition	Yes
Filters:		
High Pass	0.5 MHz (only in LIN)	Yes
	No filter for Acquisition	Yes
Low Pass	5.0 MHz (only in LIN)	Yes
	No filter for Acquisition	Yes
Smoothing	Digital	Yes
Probe:		
Material and Interface:		
Wave Type	In Wedge	Yes
Sound Velocity	0.0580 in/us	Yes
Wedge Delay	As required for accurate time base	Yes
Selection:		
Show Total	Checked	No
Modify Probe	Unchecked	No
Modify Law	Unchecked	No
T and R	Information Field Only	No
Probe Name	Probe Serial Number	No
Position:		
Scan Axis Offset	As required based on Examination Plan	Yes
Index Axis Offset	As required based on Examination Plan	Yes
Adjust Resolution	N/A	No
Beam Orientation:		
Refracted Angle	Defined by Focal Law	Yes
Skew Angle	As required based on Examination Plan	Yes

Enclosure 10

Procedure N-UT-64

NPG Nondestructive Examination Procedure	**GENERIC PROCEDURE FOR THE ULTRASONIC EXAMINATION OF AUSTENITIC PIPE WELDS** **W47 151023 004**	**N-UT-64** **Rev. 0016** **Page 1 of 8** Quality Related ☑ Yes ☐ No Effective Date 10-27-2015

Level of Use: Reference Use

Prepared by: Matt Welch

Reviewed by:	S. Alex Zipperer S. Alex Zipperer, TVA UT LIII	10-23-2015 Date
Approved by:	Jane M. Lockwood Jane M. Lockwood, Prog Mgr Operations, ISO	10-23-2015 Date

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
0	2/14/97		Initial Issue.
1	8/15/97		Revised to incorporate latest revision of generic PDI 8/15/97 qualified procedure.
2	8/2/00		Revised to Incorporate TC-00-11.
3	5/24/01		Revised procedure to Rev. C and denote the 1955 ASME Section XI Edition with Addenda through 1996. Incorporates TC 00-14.
4	9/17/01		Revised to clarify requirements for Category R-A, Risk-informed piping welds that are subject to thermal fatigue. Added note to Attachment 1, paragraph 5.1.1 and Figure 1. Also added acceptance standards for Category R-A.
5	2/8/02		Revised to incorporate TC 00-18 and 00-21.
6	9/5/03		Revise to incorporate TC 02-12.
7	2/4/04		Revise to remove “Note” from section 1.0 for the examination of dissimilar metal (DM) welds.
8	2/9/06		Revise to change Section XI Code year reference to the 2001 Edition through the 2003 Addenda. Removed the PDI Generic procedure. Added Section 9.0 and Figure 1A.
9	9/1/06		Incorporate TC-06-13, Revised p.2.4 to remove reference document N-GP-28 and add reference document N-GP-31.
10	10/25/07		General Update to TVA Procedure Template. EDMS W47 071026 006
11	3/5/08		Changed EPRI’s email address, deleted N-GP-28 and added N-GP-31, and minor grammatical changes. EDMS W47 080307 011

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
12	11/16/12		Added comment and removed reference to N-GP-28 and added N-GP-31 in paragraph 1.0, changed ASME XI Code reference in paragraph 2.0 F, and clarified paragraphs 7.0 and 8.0. Incorporated TC 12-08. Corrected reference nomenclatures. EDMS W47 121107 002
13	06/11/13		Procedure clarification and enhancement. Added Reference 2.0F. Revised paragraphs 1.0, 5.0, 7.0 and 8.0. Ref: PER 730859 EDMS W47 130610 001
14	07/29/14		Added Paragraph 5.0 to allow use of the alternative basic calibration block defined in N-GP-18 (PER 833069) EDMS W47 140718 001
15	03/09/15		Revised to incorporate PER 892287 action. Added Section 7.0.
16	10/27/15		Revise to include Section XI Code year reference to the 2001 Edition through 2007 with 2008 Addenda. Added Note to 8.0. Deleted reference to “special draw bead welds” in 1.0. General editorial and reference changes. EDMS # W47 151023 004

Table of Contents

1.0 SCOPE

This procedure implements the methods, equipment, and technique for manual contact ultrasonic examination from the O.D. surface of full penetration, wrought, austenitic piping welds. This procedure is qualified to piping weld diameter and thickness ranges specified in the PDI Generic Procedure for field applications. This procedure shall be used in conjunction with procedures N-GP-18, N-GP-29, and N-GP- 31 as applicable. This procedure shall be used by personnel qualified by the PDI program for the examination of austenitic pipe welds. This procedure includes qualification for manual contact examination for the detection of intergranular stress corrosion cracking (IGSCC).

This procedure may also be used for SS cast material. When performing examinations on SS Cast material, refracted longitudinal search units shall be used applying the techniques and equipment required by PDI-UT-2 for the material thickness being examined.

2.0 REFERENCES

A. N-GP-18, “Ultrasonic Examination Supplements”.

B. N-GP-21, “Evaluation and Resolution of Ultrasonic Data”.

C. N-GP-8, “Weld Reference System”.

D. N-GP-31, “Calculation of ASME Code Coverage for Section XI”

E. N-GP-29, “Approved Appendix VIII Ultrasonic Equipment”.

F. IEP-100, “Administration of Nondestructive Examination (NDE) Procedures

G. Section XI of the ASME Code, 2001 Edition through 2007 with 2008 Addenda as amended by 10CFR50.55a.

H. 10CFR 50.55a, as amended by the Federal Register Notice, Vol.76, No. 119, dated June 21, 2011

I. EPRI Summary Report “TVA Procedure N-UT-33 Equivalency for Cast Stainless Steel" RIMS # L18 121002 800

J. Code Cases: BFN Units 1, 2, and 3; N-577. SQN Units 1 and 2; N-716-1. WBN Unit 1; N-578-1.

3.0 PERSONNEL REQUIREMENTS

A. Personnel certification requirements are contained in procedure N-GP-18.

B. Personnel shall have a valid Appendix VIII qualification for UT examination of austenitic piping welds.

4.0 EQUIPMENT

The latest qualified equipment system combinations (Table 1) and optimum ultrasonic instrument settings (Table 2) shall be obtained from the EPRI Web site (http://epriq.com/) prior to performing examination activities. N-GP-29 contains additional guidance regarding verification of equipment and instrument settings.

5.0 ALTERNATIVE CALIBRATION BLOCK

In addition to the calibration blocks described in PDI-UT-2, the Alternative Basic Calibration Blocks described in N-GP-18 may be utilized, as applicable.

6.0 TECHNIQUE

Technique and examination requirements contained in Generic PDI Procedure, PDI-UT-2 shall be used.

7.0 EVALUATION

The process for evaluation of indications and subsequent resolution of acquired data, shall as a minimum, follow the requirements delineated in N-GP-21, “Evaluation and Resolution of Ultrasonic Data” (Reference 2.0B).

8.0 ACCEPTANCE STANDARDS FOR FLAWS

The acceptance standards of ASME Section XI shall be as follows:

A. Code category B-J — IWB-3514 See Note 1 for 07E/08A

B. Code category C-F-1 — IWC-3514 See Note 1 for 07E/08A

C. Code Category R-A — IWB-3514 See Note 1 for 07E/08A

D. This procedure shall be used to examine any code category weld susceptible to IGSCC as identified in NUREG 0313. The applicable category acceptance standards shall apply. See Note 1 for 07E/08A.

NOTE

For plants under the 2007 Edition/2008 Addenda: The acceptance standards of IWB-3514 do not apply to planer surface flaws in UNS N06600, N06082 or W86182 materials in BWR and PWR environments, or in austenitic stainless steels and associated welds in BWR environments, which are subject to stress corrosion cracking (SCC). Acceptance standards will be defined through the applicable Plant ASME Program document.

9.0 REPORTS

The format of data sheet exhibits are subject to change as required. Technical content of data forms used should contain as a minimum those listed in N-GP-18. The TVA/ISO NDE and PDI Generic Procedure numbers, revision levels, and any technical changes/applicable addenda shall be documented on the data sheet.

10.0 GENERIC PDI PROCEDURE

PDI Generic Procedure for the UT examination of Austenitic Pipe Welds, PDI-UT-2, latest revision, and any applicable addenda, shall be used. The examiner shall be responsible for verifying the latest revision and addenda prior to use.

11.0 EXAM VOLUME FOR WELDS SUBJECT TO THERMAL FATIGUE

For Category R-A, (Risk-Informed) components subject to thermal fatigue the length of exam volume shall be increased to include 1/2-inch beyond each side of the base metal thickness transition or counterbore. See Figure 1.

For components with no transition or counterbore on the ID, the exam volume shall be increased to include 1/2 inch beyond the weld toe.

If the counterbore “taper” extends beyond the increased 1/2 inch, the complete counterbore or transition area shall be examined.

Welds specified by the implementing instruction for examination under the Risk Informed program shall use the acceptance standards of IWB-3514. See 8.0 for exams under 07E/08A.

Attachment 1
(Page 1 of 1)

Similar and Dissimilar Metal Welds in Components, Nozzles, and Piping